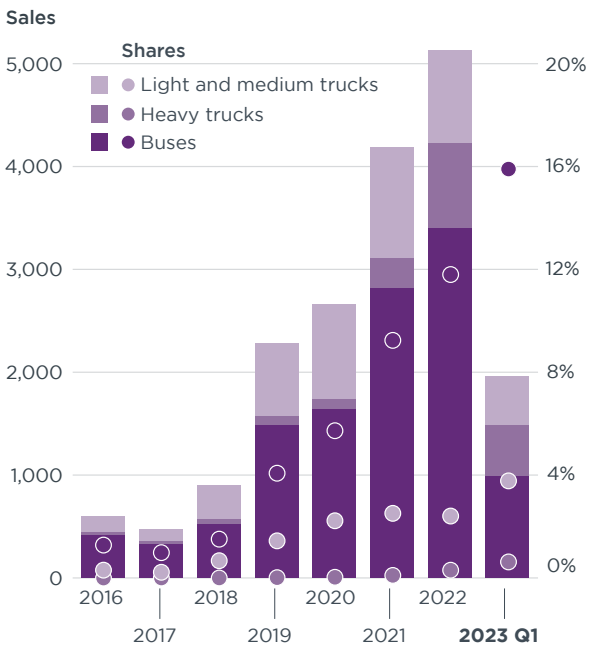
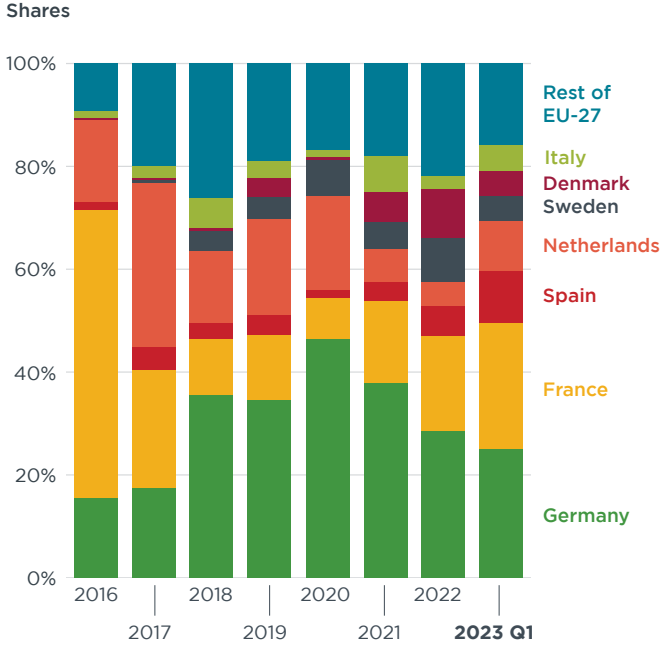
# EUROPEAN HEAVY-DUTY VEHICLE MARKET DEVELOPMENT QUARTERLY: JANUARY-MARCH 2023

EAMONN MULHOLLAND AND NICOLE EGERSTROM

**Sales of zero-emission heavy-duty vehicles by segment**




**Sales shares of zero-emission heavy-duty vehicles by Member State**




In the first quarter of 2023, just under 2,000 new zero-emission heavy-duty vehicles were sold in the EU-27, including 1,000 buses and coaches, 450 light and medium trucks, and 500 heavy trucks. Zero-emission heavy truck sales in this first quarter represented 0.6% of all sales, double the 0.3% share for the full year of 2022. Shares of zero-emission light and medium trucks reached 4% this quarter, up from 2% in 2022. Sales shares of zero-emission buses and coaches rose from 12% in 2022 to 16% this quarter. However, 23% of all city bus sales were zero-emission this quarter, while the zero-emission share for coaches and interurban buses was less than 1%.

Germany and France continue to dominate the sales of zero-emission heavy-duty vehicles, being responsible for over half the sales in the EU-27 this quarter. A notably high share of sales were in the smaller Member States of Denmark, Sweden, and the Netherlands.



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# 1. HEAVY TRUCKS

## TRUCKS WITH A GROSS VEHICLE WEIGHT ABOVE 12 TONS

Heavy trucks represent 80% of the sales of all heavy-duty vehicles. Of the 77,000 heavy trucks sold in this quarter, just 500 were zero-emission vehicles. This is more than all zero-emission heavy truck sales in 2021. The majority of these zero-emission sales were rigid body trucks, while less than 25% were tractor trailers, which is the most popular heavy-duty vehicle segment in Europe. More than half the sales of zero-emission vehicles came from Volvo Group, which consists of Volvo Trucks and Renault Trucks, even though the Volvo Group sold only one-quarter of conventional vehicles in the same period. IVECO, MAN, and DAF combined sold just 4% of Europe's zero-emission heavy trucks yet were responsible for 40% of conventional sales. Nearly one-quarter of all zero-emission heavy trucks were sold in Germany, along with roughly the same share of combustion vehicles. Denmark, Sweden, and the Netherlands accounted for 40% of zero-emission heavy truck sales in the EU-27 but less than 10% of conventional heavy truck sales.

**FIGURE 1.1**
**Sales of heavy trucks by powertrain**

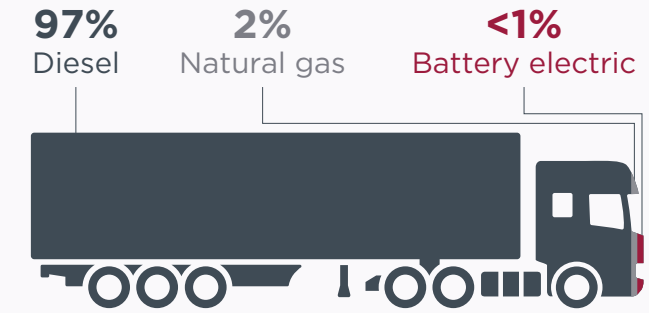


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**FIGURE 1.2**
**Sales of zero-emission heavy trucks**

