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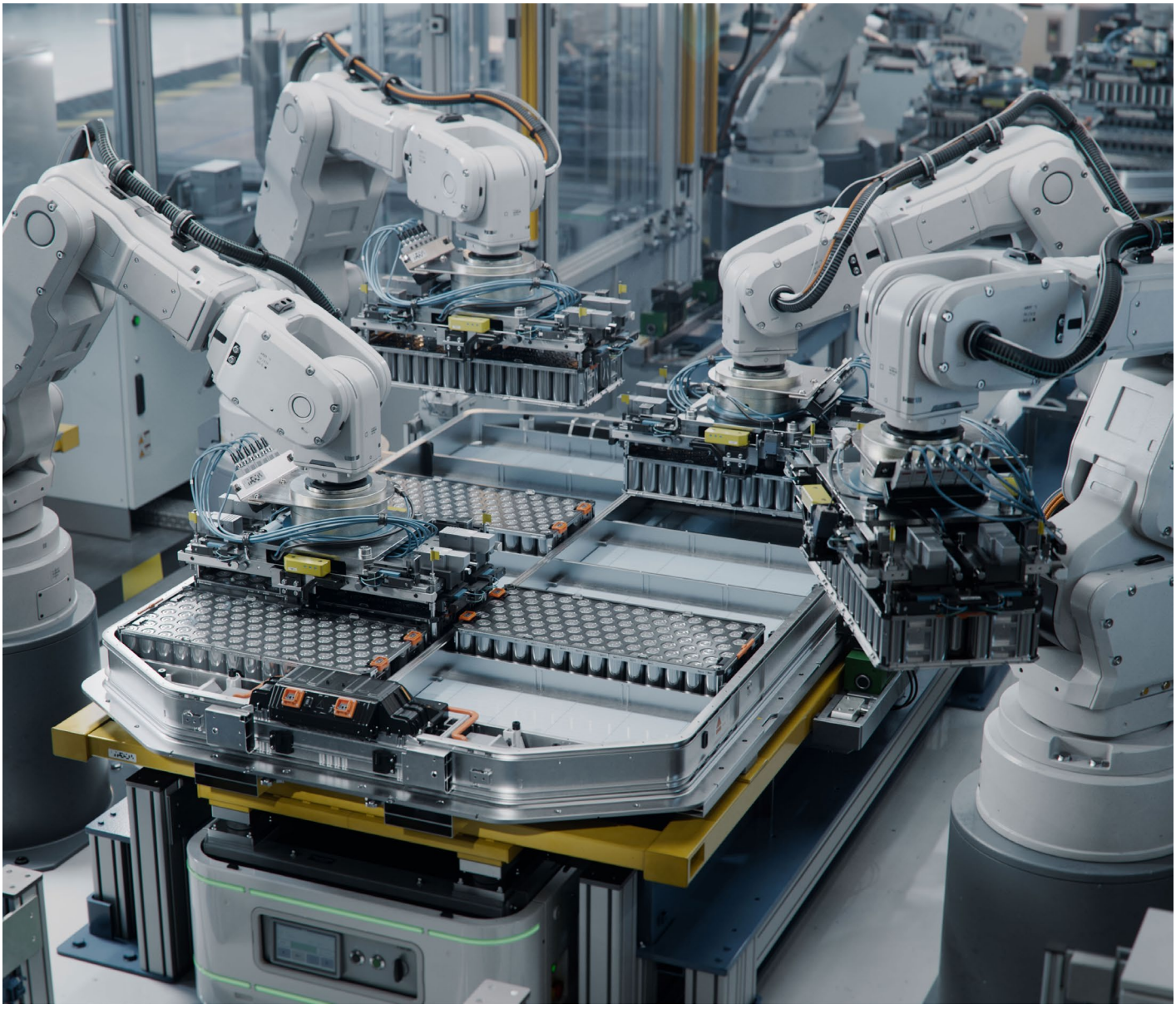
European Battery Sovereignty

Towards greater competitiveness and less dependency

Europe's automotive industry stands at a strategic crossroads. As the global shift towards electric mobility accelerates, the continent's heavy reliance on Asian battery manufacturers poses growing risks to its industrial sovereignty. Despite ambitious targets, Europe's battery production remains limited in terms of both capacity and control. Our latest analysis shows that without decisive action, the continent risks becoming a permanent price taker in one of the most critical segments of the electric vehicle (EV) value chain. We quantify the extent of market concentration and regional dependency, and outline what European OEMs and suppliers must do now to secure competitiveness and resilience in the battery race.



