THE GLOBAL ELECTRIC VEHICLE MARKET OVERVIEW IN 2023

Statistics & Forecasts

INTRODUCTION

The global electric vehicle market share has taken a tremendous leap forward in the past decade, and we expect the trend to only accelerate in the coming years. Even though we've already seen some incredible growth in the number of EVs worldwide, the EV industry predictions suggest that we've only just scratched the surface.

In this guide, we serve you the latest facts, figures, and forecasts you need to know about the EV market and its predicted growth for 2023 and beyond.

TABLE OF CONTENTS

1 Historical data on the global EV market 04

2 Global electric car market size 05

3 The state of other electric vehicles 07

4 The state of EV charging 09

5 The development of electric vehicle & charging technology 11

6 The environmental impact of EVs 12

7 The current EV-related policies 13

8 The private sector's response to EVs 14

9 Forecasts: EV market outlook by 2030 & beyond 15

1 HISTORICAL DATA ON THE GLOBAL EV MARKET

To understand the current situation of the EV sector, let's look at what happened in the past couple of years. The year **2020** did not show a significant growth in overall new car registrations. The global market for all types of cars was negatively affected by the COVID-19 pandemic and the economic downturn that followed.

Amid the pandemic, the outlook for global EV sales was quite unpredictable at the beginning of the year. However, as time showed, 2020 turned out to be a surprisingly positive year, with global EV sales growing by 43% from 2019 and the global electric car industry market share rising to a record 4,6% in 2020.

The year **2021** was a major leap forward for electric vehicle sales. Sales of electric vehicles doubled from 2020 to 6.75 million. The number of EVs sold in a week in 2021 was higher than how many were sold in the whole year of 2012.

While we're heading in the right direction, the road to full electrification is still long — but it's becoming a reality.

