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# Region-Wise Deployment of Electric Vehicle Charging Infrastructure

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## Overview

# Region-Wise Deployment of Electric Vehicle Charging Infrastructure

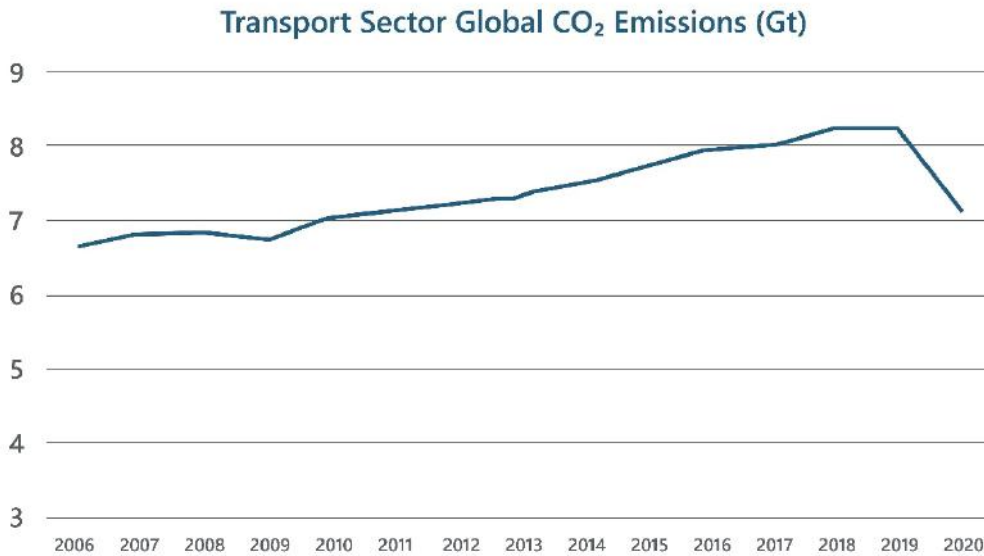
- The transport sector is heavily reliant on fossil fuels and accounts for 37% of CO<sub>2</sub> emissions from end use sectors (International Energy Agency).
- Globally APAC is the leading region in terms of EV charging infrastructure installed base which is evident from the annual sales of passenger EVs in the region.
- Utilities have been very active in the EV charging business especially in Europe where major utility companies like Enel, E.ON, Engie, EDF, and Innogy have acquired EV charging companies such as EVBox and Nuvve or are acting as CPOs.
- In EMEA, petroleum giants have emerged as the biggest players in the EVSE sector as oil giants like Total and Shell have acquired multiple big EV charging OEMs.

Globally, especially advanced economies, in the wake of rising carbon emissions and associated climate change, are shifting from Internal Combustion Vehicles (ICEs) to Electric Vehicles (EVs). International commitments, especially the Paris Agreement, have a significant role in pushing economies to take measures to reduce their emissions which in turn has led to the global emergence of the EV industry.

The Paris Agreement is a legally binding international treaty on climate change which was adopted by 196 countries at COP21, and its goal is to curtail global warming well below 2, preferably to 1.5 degrees Celsius, compared to preindustrial levels. [1]

The transport sector is heavily reliant on fossil fuels and accounts for 37% of CO<sub>2</sub> emissions from end use sectors according to International Energy Agency. Emissions have been rising, over the past decades, with the exception of 2020 when it dropped by 10% YoY to 7.2 Gt of CO<sub>2</sub>, as compared to 8.5 Gt, due to COVID-19. [2] So, the transport sector has a crucial role in curtailing global warming by providing a timely transition from ICE vehicles to electric vehicles. But the sustenance of EV sales especially is heavily reliant on the availability of charging infrastructure which is being deployed globally (APAC, EMEA and Americas).

In this white paper we will discuss region wise deployment of charging infrastructure in APAC, EMEA and the Americas, and major trends in the EV charging industry in detail.