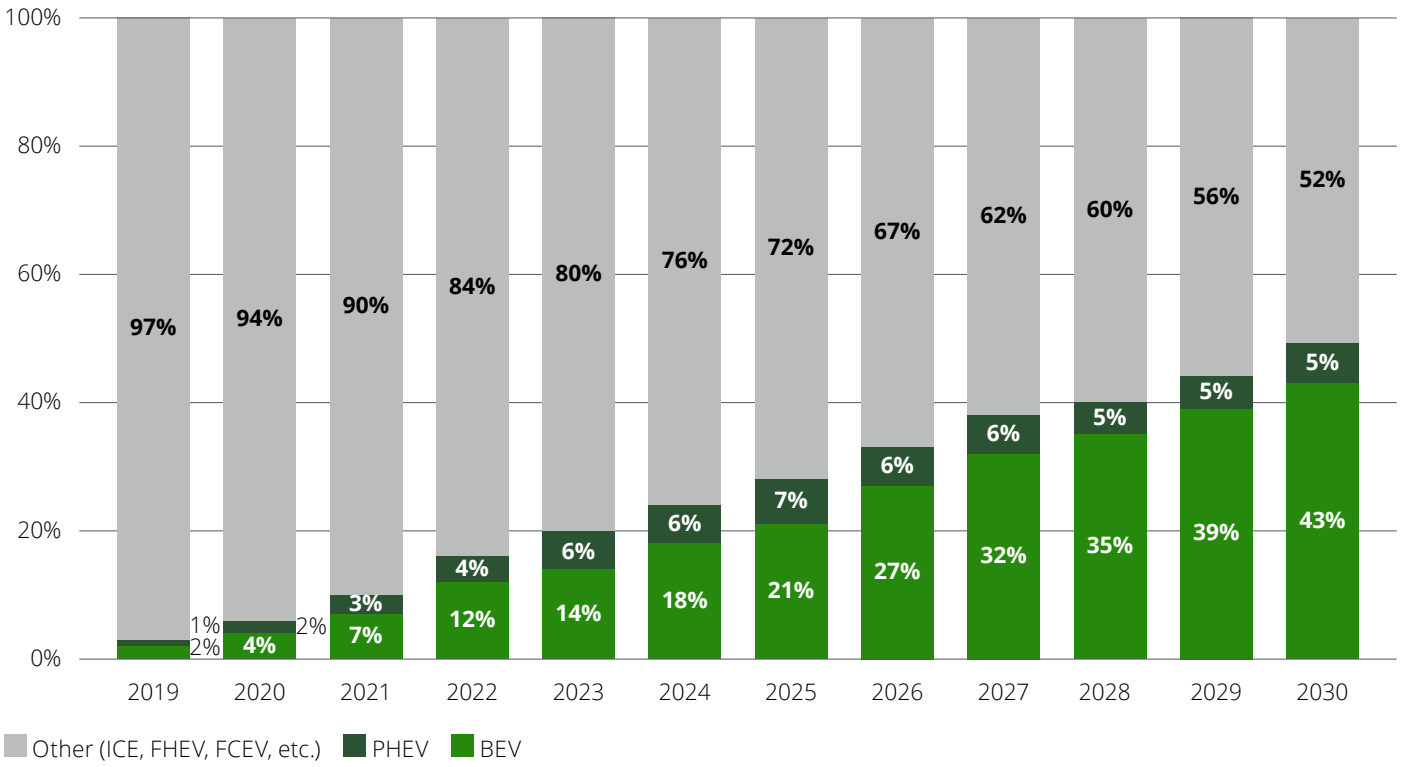
Electric mobility is gaining momentum across regions in a particularly heterogenous manner, as penetration rates vary significantly from one geography to the other. Despite this, the overall global trajectory points towards continued growth, driven by regulation, technological advancements and growing consumer acceptance overall, with fully electric vehicles (BEVs) projected to surpass 40 percent market share by the end of the decade (see Figure 1).

In order to accelerate this transformation and meet the decarbonization goals, clarity and stability for manufacturers, suppliers, and investors alike are crucial. The rise of EVs is not just about transforming manufacturer product portfolios; it involves reshaping the entire automotive value chain. Suppliers must adapt to new component requirements, such as electric drivetrains and power electronics. Meanwhile, the aftermarket faces a shift in service needs due to fewer moving parts and different maintenance cycles. To stay competitive, companies need to rethink business models, invest in new capabilities, and form strategic partnerships.

