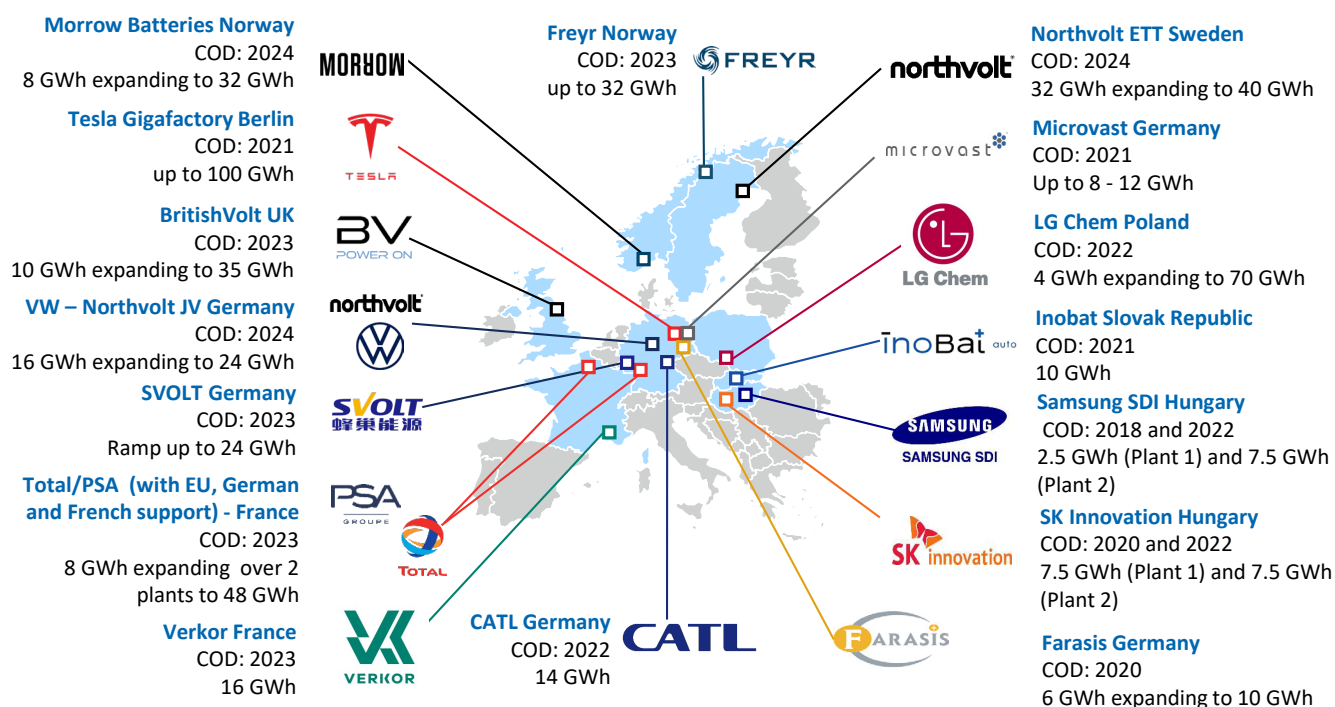


Energy Transition | European Battery Manufacturing: Charging Ahead

The potential oversupply facing Europe's booming battery industry

Europe is responsible for around 3% of the world's lithium-ion battery production, and was a net importer in 2020. However, FTI Consulting estimates Europe is poised to increase its output tenfold over the next five years, and will have a surplus by 2023. We share perspectives on how this potential overcapacity, and other risks, could impact the European battery manufacturing industry and its stakeholders.

FIGURE 1 - MAJOR EUROPEAN LITHIUM-ION BATTERY CELL FACTORIES ANNOUNCED FOR THE NEXT DECADE (PLANNED OR UNDER CONSTRUCTION)



Sources: FTI Consulting analysis – March 2021

European Battery Demand and Supply

Although accurate forecasting is a challenge to any industry, there is a strong consensus that electric vehicle (EV) sales figures are set for a meteoric rise, especially in Europe.

