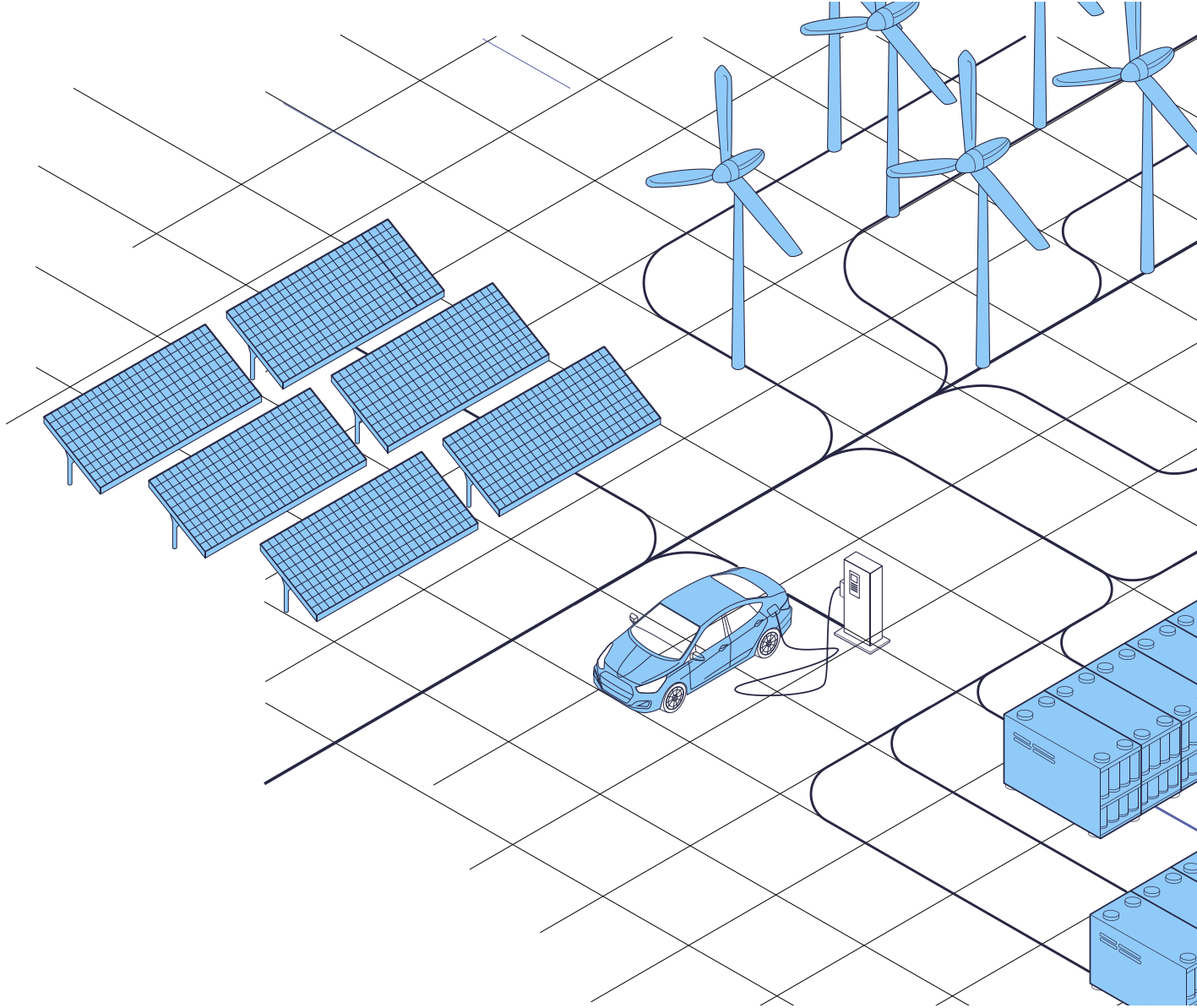


# Energy Transition Capital: Lunch Briefing September 2021



## Introduction to the briefing

On the 14<sup>th</sup> September we held a lunch and market briefing at the Eight Club in Moorgate, London. The focus of the briefing was the opportunity for capital investment in the energy transition, and as such the invited audience consisted primarily of members of the financial community.

The briefing was presented by myself and my colleagues, Charles Lester, Iola Hughes and William Roberts and provided an analysis at both a market and company level on the EV, battery, motor, charging and ESS markets.