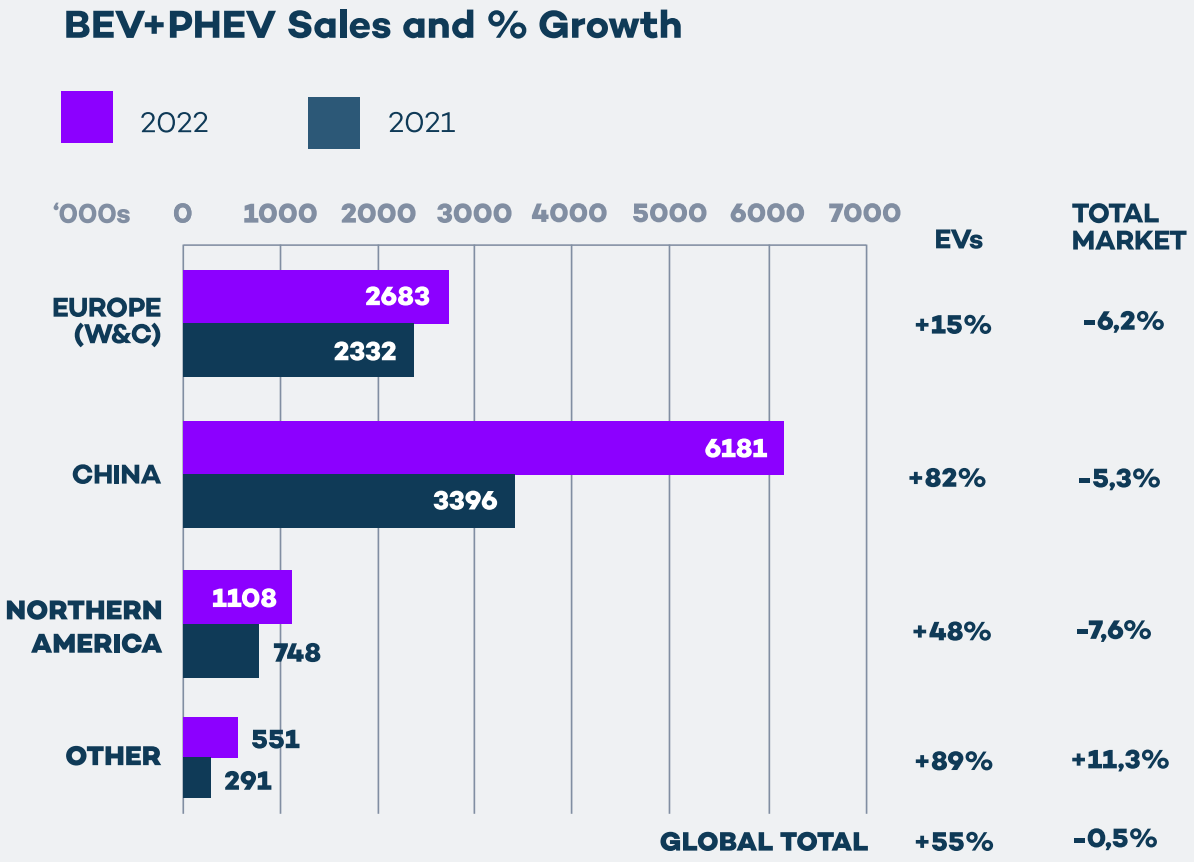


Chart 1. EV Volumes

2 GLOBAL ELECTRIC CAR MARKET SIZE

EVs are to play a central role in the ambitious objective of zero-emission targets set for 2050, and the industry is gearing up for it.

The year **2022** came on strong, breaking records. **EV sales exceeded 10 million**, with **14% of all new cars sold being electric,** quite the jump from 9% in 2021 and less than 5% in 2020. That resulted in more than **26 million electric cars roaming global roads in 2022**, representing a 60% uptake from 2021.

The market is growing. It's growing fast. And it's growing everywhere.

Carried by a decarbonisation challenge most leading nations now take seriously and supported by various policies and incentives, global EV sales keep accelerating in **2023**.

2.3 million EVs were sold only in the first quarter of the year. That is 25% more than in the same time in 2022.