*Figure 1: Transport sector global CO<sub>2</sub> emissions (Gt).  
Source: IEA*

## Region Wise Deployment of EV Charging Infrastructure

Globally APAC is the leading region in terms of the EV charging infrastructure installed base which is evident from the annual sales of passenger EVs. It is significant to note that EV charging infrastructure deployment is a key enabler for the electric vehicle industry globally.

In APAC, annual sales of passenger EVs in 2021 stood at around 2 million and are projected to reach 6 million in 2025 and more than 15 million in 2030 with corresponding growth in the EV charging infrastructure. However, it is significant to note that China and South Korea account for the majority of the EV sales and corresponding charging infrastructure in the APAC region.

Similarly, in EMEA, in 2021 close to 1 million passenger EVs were sold and sales of passenger EVs are expected to reach 4 million in 2025 and more than 8 million in 2030. The main drivers of the EVSE market in EMEA are Western European countries including Netherlands, Germany, France and the UK.

On the other hand, Americas has observed the least number of sales of passenger EVs and corresponding EVSE infrastructure as compared to EMEA and APAC. Passenger EV sales in the region stood at around half a million in 2021 and are projected to increase to nearly 2 million in 2025 and 4 million in 2030. The EVSE industry in the region is largely driven by the U.S.

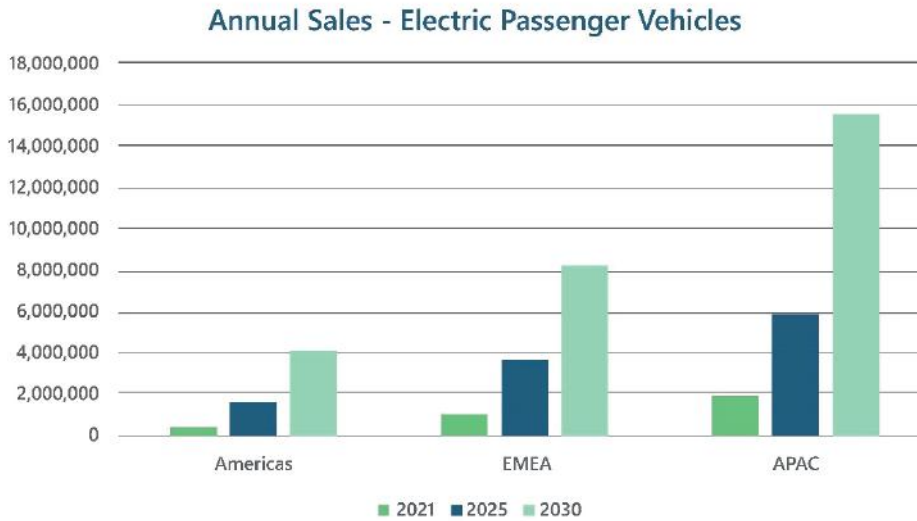


Figure 3: Main barriers for ship owners to deploy OPS systems.  
Source: Port of Barcelona

## APAC

Electric Vehicles have taken the world by storm, and it wouldn't be wrong to say that e-mobility is the future of transport industry. Among all the countries in the world trying to achieve higher vehicle electrification rates and corresponding supporting charging infrastructure, China has come out to be the global leader in this market.

It is quite evident that APAC market is leading in the Electric Vehicle sales and the main force driving the change in the APAC market is China followed by South Korea.

China, as of December 2021, has around 1,178,000 publicly accessible charging points which is more than the charging points of EMEA, and Americas combined (around 410,000 and 140,000 respectively).

The high adoption of EVs and the deployment of its charging infrastructure in China was due to timely and well-planned investments and grants from the government and relevant authorities. The Chinese government has incorporated EVs and their associated charging infrastructure into their national strategy program and will provide continuous support to the development of EV charging infrastructure through its 5-year investment plan. Two of China's main utility companies State Grid and Southern Grid of China are the biggest charging point operators. While being state owned, they own and operate most of the charging infrastructure in the country, and receive hefty investments from the government to continue building the required charging infrastructure.