For example, Jefferies Group sees EV demand in Europe rise to over 14 million vehicles per year by 2035, a twelve-fold increase relative to 2020¹. This is driven by a host of factors, such as a third of EU member states announcing some form of ban on ICE (internal combustion engine) vehicle sales, the increasing economic case for EVs, and a growing citizen climate consciousness. In response, European OEMs are accelerating their electrification efforts.

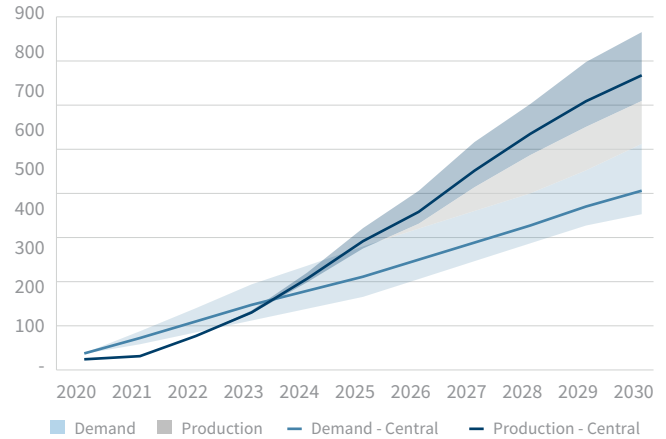
Europe is also experiencing a boom in battery investment, and dozens of battery production facilities have been announced or have begun construction. This growth is due to a number of economic and market drivers:

- The growth in local EV demand, backed by a quickening green transition – about a third of EU member states have announced some form of ban on ICE vehicle sales.
- European auto manufacturers’ EV production increasing significantly in recent years – for instance, Volkswagen sold more EVs in Europe than Tesla in 2020² for the first time.
- The EU’s local content regulations, which require 55% of a vehicle to be manufactured in the EU for free trade rules to apply.
- The EU’s own drive to localise its battery production, both for economic and strategic reasons, with significant incentives available for battery manufacturing (as we will explore later).
- The weight of EV batteries (which can exceed a ton), which lead to high overseas transportation costs.

Indeed, in Figure 2, data from both IHS Markit and the European Commission show an over five-fold rise in demand for lithium-ion batteries (from all sources) over the next five years. FTI Consulting estimates European lithium-ion battery demand could reach up to 200 GWh by 2025, when including heavy-duty trucks and buses (4 GWh) and stationary storage applications (13 GWh) as well as EVs.

FIGURE 2 - EUROPEAN LITHIUM-ION BATTERY DEMAND AND PRODUCTION FORECASTS (GWH)

DEMAND (GWH) | PRODUCTION (BASED ON ANNOUNCED CAPACITY)



Sources: FTI Consulting estimates based on announced capacity, European Commission, IHS Markit – as of March 2021

The European Commission estimates that EU lithium-ion battery production will match this demand by 2025. As shown in Figure 1, a multitude of lithium-ion battery factories have been announced in Europe for the early 2020s, with 15 currently under construction³. These plants alone could represent almost 300 GWh of production capacity by the mid-2020s (see Figure 2), with the potential for facilities ramping-up to well over double this by the end of the decade. This is a substantial increase from Europe’s current output of around 39 GWh. As a result, European demand and supply for lithium-ion will equalise before 2025, potentially as early as 2023⁴. Excess capacity could reach 300 GWh by 2030 – for demand to match this, manufacturers in Europe would need to boost EV production by over 40% from 2025 onwards⁵.

Note that the banding in Figure 2 represents different demand forecasts for the demand line. For the production line, the time to ramp up battery factories to their maximum output is varied (4 years is the aggressive limit and 10 years the conservative one). FTI Consulting has added sites that are likely to be confirmed such as Panasonic’s plant in Norway, but it is likely that this production curve could be higher in the latter half of the decade when considering facilities which have not yet been announced, and battery second life has not been considered. However, this analysis does not account for potential delays and cancellations of battery plants.