Yet one thing is clear: At the heart of this transformation lies the high-voltage battery – a key technology that not only determines vehicle performance and range but also represents by far the single most expensive component in an EV. Innovations in cell chemistry, energy density, and recycling are opening new avenues for cost reduction and sustainability. The ability to produce advanced batteries at scale within Europe will be a decisive factor in securing industrial sovereignty by reducing reliance on foreign players.

As of today, China is leading the global race in electric mobility, with approximately 43 percent of vehicle sales in 2024 having been electric[1]. Chinese manufacturers, already dominant in their domestic market, are now actively expanding abroad. With the U.S. market largely closed off due to trade tensions and tariffs, Europe has emerged as the next strategic target. In 2024, Chinese brands already accounted for 11 percent of total passenger vehicle sales in Europe. Meanwhile, European OEMs still hold a leading position in their home market, with 57 percent of sales. However, this balance is at risk of shifting, and a key factor in maintaining Europe's competitiveness will be its ability to produce its batteries domestically.

Fig. 1 – EV ramp-up worldwide (as percentage of passenger vehicle sales)



Source: Deloitte E-Mobility Forecasting Model

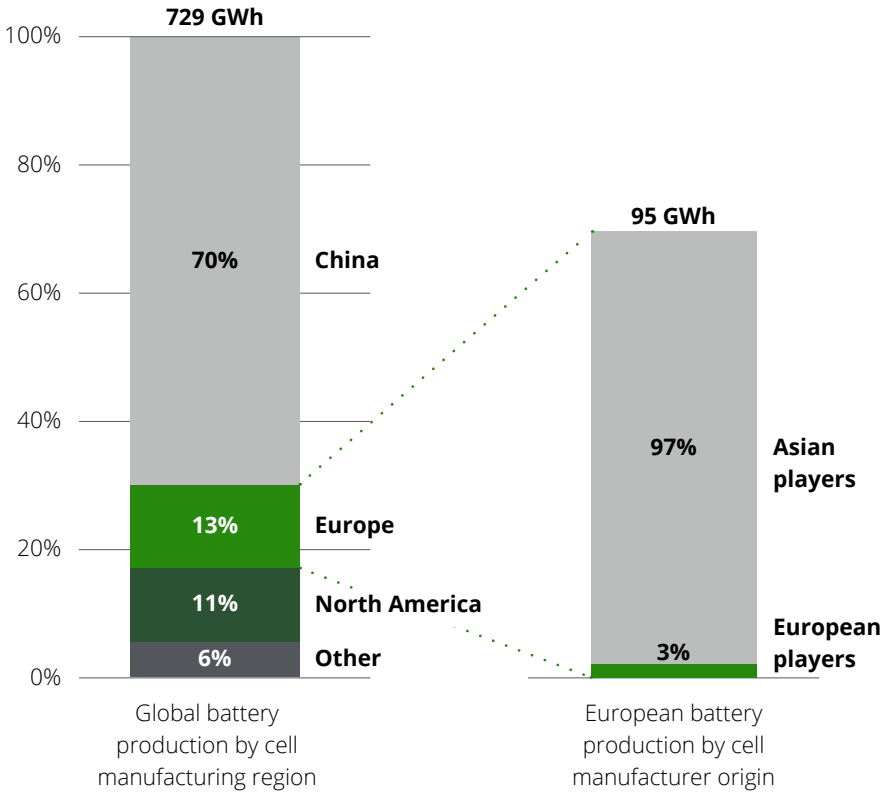
[1] Electric vehicles include battery-electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs).

Status quo of battery manufacturing in Europe: Asian dominance

Despite its importance, battery production does not yet play a major role in Europe. In the global race, it remains a relatively small player compared to other regions. Battery development and production is not only very energy intensive and expensive. It also requires completely different capabilities and know-how than traditional automotive players are used to and have specialized in. Acquiring these new capabilities while securing access to key raw materials and establishing new supply chains is a complex and resource-intensive challenge.

In 2024, around 70 percent of the global supply of BEV battery cells for light vehicles were produced in China (see Figure 2). By comparison, Europe accounted for only 13 percent in the same year. Although this figure is already relatively low, it still misrepresents the continent's industrial strength: 97 percent of this production capacity in Europe, valued at approximately 94 GWh, is controlled by non-European companies, mainly Chinese and South Korean manufacturers. Only one EU-based player managed to produce a limited volume of battery cells in 2024, and these were largely used for own vehicle brands. This heavy reliance on foreign players poses strategic risks for Europe's automotive sector, particularly in terms of supply security, pricing power, and technological sovereignty.