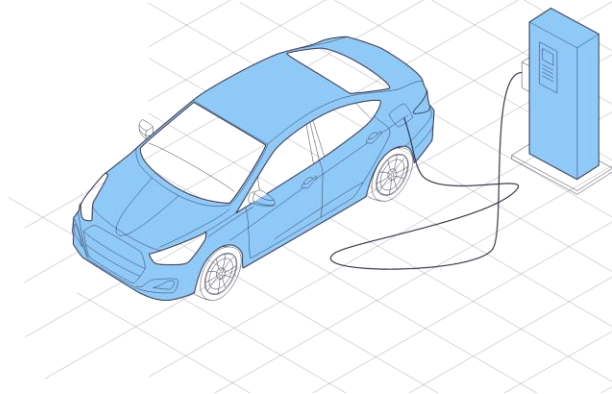
This document provides an overview of the key messages from the event, if you would like to discuss anything in more detail please get in touch with any member of the team.

Kind Regards,

A handwritten signature in black ink, appearing to read 'AP'.

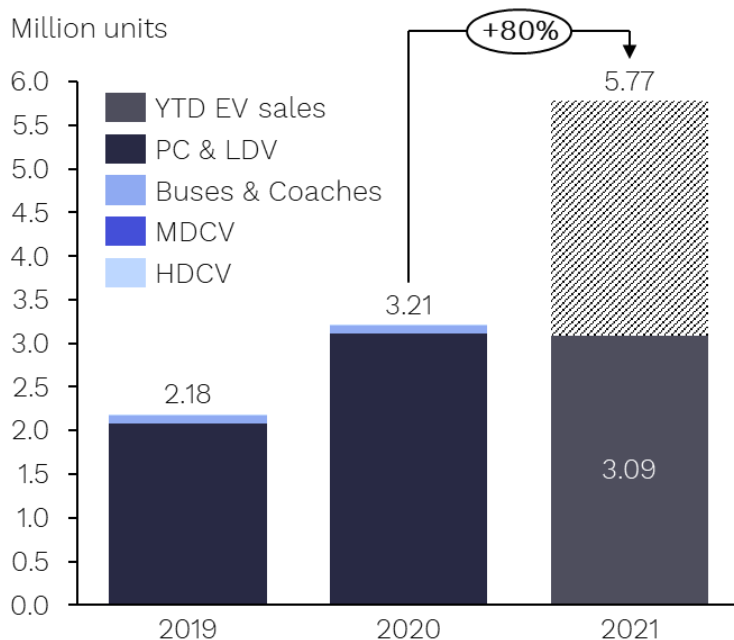
Adam Panayi  
Managing Director, Rho Motion