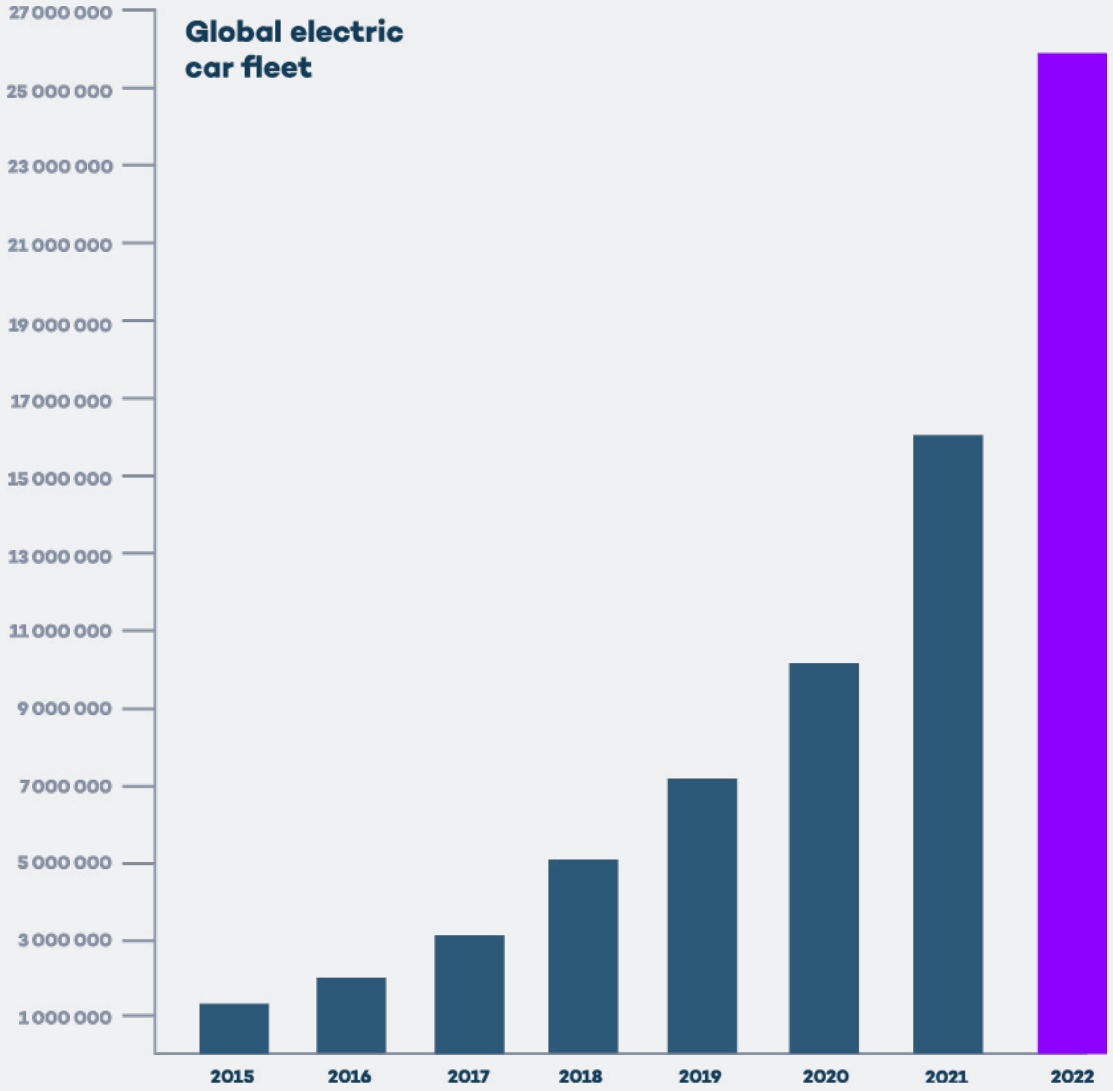


Chart 2. Global EV Outlook

We're predicted to see **14 million in sales by the end of 2023.** Electric cars could account for **18% of total car sales** by then.

HOW'S THE SITUATION IN EUROPE?

Europe experienced a downturn in EV sales in 2022 compared to the exceptional growth seen in 2020 and 2021. But the continent still **remained 2nd largest market for electric vehicles.** Electric car sales were more than 15% higher compared to 2021 and reached 2.7 million.

Despite the downturn, the continent's EV sales continue to increase steadily, reflecting the recent implementation of stricter rules regarding CO2 emission standards, such as the mandated 100% reduction in CO2 emissions for new cars and vans from 2035.

Not to mention, EV sales growth can also be attributed to **stimulus measures introduced by many European governments and various tax benefits and subsidies** put in place in major markets.

Norway, Sweden, the Netherlands and Germany remain to be the largest European markets, according to the 2023 Global EV Outlook by IEA.

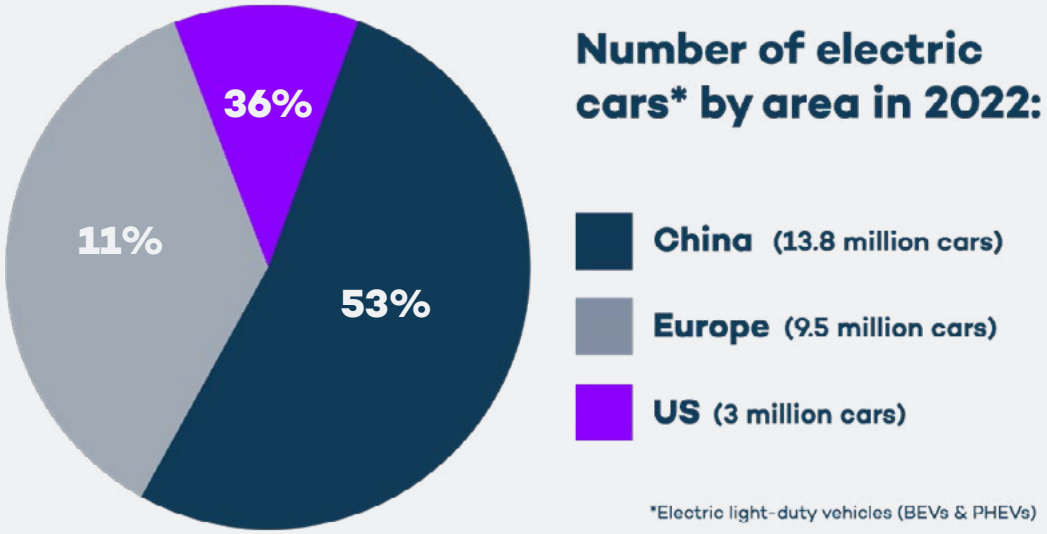


Chart 3. Global EV Outlook

3 THE STATE OF OTHER ELECTRIC VEHICLES

While passenger cars typically get all the credit for the EV revolution, it's good also to consider other forms of transportation that are gradually becoming greener.

LIGHT COMMERCIAL VEHICLES (LCV)

In 2022, the sales share of electric LCVs was higher than that of passenger EVs for the first time. Electric LCVs saw tremendous growth in 2022 as sales increased by over 90%, even though the overall LCV sales declined. Worldwide, there were about 310 000 electric LCVs in 2022.

As more electric LCV models enter the market and commercial customers become aware of the 'reduced cost' benefit of electric LCVs, we expect the market to only accelerate in the future.

HEAVY-DUTY TRUCKS

Almost 60 000 medium- and heavy-duty trucks were sold worldwide in 2022. As many truck manufacturers strive for an all-electric future, the number of commercially available zero-emission truck models has expanded in 2022. The market offers over 840 models by more than 100 OEMs.