Fig. 2 – Where are today's BEV batteries produced?
(2024, % of production capacity in GWh)

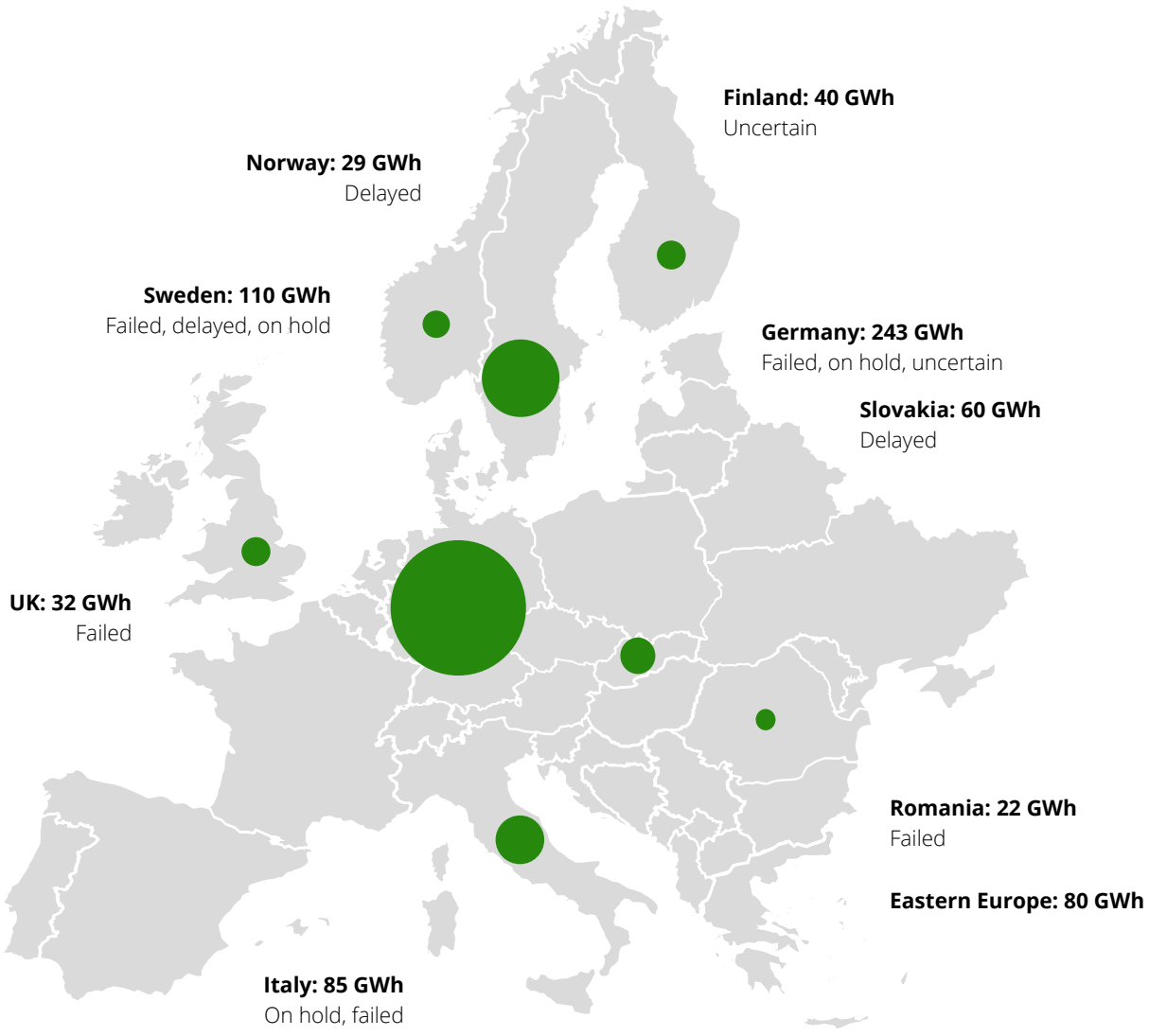


Source: Deloitte Analysis, GlobalData, 2025

The dominance of Asian firms is no coincidence. Over the last few decades, they have secured their leadership position through early, large-scale investments across the entire battery value chain, from raw material mining and processing to cell manufacturing and assembly. Their vertically integrated models and economies of scale allow them not only to serve their domestic market but also to supply a significant share of batteries for EVs assembled in Europe, a strategic advantage already highlighted in our 2023 study on battery cost dynamics[2].