# EV Market

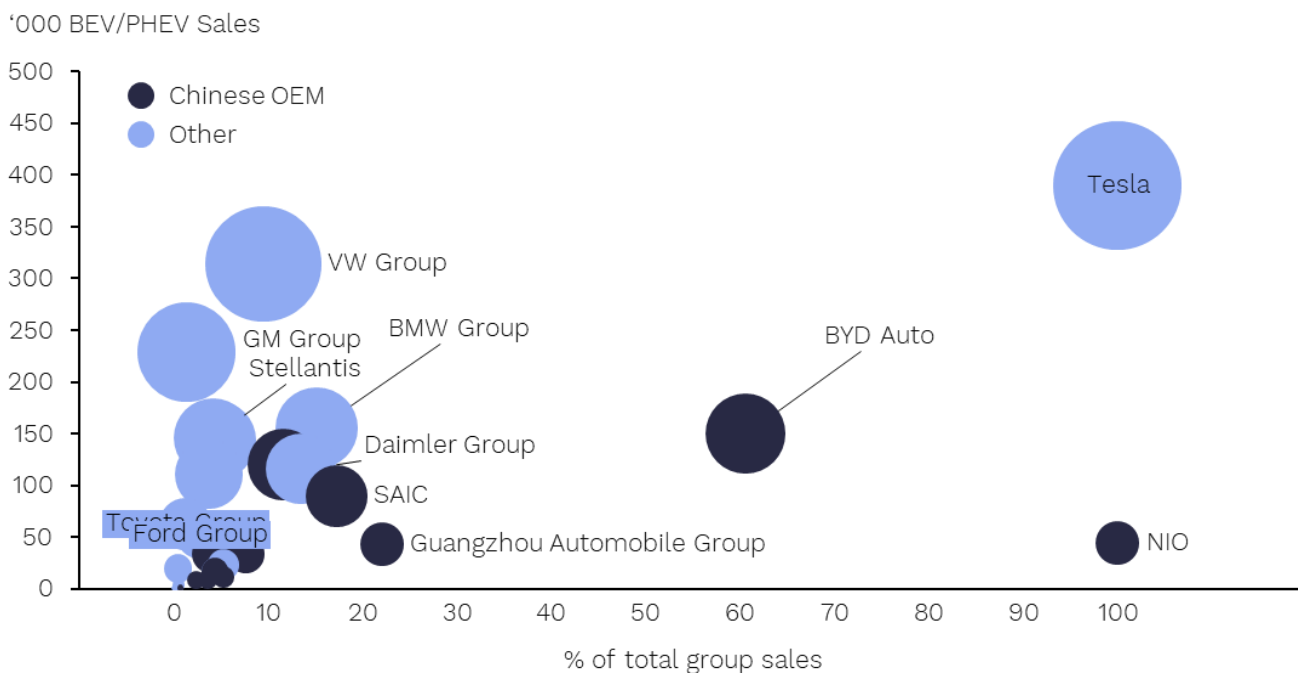


- This year we are expecting 80% sales growth y-o-y versus 2020. When looking at the ytd numbers for H1 2021, growth has been in the region of 150%, but it is important to remember that the first half of 2020 saw very low sales as shut downs were initiated in first China, then western economies.
- The key growth areas this year are China, where the market is maturing with over 200 models available, and where the impact of subsidy reductions at the start of the year have proved to be inconsequential; and Europe, where CO2 standards continue to push OEMs towards BEV, PHEV and HEV model offerings.

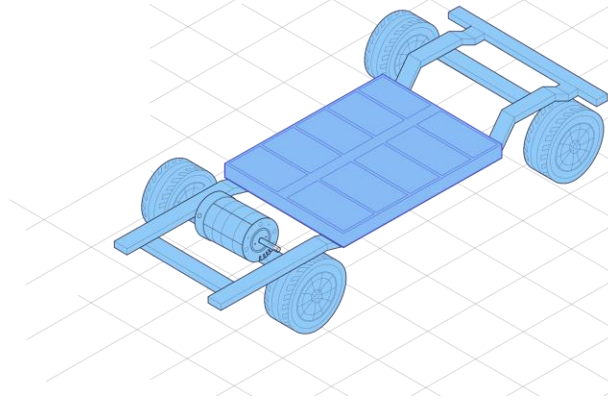
**EV sales outlook by vehicle class**



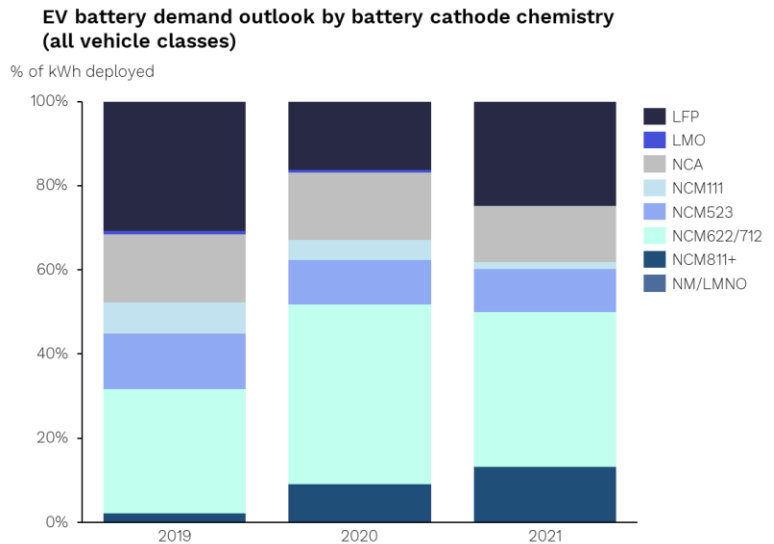
**BEV & PHEV Sales by OEM, and % of total sales, H1 2021**