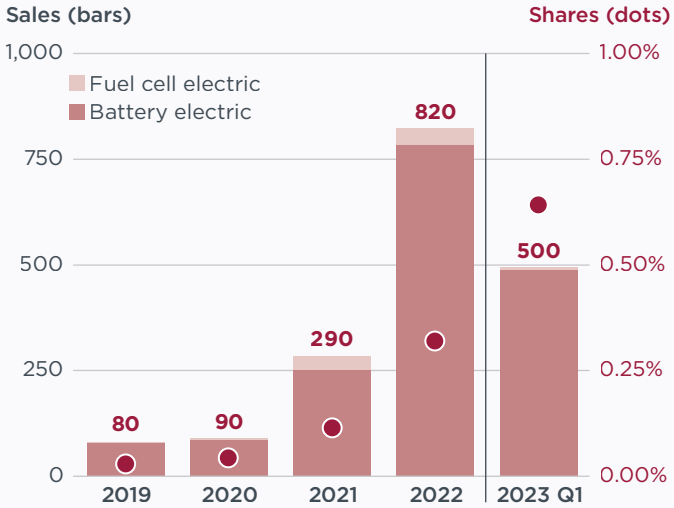


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**FIGURE 1.3**
**Sales of zero-emission heavy trucks by configuration and powertrain**

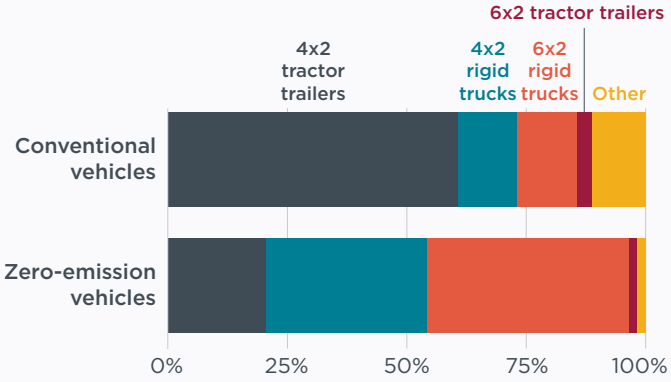


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**FIGURE 1.4**
**Sales of zero-emission heavy trucks by model and battery capacity**