The electrification of the heavy-duty sector is a crucial part of the journey to a zero-emission future because even though they only account for 10% of all ICE vehicles, they are responsible for 70% of ICE CO2 emissions.

Govaernments are well aware, and various countries are pledging to achieve 100% zero-emission truck sales by 2040. In 2022, the US and the EU proposed higher emission standards for heavy-duty vehicles.

BUSES

Electric buses have been growing in popularity since 2020. In 2022, almost 66 000 electric buses were sold globally. China dominated the market, accounting for

over 80% of global electric bus sales. The country also excels in manufacturing electric buses and is a major exporter to Latin American, North American and European countries.

In the European Union countries, the Clean Vehicles Directive provides targets for public procurement of electric buses. France, Germany, and Spain are only a few EU countries witnessing increased electric bus sales. In 2022, Finland saw Europe's highest sales share of electric buses. Electric bus sales accounted for more than 65% there.

TWO AND THREE-WHEELERS

Historically, China dominated the electric two-wheeler market and continued to do so in 2022 despite sales dropping from over 10 million in 2021 to less than 7.7 million in 2022. This drop can be explained by supply chain challenges following the Covid-19 pandemic.

In terms of electric three-wheelers, India leads the race with 425 000 units sold in 2022. Together with China, where almost 350 000 three-wheelers were sold in 2022, these two countries accounted for nearly 99% of global sales.

4 THE STATE OF EV CHARGING

Most charging still happens at home or work, but the more electric vehicles roaming the roads, the more public charging points are needed to support the wide EV uptake.

In 2022, there were **2.7 million public charging points globally**. 900 000 of these were installed over the year, accounting for 55% growth from 2021.

For both slow AC charging and fast DC charging, China dominated the market in 2022. During the year, 360 000 slow and almost 297 000 fast charging points were installed in China.

AND HOW ABOUT EUROPE?

In 2022, we counted **over 450 000 publicly available EV chargers in Europe**. By 2025, it's estimated that 1.3 million charging stations will be publicly accessible, and the number should grow to 2.9 million by 2030.

The Netherlands takes the lead in deploying EV charging infrastructure, followed by France and Germany. Italy and Spain also make it to the top 5, with Spain's public charging infrastructure growing by 223% in 2022 compared to the previous year.

EV CHARGING TRENDS

Fast(er) chargers make longer journeys much more comfortable and might be a reason for those without private charging access to buy an electric vehicle. They are the most efficient way to fight range anxiety (or how far one can go with an EV before having to stop and recharge).

In Europe, slow chargers are being replaced by fast and ultra-fast chargers. In 2022, the **number of fast chargers was up by more than 55%** and reached almost 70 000 units.

The Alternative Fuels Infrastructure Regulation (AFIR), revised in the first quarter of 2023, sets requirements for EV charging coverage across Europe. This regulation highlights the

ambition to develop public charging infrastructure across the continent further.

For example, the EU's Member States need to make sure there is a **fast-charging pool every 60 km** in each direction of travel by 2025 along the main European routes.

Another trend that's steadily increasing in the EV space is the smart charging of electric vehicles, i.e. the use of cloud-connected charging devices. For business owners and consumers alike, smart EV charging allows — among other things— greater convenience and control over electricity consumption.

Lastly, we can't mention EV charging trends without acknowledging vehicle-to-grid (V2G). V2G technology makes it possible to transfer the electricity stored in electric vehicle batteries back to the grid in the same way stationary storages are connected to the grid. V2G services are already commercially available, and several charger manufacturers can supply V2G chargers.

The V2G market is projected to grow to over €4,5 billion by 2024. The European standard for V2G charging, ISO 15118-20, developed back in 2020, defines the requirements for bidirectional charging. Virta has been recognised as one of the global leaders in V2G.