# EV Batteries



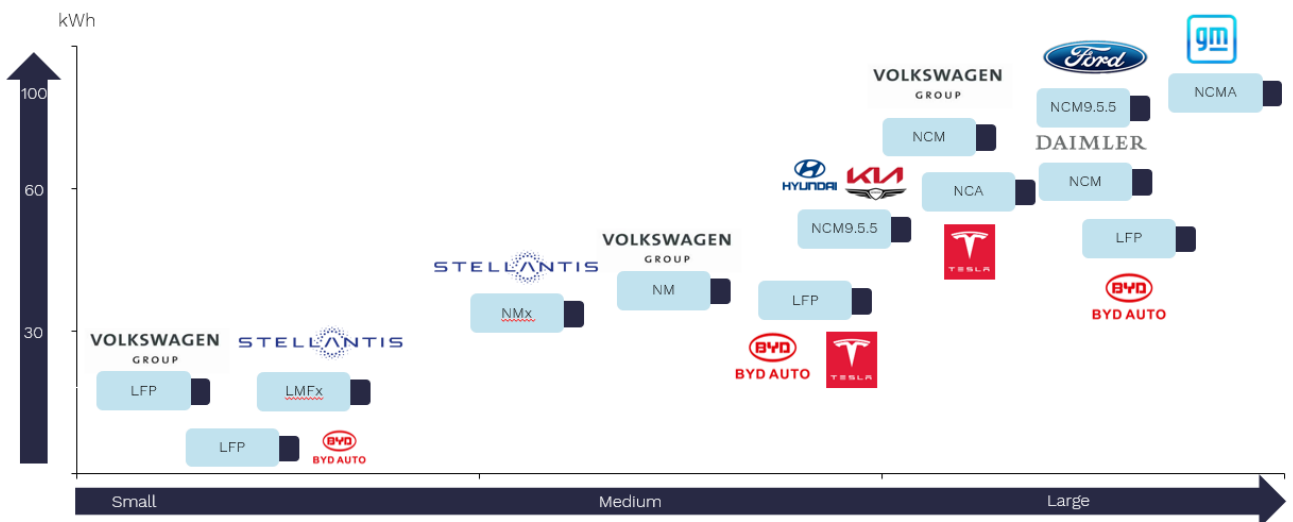
- The key story this year has been the resurgence of LFP as a technology for passenger cars and light duty vehicles. This has been entirely China led to date, but will also become a theme in Europe as model line ups are confirmed for 2023-2024.
- Looking forward, the chart below shows the range of chemistry strategies being considered by OEMs across their vehicle offerings, which points at several other main areas that we will be watching in the coming years. These include the deployment of NM chemistries in mid-size vehicles, likely beginning in 2024, and the extent to which LFP will be deployed in larger vehicles outside of China.



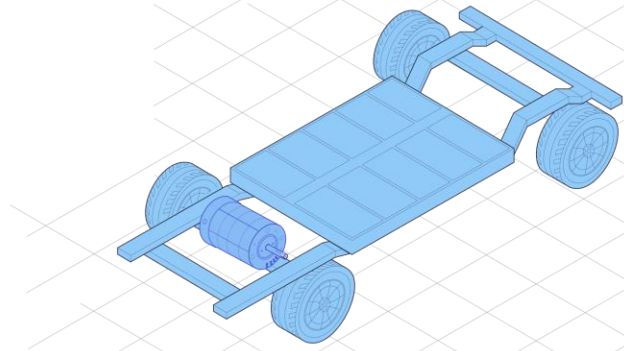
## Chemistry choices are a function of use case and geography

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OEM Battery Strategy By Segment