1 Jefferies LLC, Auto Tech & Connected Mobility - Equity Research Report- Jan 2021
 2 VW Sales Top Tesla in Europe After Incumbents Fight Back, Bloomberg article, 27/01/2021

3 EU says it could be self-sufficient in electric vehicle batteries by 2025, Reuters article 24/11/2020
 4 Electric Surge: Carmakers’ electric car plans across Europe 2019-2025, European Federation for Transport and Environment Report, July 2019
 5 European Federation for Transport and Environment EV production forecast

What are the Implications?

WHAT DOES THIS MEAN FOR BATTERY MANUFACTURERS?

Production levels exceeding demand is not necessarily negative news for European battery manufacturers and their investors, although it should be noted that the above forecasts are far from certainties. It is likely lithium-ion battery prices will continue to drop (with BNEF predicting prices as low as \$60/kWh by 2030), but this was predicted to occur anyway due to improving manufacturing methods and economies of scale. Europe could export this additional capacity, as Asia does today – however, this introduces new risks into European battery manufacturers’ business models.

Firstly, it is likely that the export market for lithium-ion batteries will be dominated by Asian manufacturers for the foreseeable future. EV battery supply is currently dominated by a few global players with almost 85%⁶ of global capacity provided by just 5 companies (LG Chem, CATL, Panasonic, SDI and BYD, in order of capacity supplied) in 2020, all of which are based in Asia. There are several reasons why these companies will likely continue to dominate, at least in the export market:

- Economies of scale – these play a crucial role in manufacturing batteries. Although European sites will grow to large sizes they are still likely to be smaller than the factories of established Asian manufactures.
- R&D – the larger Asian manufacturers can spend more on research and development (R&D), which is critical to increasing battery efficiency and decreasing manufacturing costs.
- Regulations – there are several potentially costly regulatory hurdles European manufacturers will need to comply with, which will disadvantage them relative to their Asian competitors (see Figure 3). These include minimum recycled contents in their products and higher safety and sustainability requirements for manufacturers and their supply chains.
- Cheaper products – although this is likely to vary, Europe tends to have higher capex and labour costs than Asian markets⁷. For example, European labour costs are around 100% higher than in China⁸, and these factors will feed into battery prices.

Accordingly, the export market is likely to be challenging for European battery manufacturers to gain significant market share in. There are of course still export opportunities, including access to nearby countries or other markets with strict regulations on content and supply chain which European players could access at little extra cost, or the significant sources of funding which have been made available to them, which we discuss below. Players should focus on investing in these opportunities to avoid being entirely dependent on a soon-to-be highly competitive European market.

FIGURE 3 – EU BATTERY SUSTAINABILITY REGULATIONS

Proposed European Regulation: Sustainability Requirements for EV batteries

Hazardous substances	Restrictions on hazardous substances in all battery types, in particular mercury and cadmium
Carbon footprint	<p>As of July 2024: EV batteries require carbon footprint declaration</p> <p>As of January 2026: EV batteries require a carbon intensity performance class label</p> <p>As of July 2027: EV batteries need to comply with maximum carbon footprint threshold</p>
Recycled content	<p>As of July 2024: EV batteries have to declare the content of recycled cobalt, lead, lithium and nickel</p> <p>As of 2030: Minimum of recycled content required (12% cobalt; 85% lead, 4% lithium and 4% nickel)</p> <p>As of 2035: Recycled content to increase (20% cobalt, 10% lithium and 12% nickel)</p>

WHAT DOES THIS MEAN FOR AUTO ORIGINAL EQUIPMENT MANUFACTURERS (OEMs)?