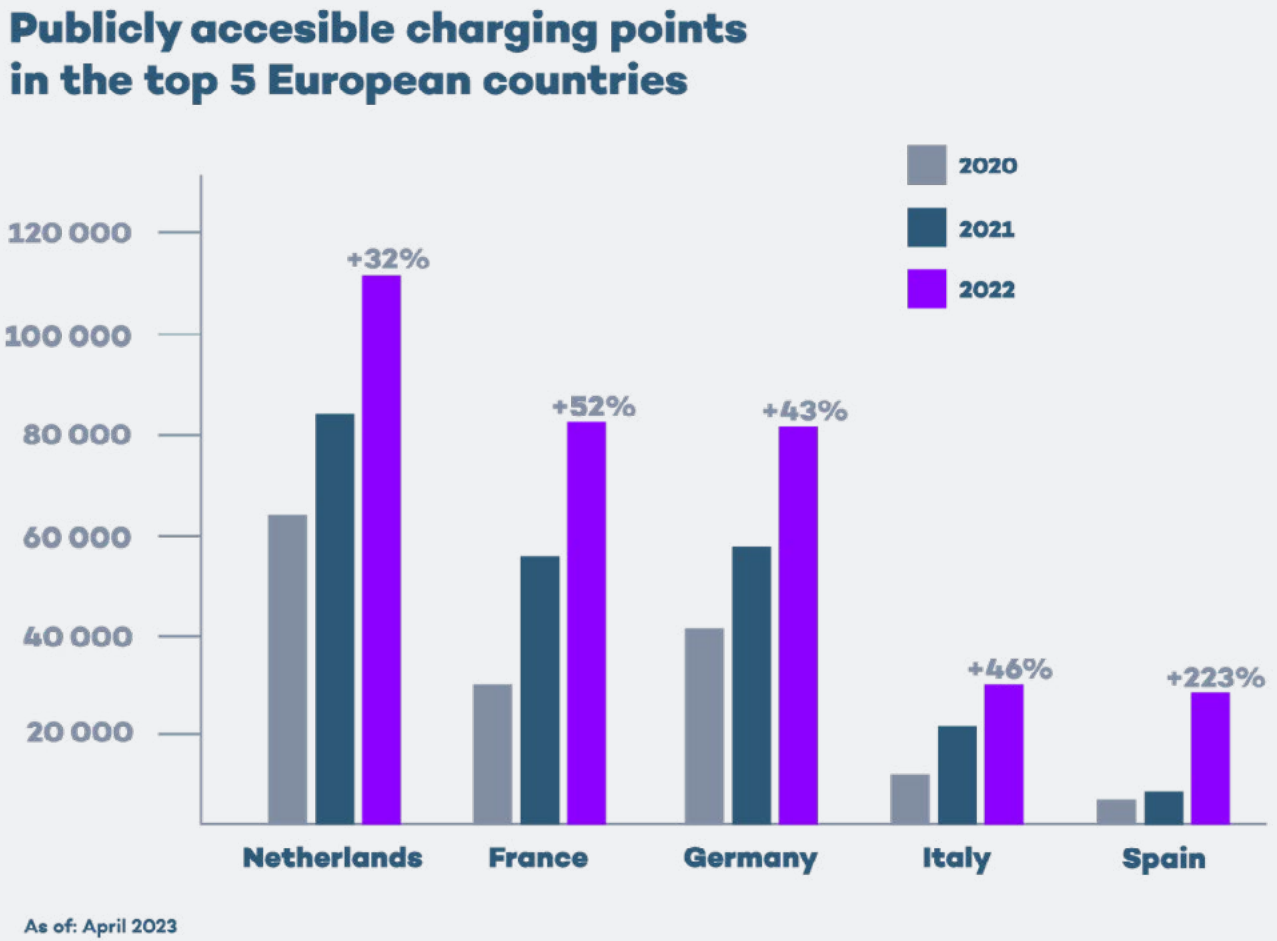


Chart 4. Global EV Outlook

WANT TO LEARN MORE ABOUT V2G AND SMART CHARGING?
Read our quick guide onbi-directional charging. If you're also interested in learning more about smart charging, take a look at our comprehensive Smart Charging guide.

5 THE DEVELOPMENT OF ELECTRIC VEHICLE & CHARGING TECHNOLOGY

Another interesting perspective relates to developing new EV parts and charging technologies.

The increase in electric car registrations resulted in an increased production of automotive lithium-ion batteries. **In 2022, EV battery demand increased by 65%** from the previous year as EV sales continued to grow in all markets, especially in China.

The battery demand increase can be attributed to the growing sales of battery electric vehicles (BEV) and plug-in hybrid electric vehicles (PHEV), which require batteries larger in size as opposed to hybrid electric vehicles (HEV).

China remains the leading country for battery production, specifically heavy-duty battery production. However, Europe is not staying behind. According to BloombergNEF, Europe's share of global battery production could rise to 31% by 2030.

It's clear that to support the growing demand for electric vehicles, the various elements of the EV battery supply chain will have to increase, from the extraction of raw materials such as lithium or nickel to the EV production itself.

A variety of developments in battery characteristics, driven by high demand, will provide multiple benefits to the EV business.