## EMEA

In EMEA, the main drivers of the charging infrastructure are the Western European countries mainly Netherlands, Germany, France, the UK. These four countries combined contained 64% of the publicly accessible charging infrastructure in Europe in 2020.

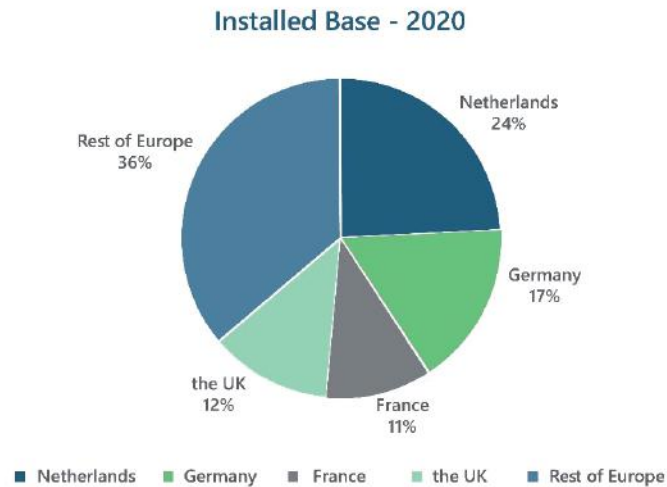


Figure 3: Installed base of public charging in key European countries versus the rest of Europe.

Source: Power Technology Research

Although, the majority of the charging infrastructure lies in Western Europe, Nordic

countries, especially Norway is going to become the first country in the world to phase-out ICE vehicles. Furthermore, the country planned to ban ICE vehicles by 2025 but the recent rate of adoption of EVs shows that the target will be achieved much earlier than that and might be achieved as early as this year.

In all the countries which have shown rapid EV adoption and charging infrastructure deployment one factor has been consistent and that is support and investment from the government and local authorities.

In Germany, the federal government announced kfW bank funding in November of 2020 where, by under certain conditions, individuals could get a 900 euros for a residential charger. The funding was so successful that 300 million euros were added to the fund in July 2021 after the initial amount of 500 million euros got exhausted. Now funding is not available for the residential sector and has been allocated to workplace charging infrastructure.

In early 2021 the UK government approved USD 27.4 million for on-street residential charging and more recently, approved USD 413 million so that Ofgem will build 3,550 ultra-rapid charging points on motorways and in towns.

With with recent European Green Deal, and regulations to install a charger at every 60km along the highways, there will be an increase in charging infrastructure, and there are



expectations that other, non-EU member countries, will also begin to ramp up investments into the charging infrastructure. However, government support in terms of investments and grants will remain crucial.

## Americas

In the Americas, the U.S. is leading the deployment of charging infrastructure. Although progress has been not at par with developed countries, it has improved in the past year especially with the recent announcements from the federal government with plans to deploy 500,000 charge points by 2030. [3]

Within the U.S., California is leading the charging infrastructure deployment with plans to install 250,000 charging points by 2025. [4] Furthermore, the California Energy Commission approved funding of \$1.4 billion for the furthering of green revolution in the state with \$314 million allocated for the deployment of charging infrastructure in the next 2 years. [5]

In Canada there are investments available for installation of EV charging infrastructure in a number of provinces while Mexico is still an emerging market with regards to the deployment of EV charging infrastructure. In South America, Brazil is one of the leading markets which has EV charging infrastructure.

As the market for EVs and their associated charging infrastructure develops across the regions (APAC, EMEA and Americas), key market players have emerged in the EV charging industry which include major European utilities and petroleum giants. Furthermore, it has also been observed that EV charging companies are going public to draw investments needed to cater visibly high demand for charging infrastructure.