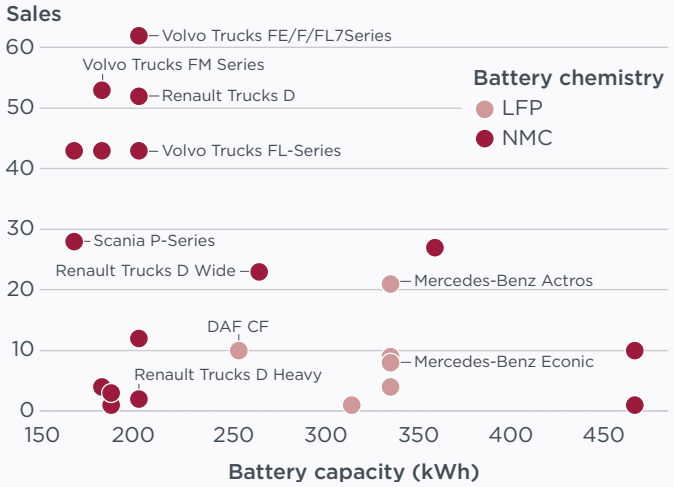


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FIGURE 1.5

**Sales of zero-emission heavy trucks by Member State**

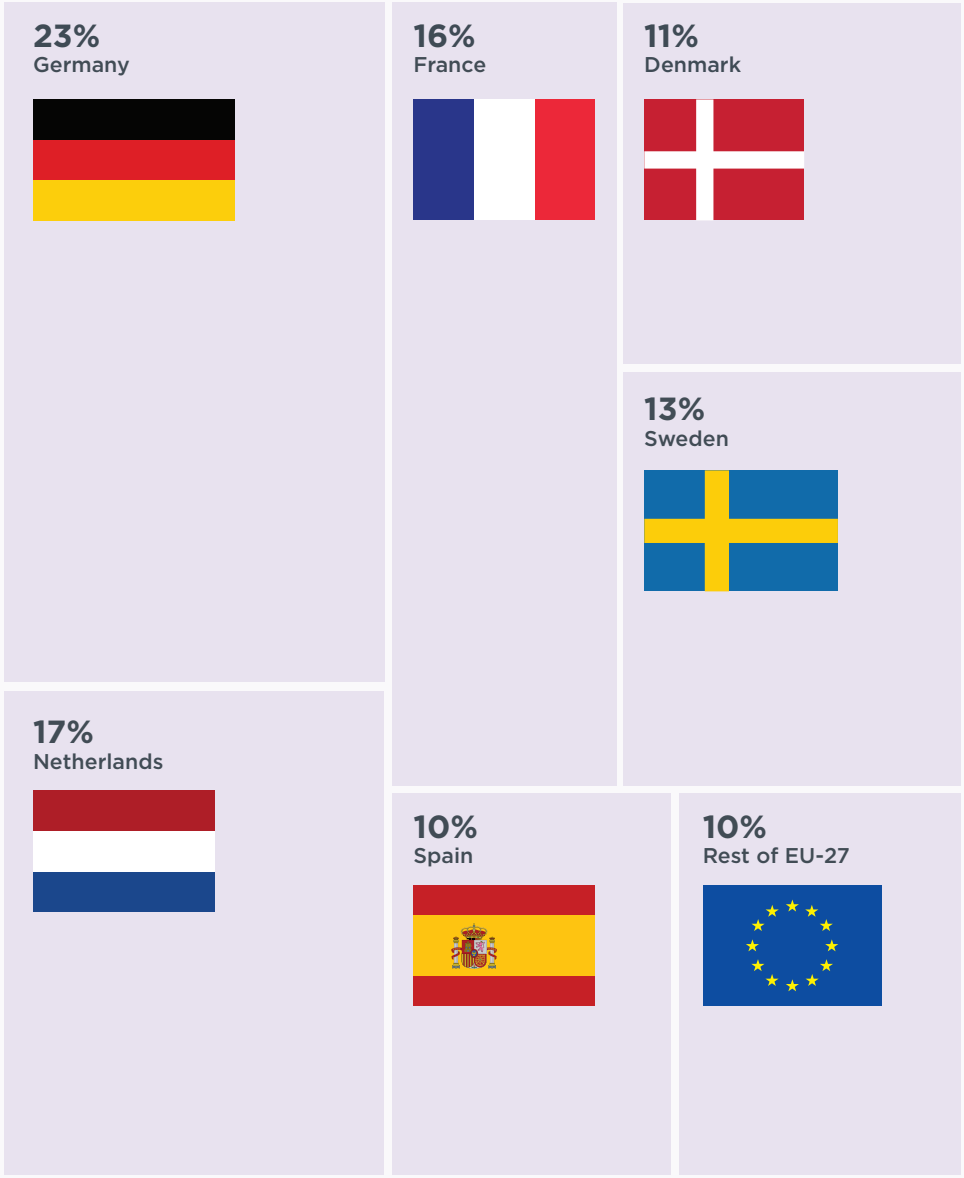


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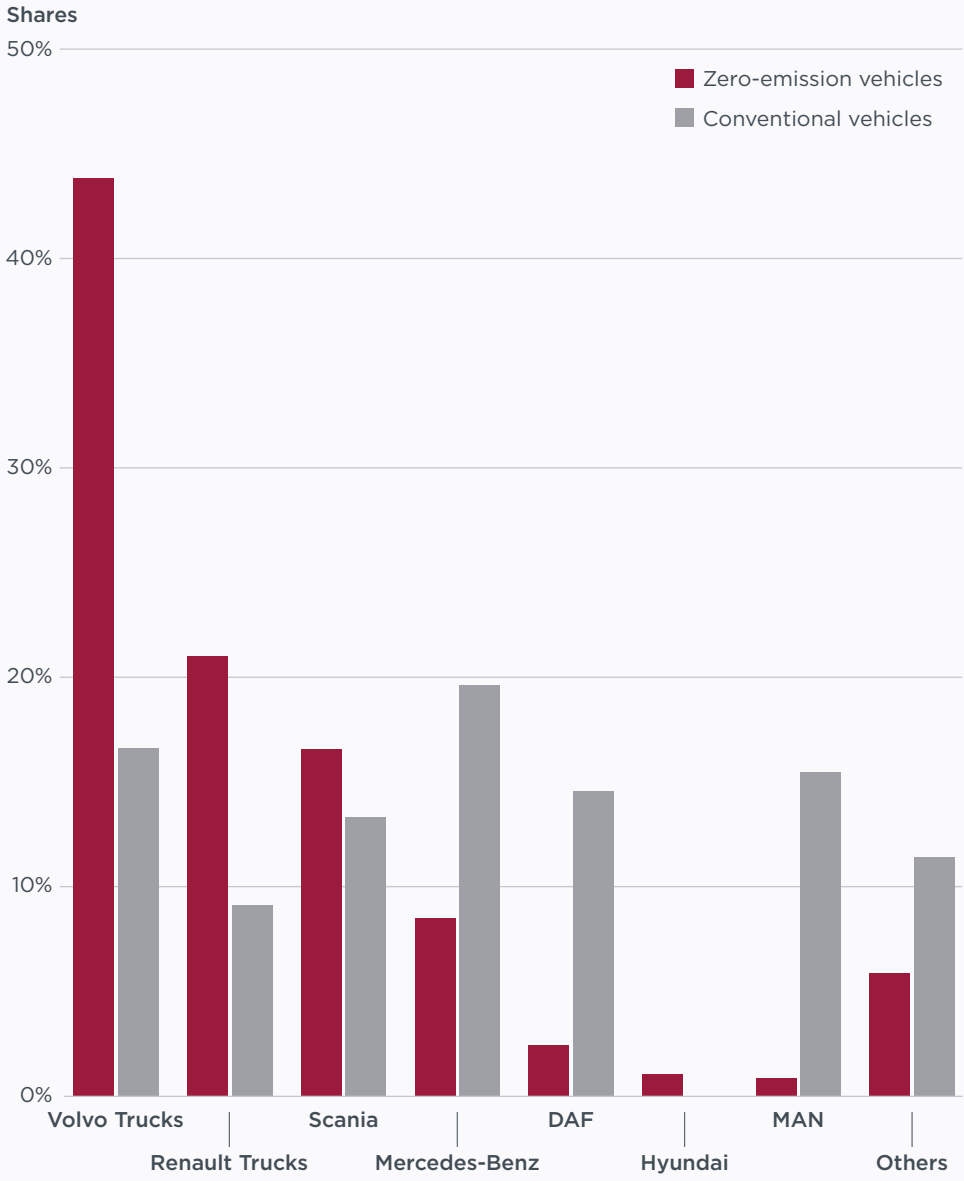
FIGURE 1.6

**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 TONS AND 12 TONS

Light and medium trucks constitute 14% of the sales of all heavy-duty vehicles. Of the 12,000 vehicles sold this quarter, 450 were zero-emission vehicles. This represents an increase in the zero-emissions sales share from 2% in the full year of 2022 to 4% this quarter. More than 80% of zero-emission vehicle sales were vans, even though vans represent only 30% of conventional vehicle sales. The majority of zero-emission vehicle sales occurred in Germany. Over half of all zero-emission vehicles were supplied by Ford. Several manufacturers produced only zero-emission light and medium trucks, such as StreetScooter, Maxus, and Bucher.