> **"In 2022, EV battery demand increased by 65% from the previous year, mainly due to the increased EV sales in China.**

For the EV market, further technological advances include:

- changes in battery chemistry
- changes in energy density
- changes in the size of battery packs

Ultimately, these changes will lead to cost reductions and increased production efficiency.

Several EV manufacturing plants are planning to expand their electric car production capacity because of increased policy support. This is, of course, good news for the market at large, since it means that the supply of EVs will be able to catch up with the demand.

And if that wasn't enough, we're also working on some pretty exciting stuff here at Virta. For example, our proprietary Plug&Charge feature allows our customers to identify themselves directly by connecting their vehicle to a charger. No pin codes, RFID tags, or credit cards necessary.

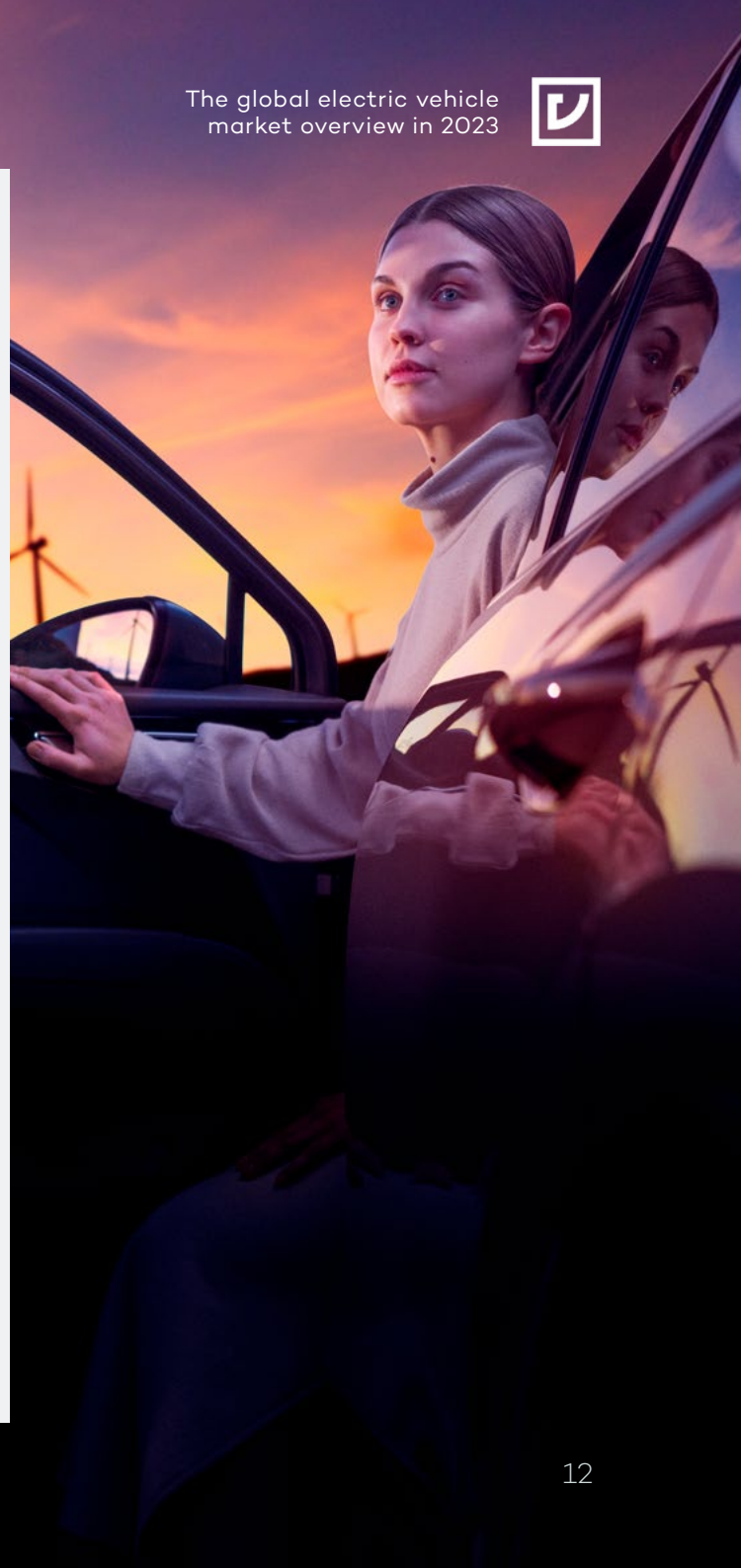
6 THE ENVIRONMETAL IMPACT OF EVS

Altogether EVs consumed approximately **110 terawatt-hours of electricity in 2022,** doubling from the previous year. In the future, EVs are projected to account for less than 4% of global electricity consumption by 2030.