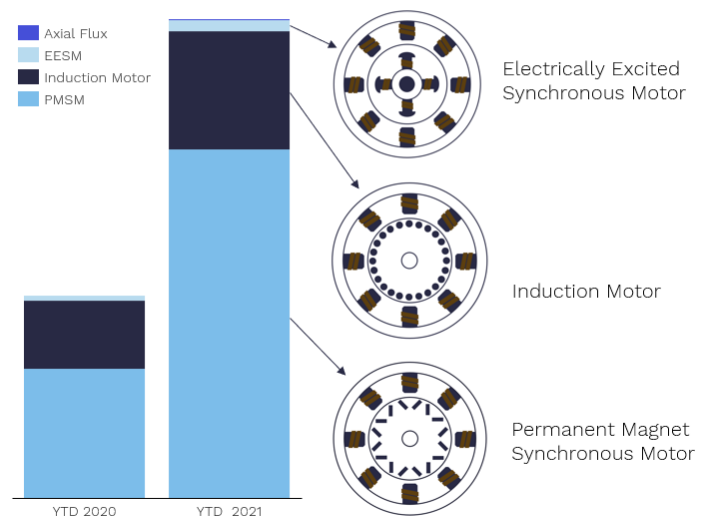


# EV Motors

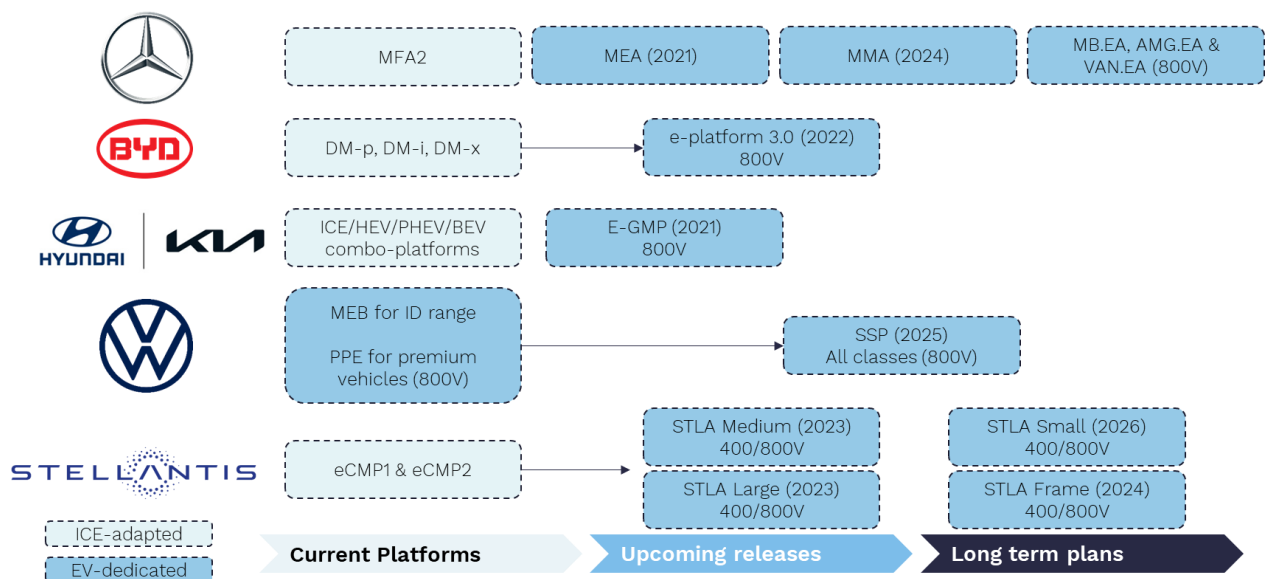


- Currently PMSM technology is the dominant force in the industry (See chart). As supply chains are stretched in the future OEMs, particularly in Europe, may have to look to other technologies to fill the gaps. Axial flux, induction and switched reluctance are all contenders.
- Automotive part suppliers are facing up to the challenge of electrification. New flexible powertrain offerings are looking to compete with the attractions of OEMs moving powertrain operations in-house.
- OEMs are making the move to EV-dedicated platforms away from first generation ICE-adaptations. This change allows the adoption of more efficient systems such as 800V architecture and Silicon Carbide Inverters.

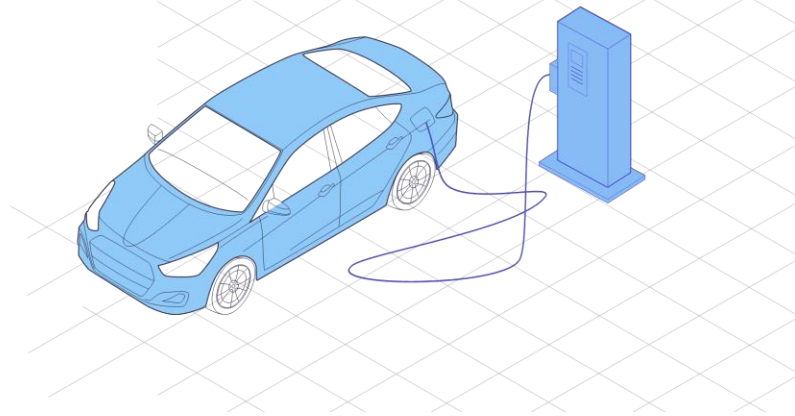
## Types of Electric Motor



## OEMs make the move to EV-dedicated platforms

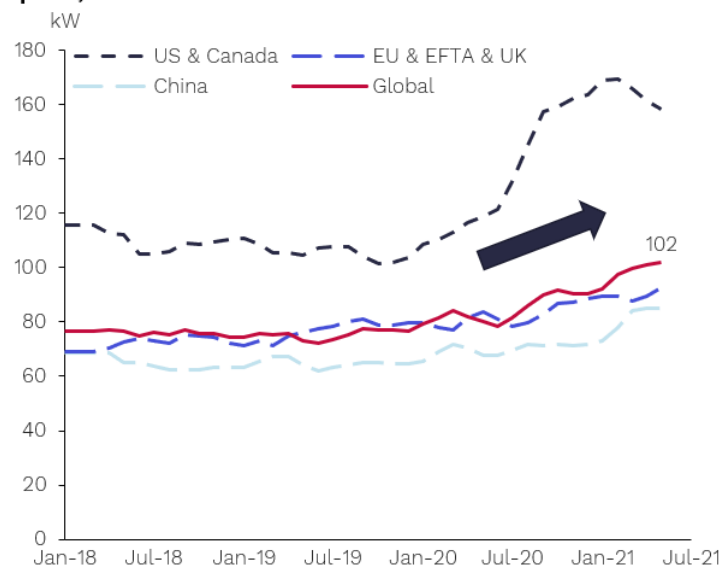


# EV Charging



- In 2021, we expect the global number of public EV charging points to rise by 52% y- o- y to 1.9 million, with most of the growth coming from China and Europe. By 2025, we forecast 4.3 million global public EV charging points will be required, and over 9 million by 2030.
- At the vehicle level, the average maximum charging speed has been increasing for three main reasons: strong sales of the Model Y, rising sales of volume segment vehicles with high charging speed (i.e. ID.3), and the introduction of 800-volt platforms which facilitate faster charging.
- We expect charging speed to continue to rise as more OEMs adopt 800-volt platforms, and developments on the anode continue to advance, which can allow for further increases in charging speed.