**FIGURE 2.1**
**Sales of light and medium trucks by powertrain**

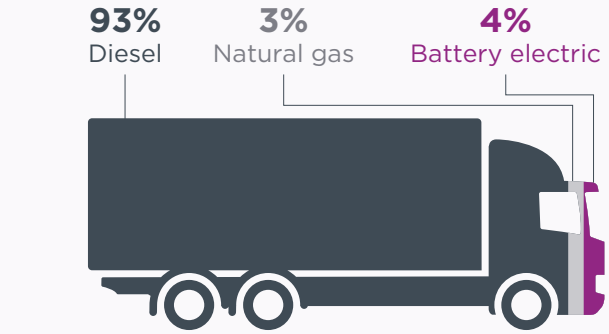


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**FIGURE 2.2**
**Sales of zero-emission light and medium trucks**

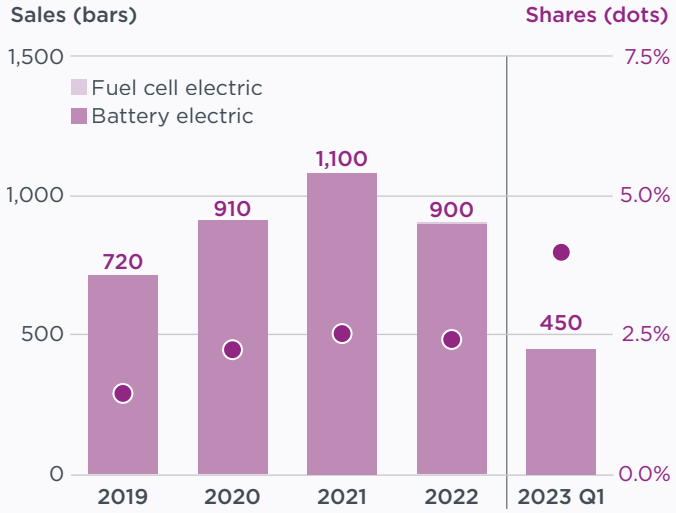


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**FIGURE 2.3**
**Sales of zero-emission light and medium trucks by configuration and powertrain**

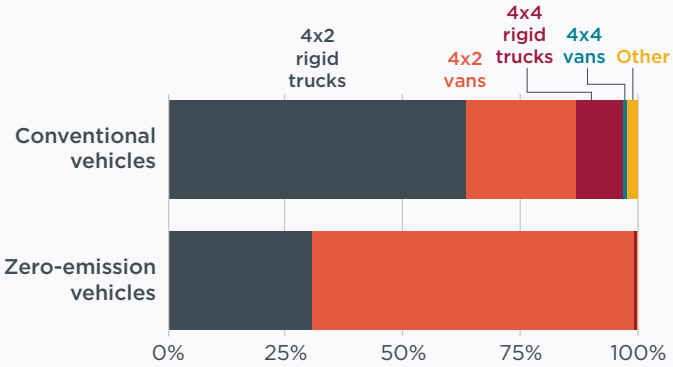


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**FIGURE 2.4**
**Sales of zero-emission light and medium trucks by model and battery capacity**