As the electricity demand for charging electric vehicles grows, the need to protect the electricity grid grows with it. Careful planning of electricity infrastructure, the widespread use of smart charging and the implementation of smart energy management solutions for load management will all be crucial to ensure healthy and balanced power systems.

In 2022, EV use saved more than **80 million tonnes of GHG emissions** globally. In practice, all EV emissions are born due to the manufacturing process, while we can't apply similar logic to internal combustion engine (ICE) cars. In the grand scheme of things, it's safe to conclude that the public debate over EVs vs ICE cars' environmental impact is turning in favour of EVs.
Future predictions based on the Stated Policies Scenario say that in 2030, using EVs could help avoid **700 million tonnes (Mt) of carbon dioxide equivalent (CO2-eq) of GHG emissions.** The Announced Pledges Scenario takes this number even further, predicting **over 770 Mt of CO2-eq.**

While it's true that EVs increase electricity consumption, that can become the saving grace of energy utilities in the future. **By the 2040s, electric vehicles will add up to over 30 TWh of installed battery storage capacity.** For utilities, this means that EVs offer cheap energy storage, with no capital cost and relatively low operating costs.



7 THE CURRENT EV-RELATED POLICIES

It's no secret that governmental and local policies play a huge role in accelerating EV adoption. In 2022, EV-related policies accounted for over 90% of global LDV sales and 70% of HDV and two/three-wheeler sales.

Major markets (China, the US, Europe) currently seeing rapidly growing EV sales began their EV journeys by introducing policies like vehicle purchase incentives. These markets are now shifting from incentivising the sales of electric cars towards supporting heavy-duty transportation and EV charging.

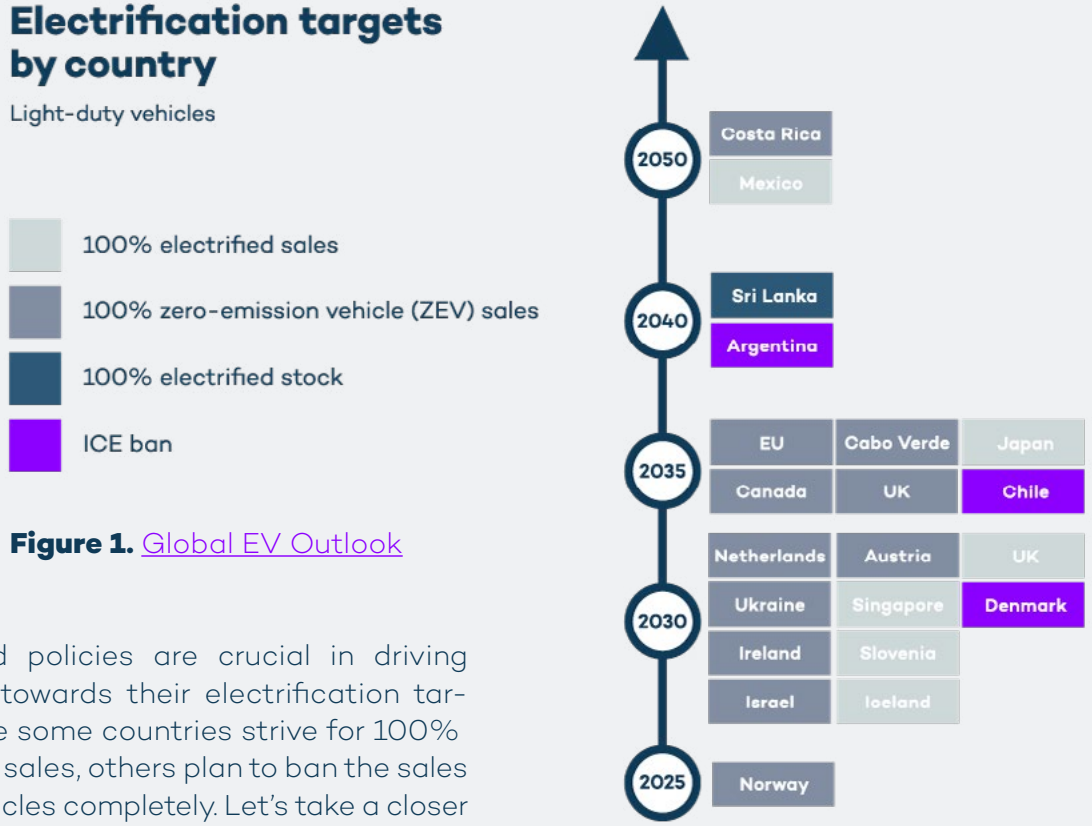


Figure 1. Global EV Outlook

EXAMPLE: THE UNITED KINGDOM

The country stopped subsidising the sales of electric cars and dedicated GBP 1.6 billion to growing the public charging infrastructure. It's expected that 300 000 public chargers will be installed in the country by 2030.