3-month sale weighted average maximum BEV charging speed, YTD 2021

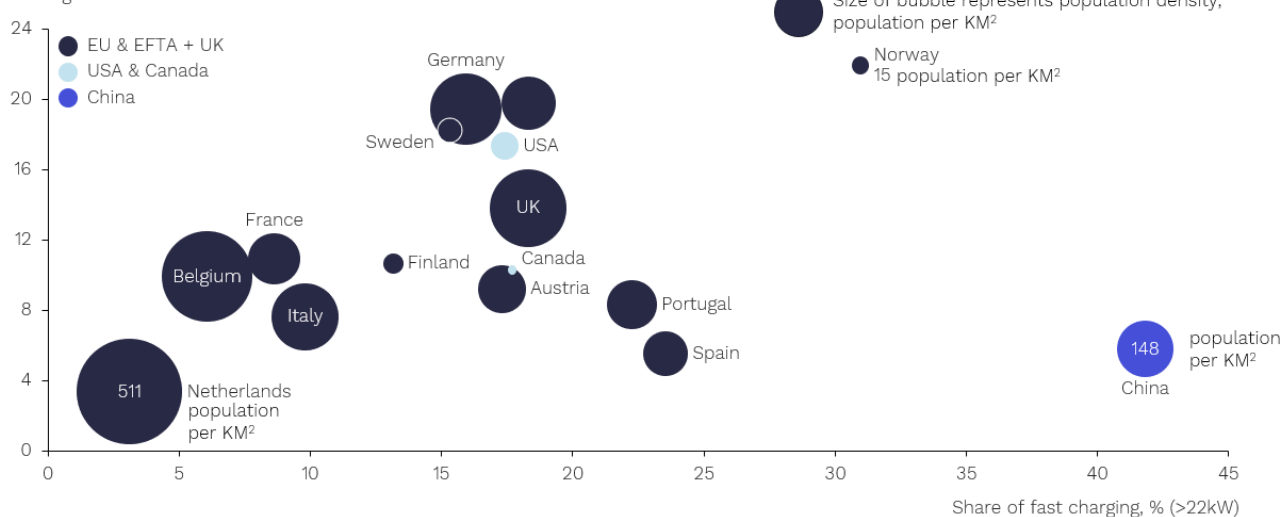


## Public EV charging demand varies by region and is shaped by several key market dynamics

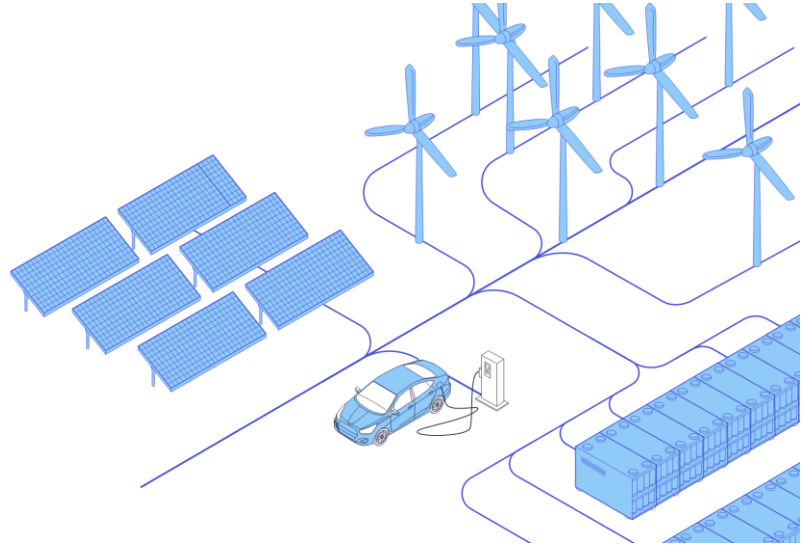


The number of EVs to charging points by region, % of fast charging, YTD August 2021