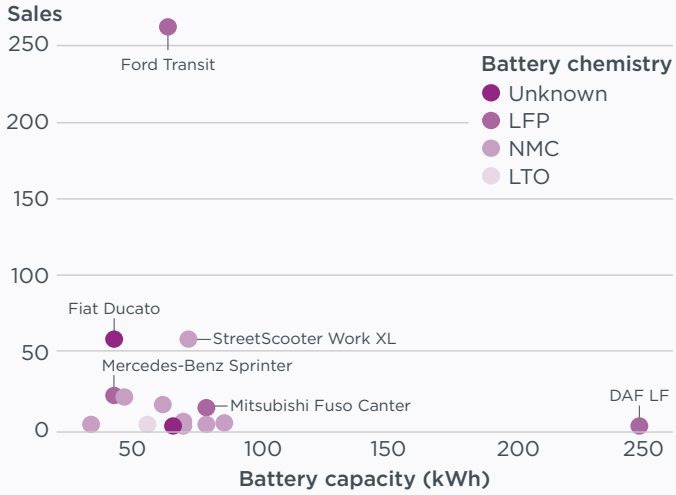


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FIGURE 2.5

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

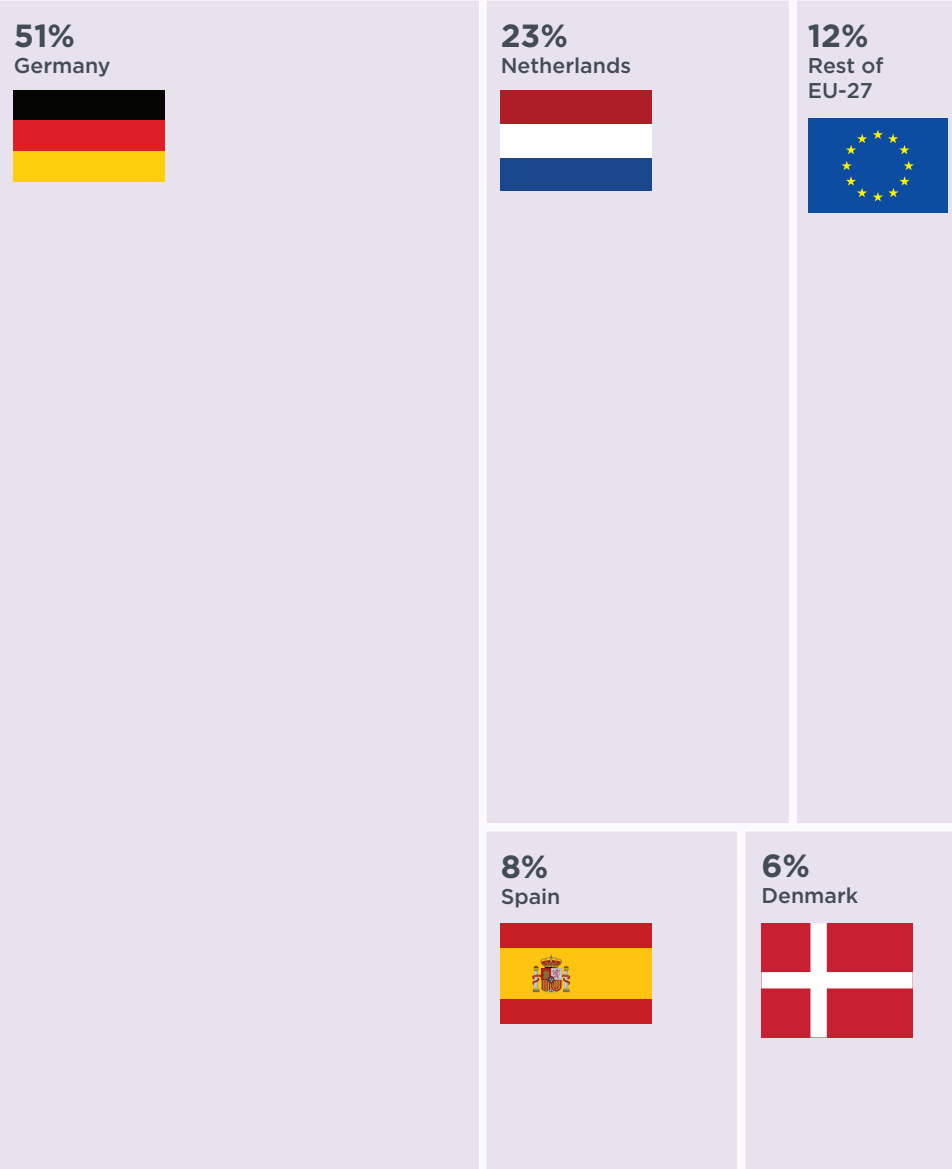


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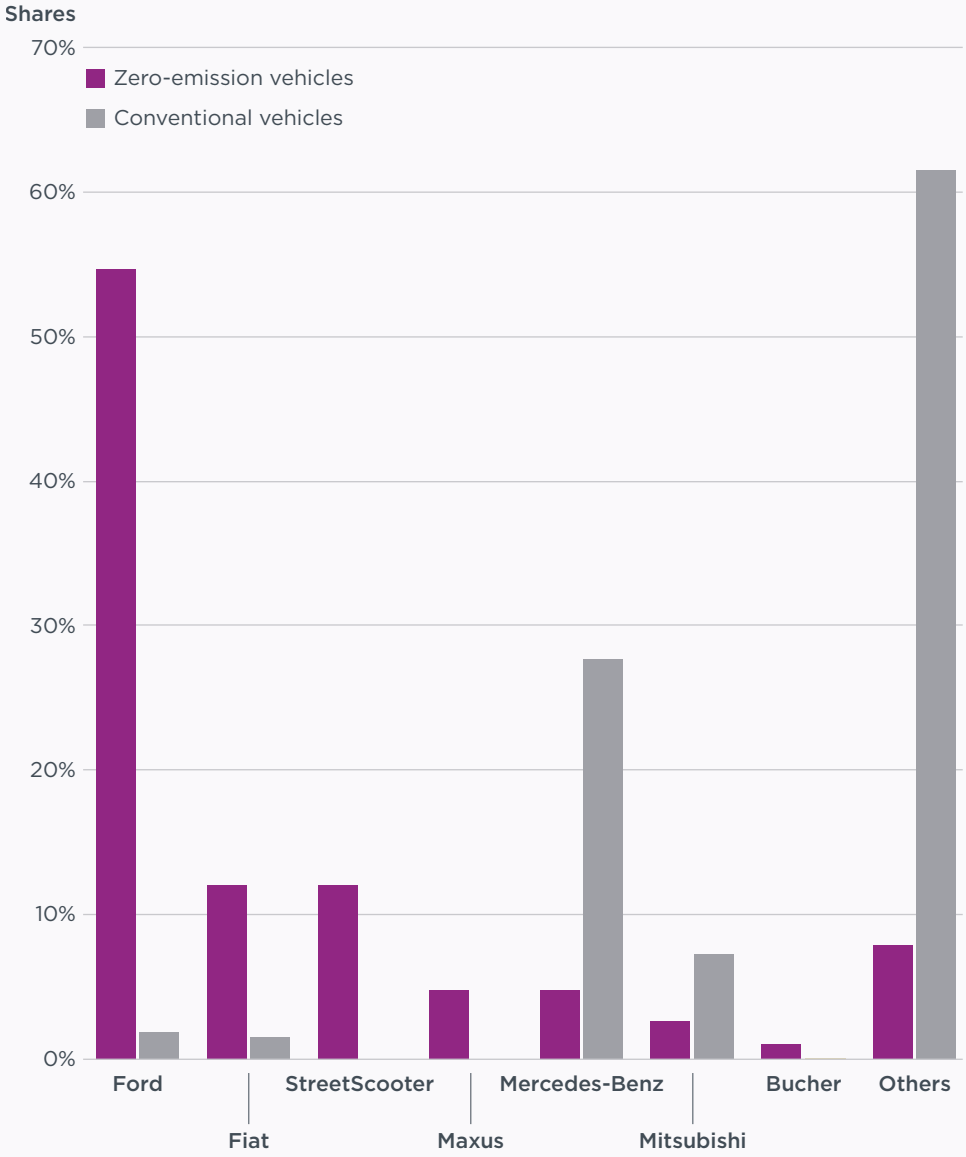
FIGURE 2.6

**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 TONS**

The gap between diesel and electric city bus sales narrowed significantly, while hybrid buses became the most sold powertrain type for the first time. All city buses sold this quarter in four countries (the Netherlands, Denmark, Ireland, and Lithuania) were zero-emission. The majority of zero-emission bus sales came from manufacturers who produced no diesel vehicles in Europe. BYD (headquartered in China), Yutong (China), Heuliez Bus (France), and Karsan (Turkey) produced half of all zero-emission buses sold in Europe.