EV-related policies are crucial in driving countries towards their electrification targets. While some countries strive for 100% electrified sales, others plan to ban the sales of ICE vehicles completely. Let's take a closer look at the varying electrification targets of countries globally and their timeline.

8 THE PRIVATE SECTOR'S RESPONSE TO EVS

The private sector, and car manufacturers, in particular, have responded positively to the ongoing changes in the market. Many car manufacturers have announced electrification of their fleets either partially or fully.

On the fleet side, EV100, a global initiative supporting the switch to zero-emission transportation with its 130 members, is committed to switching to electric and installing charging infrastructure for employees and customers by 2030.

To list a few examples, **Unilever** pledges to transition its fleet of more than 11 000 vehicles to electric and install workplace EV charging for their staff. **ABB** also plans to switch to electric for their 11 000 fleet vehicles.

But it's not only the companies that are part of EV100 introducing ambitious pledges. DHL has pledged to reach 70% clean operations of last-mile pick-ups and deliveries by 2025. And DB Schenker wants to make its transport activities in European cities emission-free by 2030.

Electrification targets of selected major automakers for light-duty vehicles

Automaker	Target	Region
Ford	600 000 BEV sales by 2026	Europe
Volkswagen	Fully electric production by 2033	Europe
Toyota	1 500 000 BEV sales; introduce 10 new models by 2026	Global
Mazda	At least 25% of global sales to be BEV in 2030	Global
Honda	Launch 30 EV models globally by 2030	Global
Nissan	Global target of 44% EV sales by 2026, 55% by 2030	Global
Porsche	80% of sales to be electric by 2030	Europe
BMW Group	EV sales share to reach 30% by 2025, 50% by 2030	Global
Mitsubishi	100% EV sales by 2035	Global

Table 1. Global EV Outlook

While actions like these are worthy of attention on their own, their fringe benefit is of course that they act as signalling devices for the rest of the market.

In other words, it is public pledges like these that pressure competitors and stakeholders to act faster than they otherwise would have.

9 FORECASTS: EV MARKET OUTLOOK BY 2030 & BEYOND

When it comes to the future, according to the **Global EV Outlook 2023,** there are three possible scenarios:

1 The Stated Policies Scenario suggests that by 2030, the global electric vehicle stock (excluding two/three-wheelers) will reach nearly 240 million vehicles and account for over 10% of the global vehicle fleet.

2 According to a bit more ambitious scenario, the Announced Pledges Scenario, almost 250 million EVs will be roaming global roads by 2030, and EV sales will represent over 35% of all vehicle sales..

3 Net Zero Emissions by 2050 Scenario predicts that the global EV stock will reach 380 million EVs, with EV sales climbing up to 60% of all vehicle sales in 2030.

WHAT ABOUT EUROPE?

The next few years will be crucial for Europe to secure its leading status. We expect to reach a first milestone of 14 million EVs by 2025. After that, low estimates mention 33 million EVs by 2030, while high estimates talk about 40 million EVs roaming around Europe at the same time.

From 2035 onwards, we expect that 100 % of new cars sold in Europe to be electric.

Of course, only time (and new data) will tell tell us if those predictions are to become realities. However, the latest trends are heading in the right direction.

VIRTA – A GLOBAL FORERUNNER IN SMART EV CHARGING SOLUTIONS

Virta is a global pioneer in developing smart electric vehicle charging services. It was ranked on the Financial Times 1000 Europe's Fastest Growing Companies list for the fourth time in a row in 2023.

Virta's digital EV charging platform is used by over 1,000 private and publiccompanies and organisations in retail, hotel, real estate, parking, petrol retail,automotive, and energy industries. These customers operate over 75,000 chargers in 35 countries, forming the "Powered by Virta" network. Through roaming, EV drivers can access over 320,000 charging points in over 65 countries.

Virta is at the forefront of bringing the world to a more sustainable future by making EV charging easier. It has 19 patent families with a focus on energy management capabilities, which are central to the future connected energy and mobility ecosystem.

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