EVs to charger ratio

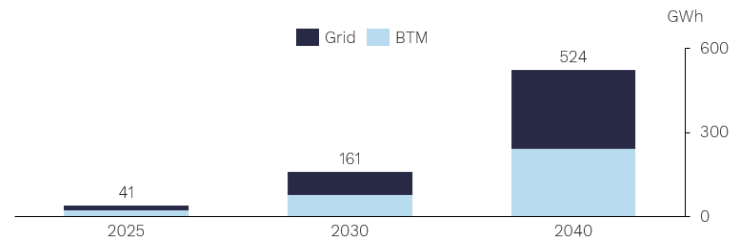
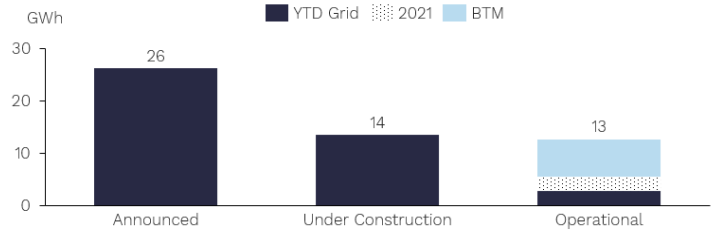


# ESS



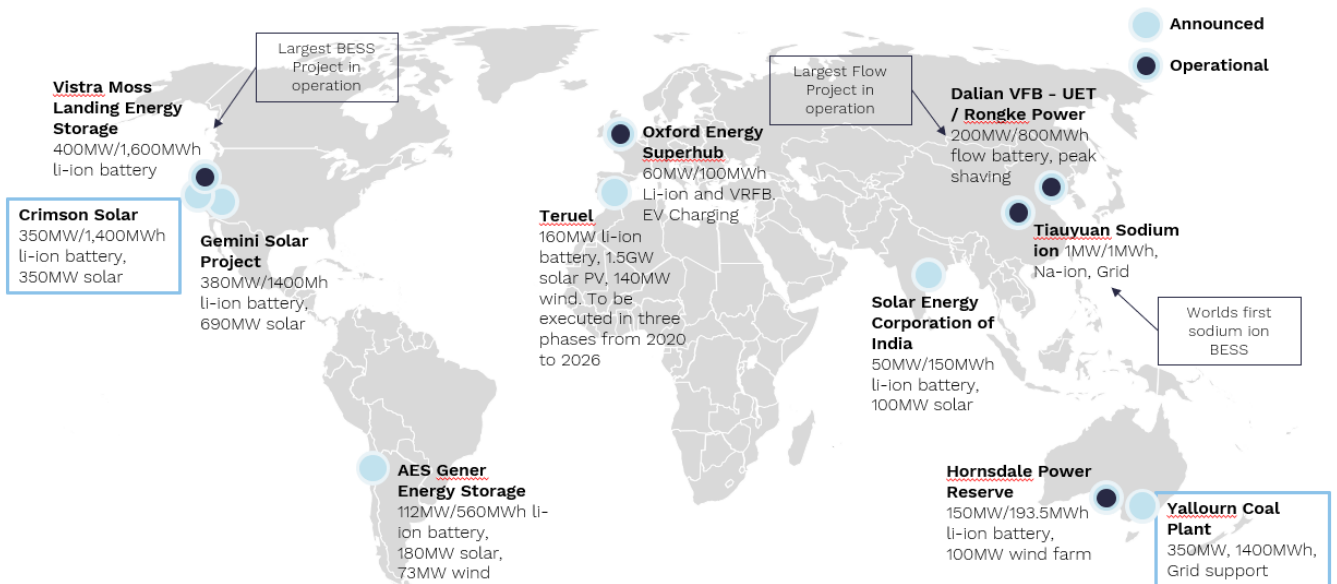
- As the world looks to decarbonise its electricity grid and countries step up their climate actions, the change in electricity generation and supply is having a knock-on effect on the structure and future of the electricity grid, driving the need for energy stationary storage. The fastest growing sectors include the use of paired solar and storage, and at the sites of decommissioned coal and gas plants.
- January – August 2021 installed BESS grid capacity exceeds 3GWh, with more than 40GWh announced or under construction. Demand is set to grow significantly by 2030 to equivalent to 10% of EV battery demand.

2021 YTD BESS Grid



## Large scale grid projects are increasingly being added to the market

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# About Rho Motion

- Our core monthly and quarterly assessments and outlook provide ongoing analysis of the development of Electric Vehicle battery pack sizes, energy density, chemistry and costs, as well as the rate of growth of the Electric Vehicle & Battery market by vehicle class. We also track the roll-out of the charging network and associated infrastructure development linked to battery storage.
- Based in London, our team has expertise in vehicle markets and economics, the battery supply chain and its raw materials, as well as the impact of government legislation on OEM technology choices.