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

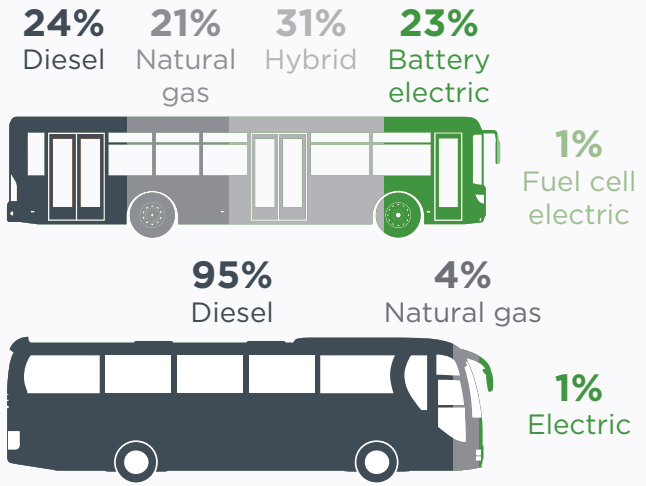


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**FIGURE 3.2**
**Sales of all zero-emission buses**

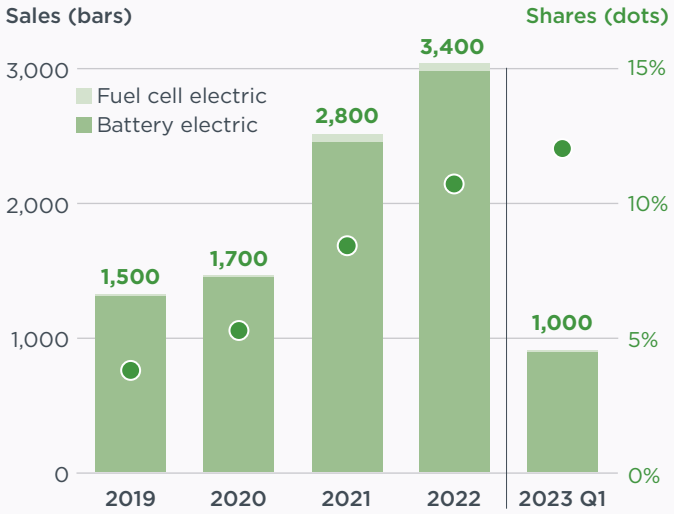


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**FIGURE 3.3**
**Sales of zero-emission city buses by model and battery capacity**