Lithium-ion battery prices are forecast to drop almost 50%⁹ over the next 20 years. For European OEMs, a surplus in local supply will allow access to low prices, bolstering the trend of falling EV prices in the coming years. This is because manufacturers are unlikely to be able to maintain high profit margins when price competition is strong.

In addition, this surge in local manufacturing will allow EV OEMs to continue the recent shift towards vertical integration. A number of OEMs have recently entered JVs with battery manufacturers (Tesla, Volkswagen, Toyota and GM to name a few – see Figure 4). The pool of local manufacturers will likely see this trend extend to other major European OEMs such as Renault, BMW, FCA and JLR. Furthermore, it will assuage battery shortage anxiety, at least for most European EV factories.

6 Four Companies Leading the Rise of Lithium & Battery Technology, Global X article. 09/12/2020

7 The European Commission proposed new sustainability requirements in December 2020: https://ec.europa.eu/environment/pdf/waste/batteries/Proposal_for_a_Regulation_on_batteries_and_waste_batteries.pdf

8 National Bureau of Statistics of China, Eurostat

9 The Electric Car Battery Boom Has Screeched to a Halt, For Now, article by Bloomberg citing BNEF data, June 2020

FIGURE 4 – MAJOR OEMS JVS WITH BATTERY MANUFACTURERS



WHAT DOES THIS MEAN FOR GOVERNMENTS?

This boom in local production is seen as a double-edged sword for Governments. On the one hand, FTI Consulting estimates almost 100,000 new jobs could be created in the industry by 2030, and the EU will go from importer to exporter of batteries. On the other hand, only around 25% of the announced production is from European companies – the bulk of production still lies in the hands of Korean and Chinese manufacturers¹⁰. This could create strategic security of supply issues, if Governments decide that, like telecommunication networks, battery manufacturing is a vital industry. However, funding from local Governments and the European Commission (who recently approved €3.2 billion for battery value chain R&D) could tip the scales in the favour of European companies.

WHAT DOES THIS MEAN FOR AUTO SUPPLIERS?

While suppliers of components that are common to EVs and ICE vehicles are not likely to see much impact from these changes, this could significantly affect traditional engine manufacturers. As battery prices plummet and supply becomes relatively abundant, one of the key barriers to the EV transition will be removed, which will likely further contribute to quickening it. As a result, ICE manufacturers that have delayed adapting their business model risk becoming stranded and dependent on ever-tightening demand as major OEMs all shift to increasingly profitable EV production.

Conclusion

FTI Consulting estimates that European battery production capacity will soar tenfold in five years, to exceed 300 GW by 2025. This will likely outpace even ambitious European vehicle electrification forecasts, and manufacturers will likely be left with a European surplus as early as 2023-24.

This surplus will have positive consequences for EV OEMs, as this increased local competition will likely result in battery prices falling as forecast. It is also an opportunity for laggard OEMs to join up with local battery manufacturers, as so many OEMs are already doing, to guarantee supply and prices. For governments, the increased production will result in a windfall of almost 100,000 new jobs and tilt the balance of trade in batteries back in their favour. However, a number of these new factories will be built by the Asian battery giants, which could result in strategic supply issues.

For European battery manufacturers and their stakeholders, several key steps should be taken to avoid losing market share:

- Invest in R&D, to ensure a stake in future technologies such as solid-state batteries or cheaper manufacturing techniques, and avoid being undercut by other producers.
- Analyse the export market carefully, and leverage their high regulatory standards to select key markets where they are most likely to beat the incumbent Asian exporters.
- Engage in tie-ups with OEMs and other clients as much as possible, to secure demand as well as investments.

Stakeholders in the European battery value chain and the wider EV value chain should carefully consider the implications from this local surplus in production or risk being crowded out of business.

10 Top electric vehicle markets dominate lithium-ion battery capacity growth, S&P Global article, 16/02/2021

The views expressed in this article are those of the author(s) and not necessarily the views of FTI Consulting, its management, its subsidiaries, its affiliates, or its other professionals.

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