Adam Panayi, Managing Director



Charles Lester, Senior Research Analyst



Iola Hughes, Senior Research Analyst



William Roberts, Research Analyst



Mina Ha, Research Analyst



Yu (Frank) Du, Research Analyst



Terry Scarrott, Principal Consultant



Crispin McCutcheon, Business Development Manager



Fred Keeling, Business Development Executive



Alicia Bennett, Marketing & Membership Manager



Louis Spice, Marketing Manager



Josephine Kirwan, Administration and Accounts

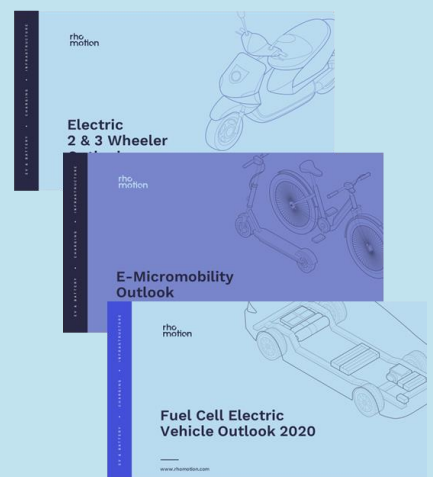
## Monthly Assessments & Databases



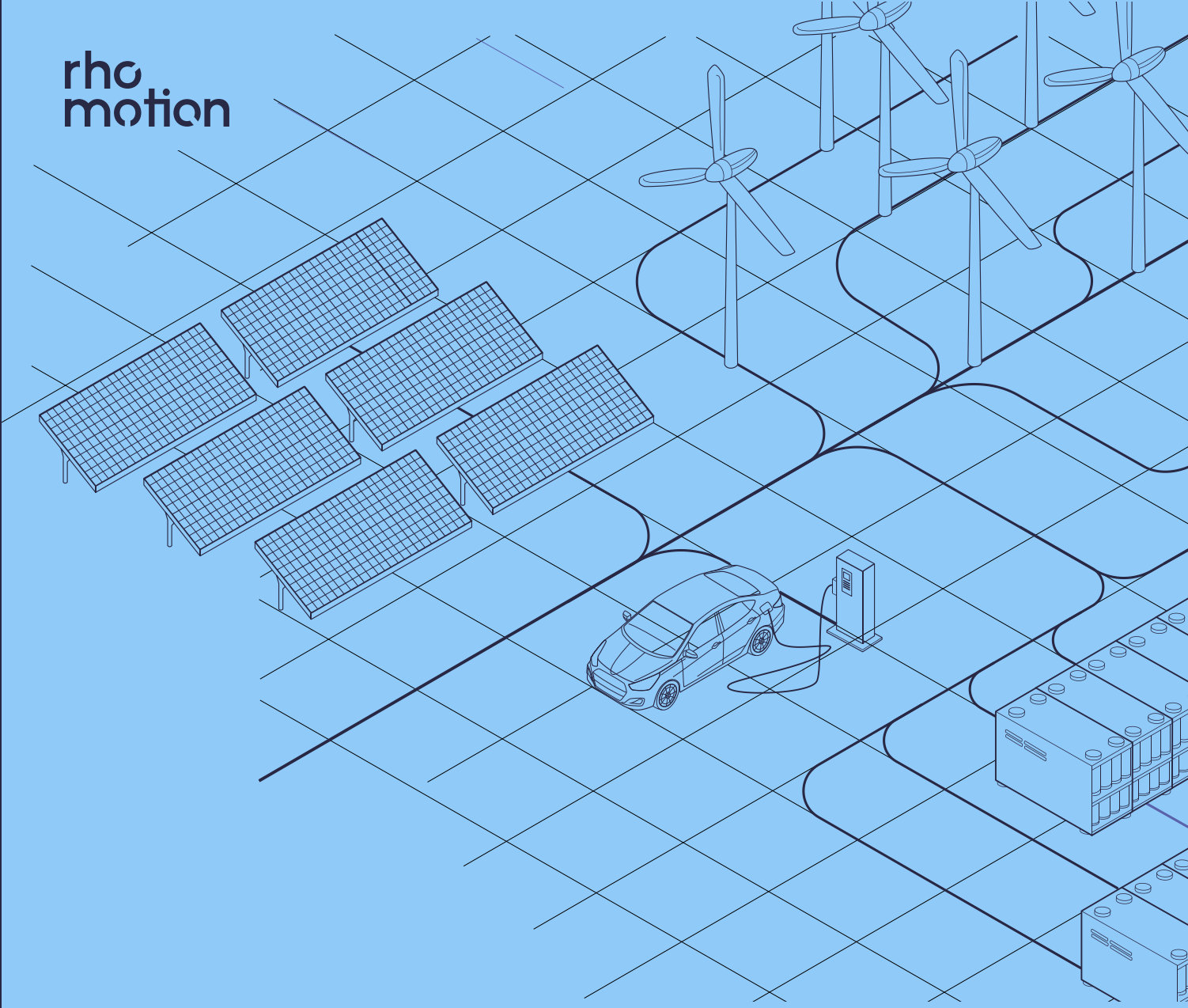
## Quarterly Outlooks



## Focus Reports







**Get in touch**

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