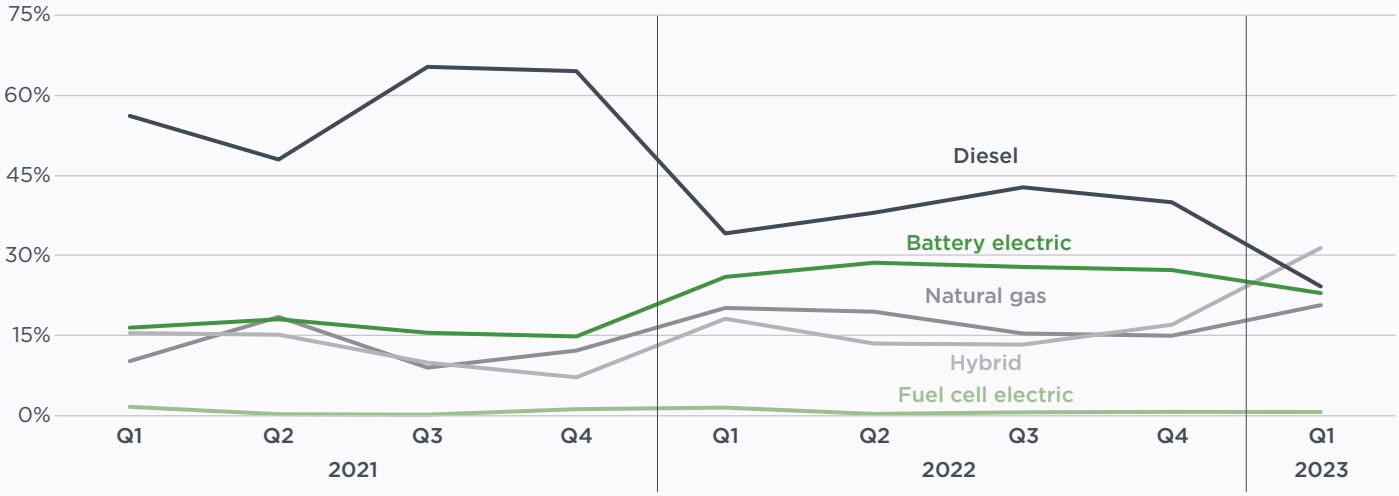


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FIGURE 3.4

**Sales of zero-emission city buses by configuration and powertrain**

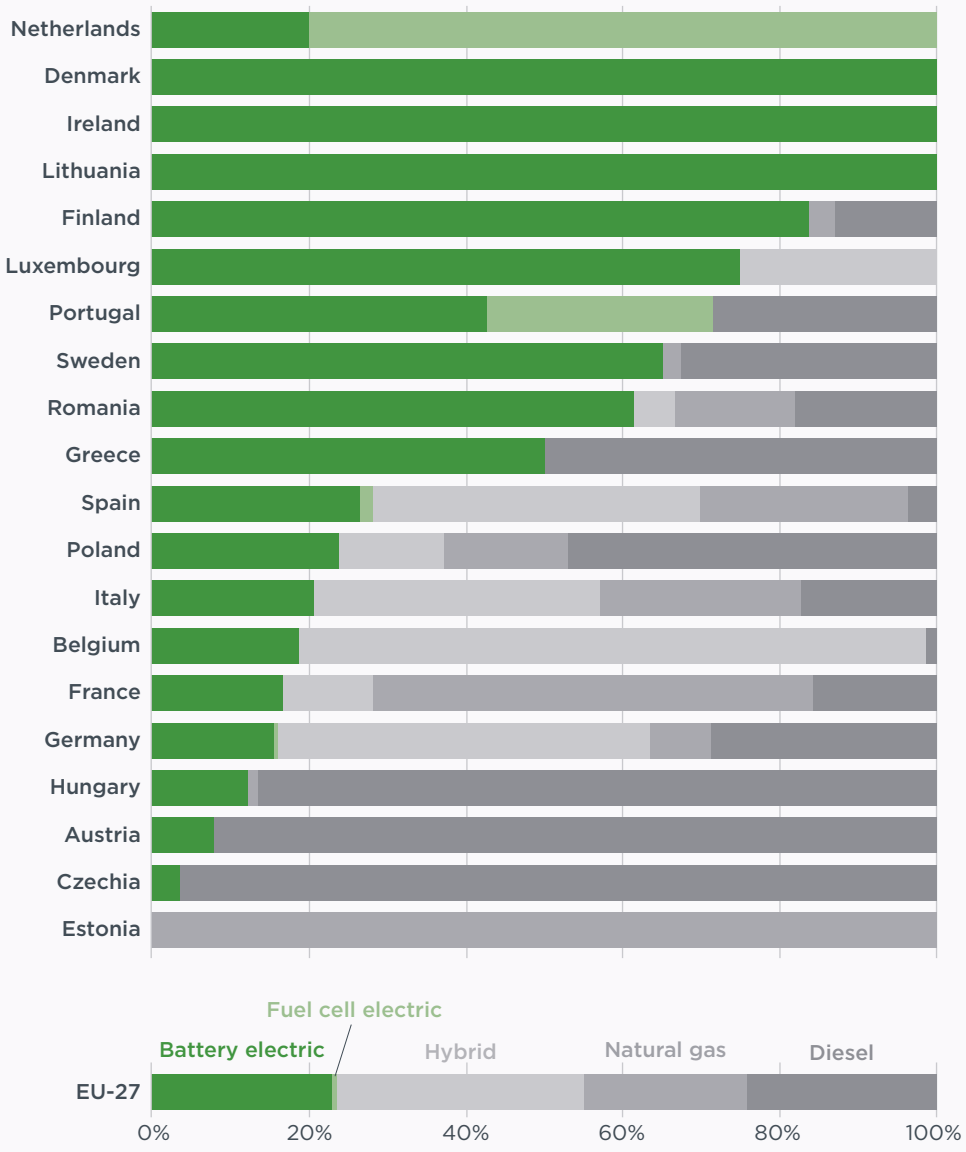


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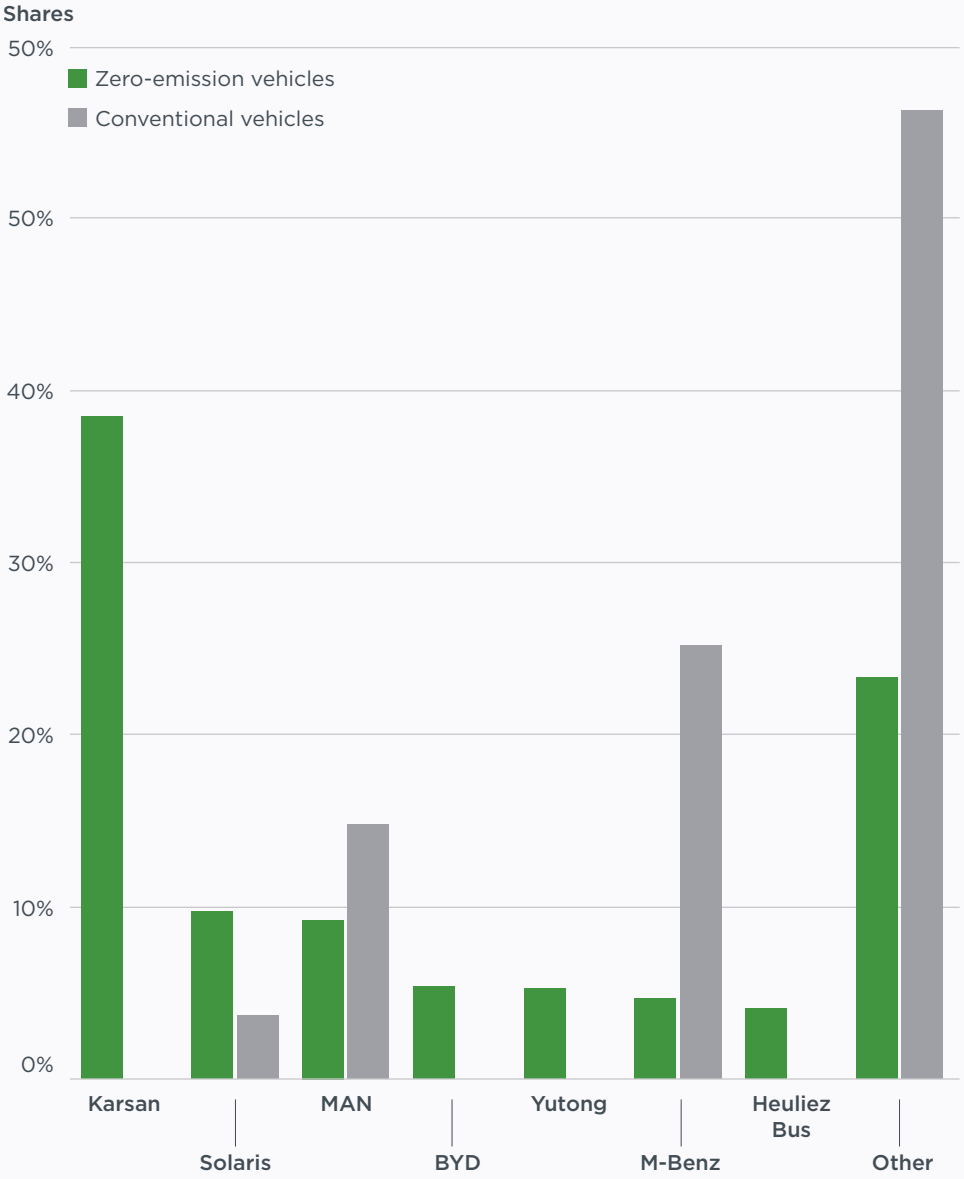
FIGURE 3.5