## Major Trends in EV Charging Industry

Utilities have been very active in the EV charging business especially in Europe where major utility companies like Enel, E.ON, Engie, EDF, and Innogy have acquired EV charging companies such as EVBox and Nuvve or are acting as CPOs. This has given them control over the charging company's previously installed network of chargers and a stake in the EV charging business. As utility companies already have a customer base, which buys electricity from them, they find it a profitable business to also be the primary suppliers of charging hardware to the consumers.

Utility companies particularly in the Scandinavian and Southern European region, partner with EVSE OEMs and play the role of distributors for the company to their already established electricity consumer base. They also act as CPOs for instance Energy Regulatory Office in Poland appointed energy companies to act as operators in 8 big cities of that country.

On the other hand, petroleum giants have come out to be one of the biggest players in the EVSE sector in the EMEA market. Multiple big EV charging OEMs, with some of the highest market shares, have been acquired by oil giants like Total and Shell. In the UK and France,

OEMs like Chargemaster Ubitricity, NewMotion, and G2Mobility have been acquired by oil giants like British Petroleum, Shell and Total.

Investments of oil companies are not just focused on the manufacturing side but on the entire value chain of the EV charging business from manufacturing of chargers to their management and operations. They are also partnering with EV manufacturers for selling their EV chargers like Shell's NewMotion which partnered with Renault to be their official supplier of EV chargers in 2019.

In recent years another trend seen is that major EVSE OEMs, which were initially private companies, are going public (to raise capital for future plans) either through IPO (Initial Public Offering) or through Special Purpose Acquisitions (SPACs). IPO is when a company offers stocks or shares to the public for the first time while SPAC is a shell corporation already listed on a stock exchange only to acquire a private company to make it public without having to go through the IPO route. Companies that go public via SPAC route do it to save time and avoid regulations of the Securities and Exchange Commission (SEC).

In 2021, ChargePoint became the first company operating across continents to go public via a SPAC deal with Switchback Energy Acquisition Corporation. Dutch-based EV charging hardware and software solution provider, EVBox, also went public in 2021 via a business combination with TPG Pace Beneficial Finance. Spanish EVSE manufacturer, Wallbox, announced a business combination with SPAC Kensington Capital Acquisition Corp. II. The joint company, valued at around USD \$1.5 billion went public on October 1st, 2021. Similarly, Tritium announced to go public via a merger with U.S. based Decarbonization Plus Acquisition Corp II, a SPAC company. The acquisition process was completed in Jan 2022.

## Looking Ahead

EVSE is a multibillion-dollar industry which is expected to keep on growing with rapid pace as governments further regulate the transportation sector and impose ban on ICE vehicles in years to come. More countries are expected to incentivize adoption of EVs, and installation of EV charging infrastructure aimed at reducing carbon emissions and achieve net neutrality in the long run.

Currently, EVSE market of APAC is dominated by China followed by South Korea, but more regional players are expected to enter the market as well. Globally, the European market is the most mature EVSE market with significant activity and developments regarding EV charging infrastructure observed in the western and northern Europe.

Similarly, the Americas EV market is dominated by the U.S. while Canada is also working



towards its electrification goals especially in British Columbia, Quebec and Ontario where state funding and private investments are available for installation of EV charging infrastructure. However, it is expected that South America will also move towards adoption of EVs and install EV charging infrastructure in the future.

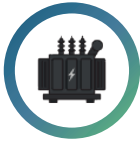
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- [2] IEA, "Transport," [Online]. Available: <https://www.iea.org/topics/transport>. [Accessed 31 March 2022].
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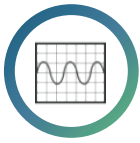
**Synchronous Condensers**  
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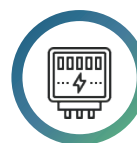
**Storage Value Chain Monitor**  
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**EV Charging Infrastructure**  
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