**Shares of all buses by powertrain and manufacturer**

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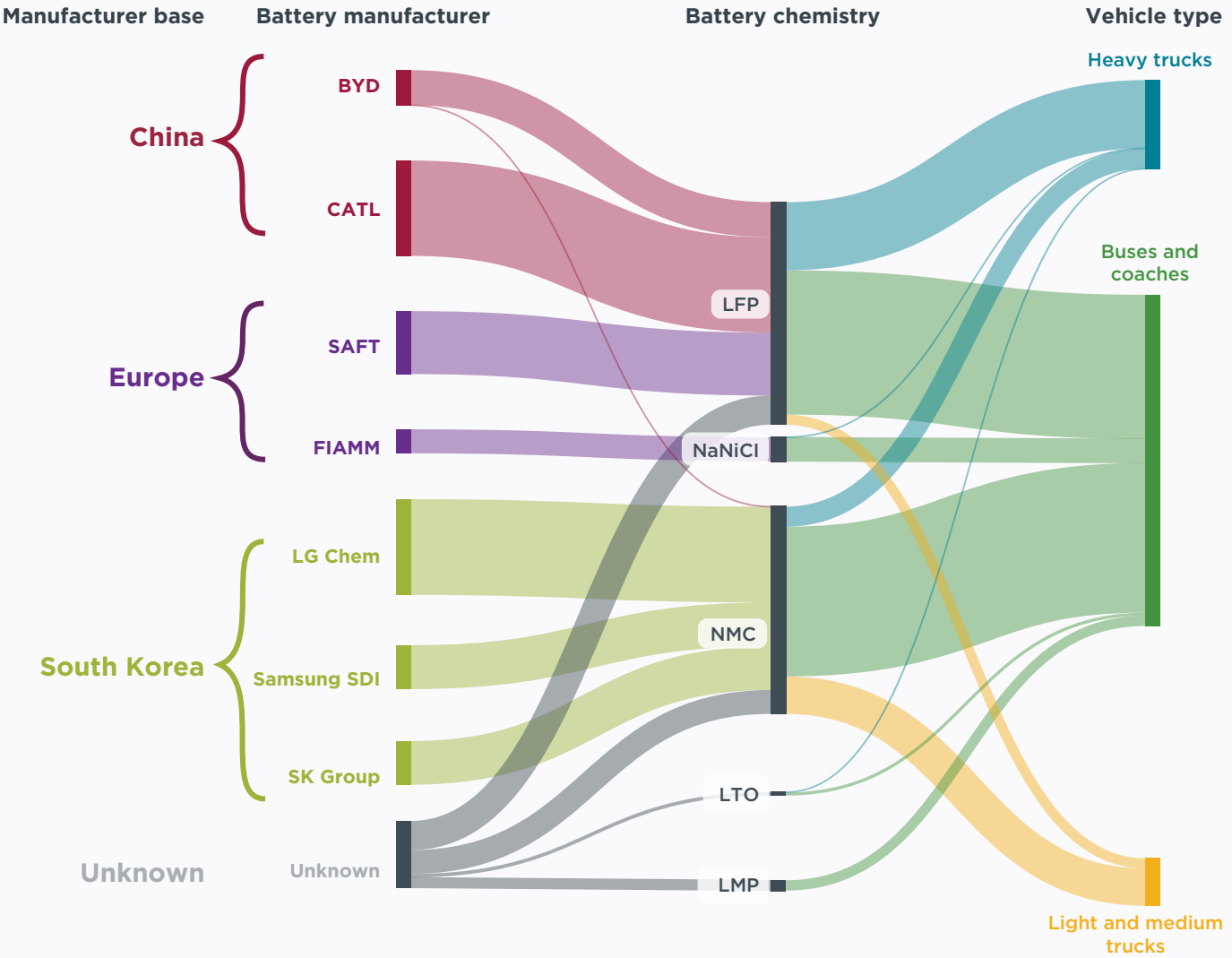
# 4. TECHNOLOGY FOCUS: BATTERIES

## LOOKING BEYOND QUARTERLY SALES

The zero-emission truck and bus market is heavily dependent on the supply of batteries. In Europe, most of these batteries are supplied by non-European manufacturers. In 2022, the latest full year of data, suppliers headquartered in South Korea were responsible for one-third of Europe's heavy-duty batteries (all NMC), while suppliers headquartered in China provided one-quarter (almost all LFP). Roughly 20% of Europe's heavy-duty batteries were produced by companies that are headquartered in the bloc, with the remaining share from unknown sources.

Two battery chemistries dominate the heavy-duty sector: lithium nickel manganese cobalt oxide (NMC) and lithium iron phosphate (LFP). NMC batteries are the most common battery chemistry in the transport sector globally, representing 60% of all electric vehicle sales, but LFP batteries have started gaining traction, particularly in the heavy-duty market. In China, 95% of battery electric trucks are powered by an LFP battery. LFPs have a lower energy density but are comparatively cheaper than their NMC counterparts because they rely on less expensive and more abundant materials. They also pose less of a safety risk, with a lower propensity to overheating, and have a longer average lifetime.

FIGURE 4.1
**Sales of trucks and buses in 2022 by battery manufacturer, battery chemistry, and manufacturer headquarters**

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# DEFINITIONS, DATA SOURCES, METHODOLOGY, AND ASSUMPTIONS

A **zero-emission vehicle** is any vehicle with a propulsion system producing 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.

***Battery abbreviations***:

***LFP***: Lithium iron phosphate

***LMP***: Lithium metal polymer

***LTO***: Lithium titanate oxide

***NMC***: Lithium nickel manganese cobalt oxide

***NaNiCl***: Sodium nickel chloride

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 were supplied by IHS Markit; Copyright © IHS Markit, 2023. Any figure with the heading "city buses" was sourced from Chatrou CME Solutions. All data from the ***batteries*** sheet was sourced from EV Volumes. All countries from the EU-27 Member States, except Bulgaria, are covered here. Data related to city buses excludes Bulgaria, Slovakia, Croatia, Malta, and Cyprus.

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