Despite numerous announcements of battery plant projects in Europe in recent years, only a few have progressed as planned. Many initiatives have been delayed, scaled back, or canceled altogether (see Figure 3). The reasons are multifaceted: limited access to critical raw materials, high capital requirements, operational inefficiencies such as high scrap rates, and a lack of clear regulations and demand for electric vehicles have all contributed to the slow development of a competitive domestic battery ecosystem.

Fig. 3 – Battery production capacities in Europe of delayed and failed projects

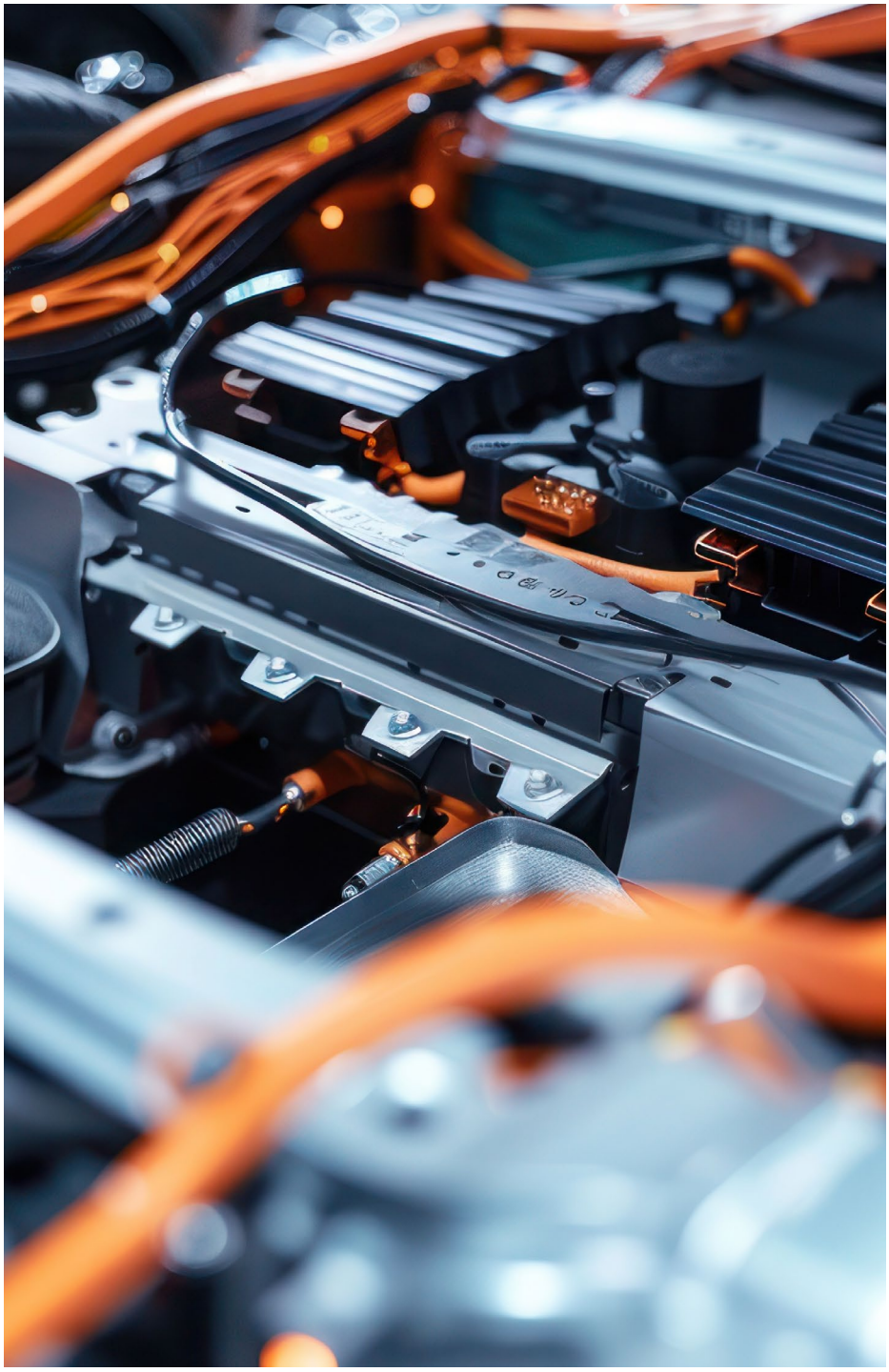


Source: Fraunhofer ISI, 2025

[2] The key role of battery costs in Automotive | Deloitte Germany

Analyzing market concentration around battery production in Europe

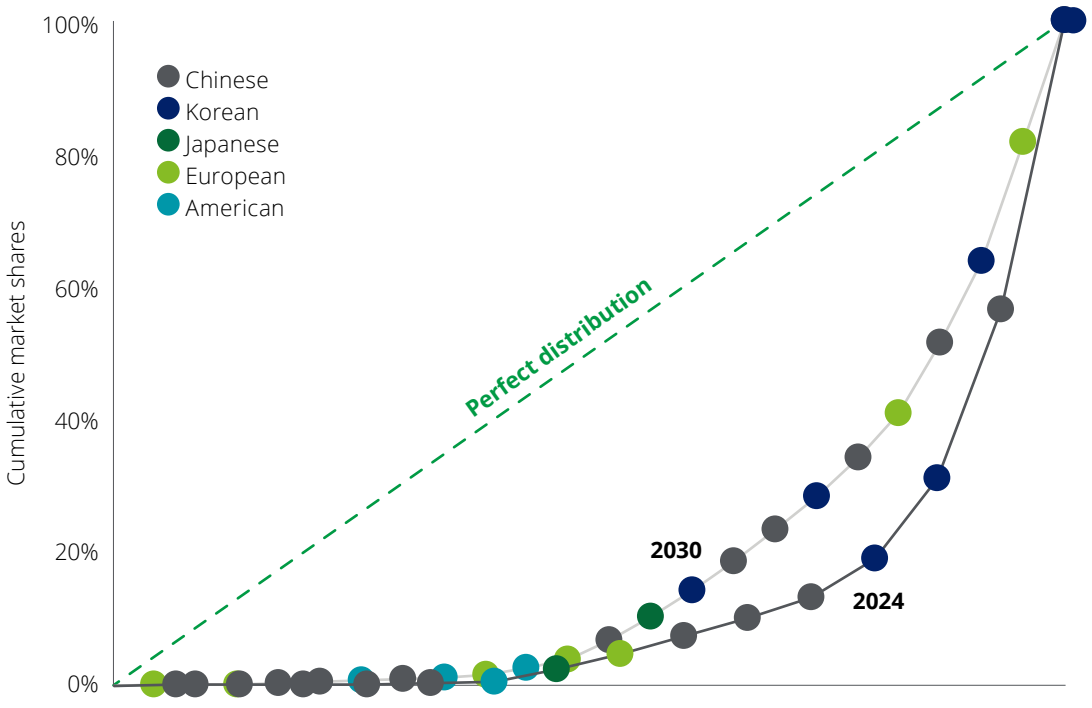
If current trends continue and no decisive action is taken by European players, the continent will remain heavily dependent on external suppliers for the most critical component of EVs. Missing the opportunity to build a competitive and sovereign battery ecosystem is therefore a latent risk. To better understand the situation and derive strategic levers to react, we analyzed the market concentration of battery production in Europe today (2024) and in the future, using two complementary tools: the Lorenz curve and the Herfindahl-Hirschman Index (HHI).



1. Visualizing market imbalance: the Lorenz curve

Figure 4 illustrates the distribution of battery production capacities in Europe. The current market inequality is clearly observed as a steep Lorenz curve for 2024, where the top two players have combined control of around 69 percent of the market and therefore a vast majority of production capacities. While European firms are projected to gain some ground by 2030 and the top two players would achieve a far lower combined market share of 36 percent, the curve flattens only slightly compared to a perfect distribution. This indicates that structural imbalance will persist without significant intervention.

Fig. 4 – Cumulative share of BEV-battery manufacturersin Europe
(2024 and 2030, 9 of production capacity in GWh)



Set of active companies in 2024 (dark gray line) and 2030 (light gray line) ascending by market share

The Lorenz curve, originally developed to illustrate income inequality, is equally effective in highlighting market imbalances – in this case, how unevenly battery production is distributed among companies.

In a perfectly competitive market, production would be evenly spread, and the curve would mirror the line of perfect distribution. However, a steep Lorenz curve indicates that a small number of players control a disproportionate share of the market, signaling high concentration and strategic vulnerability.

2. Quantifying concentration: the Herfindahl-Hirschman Index (HHI)

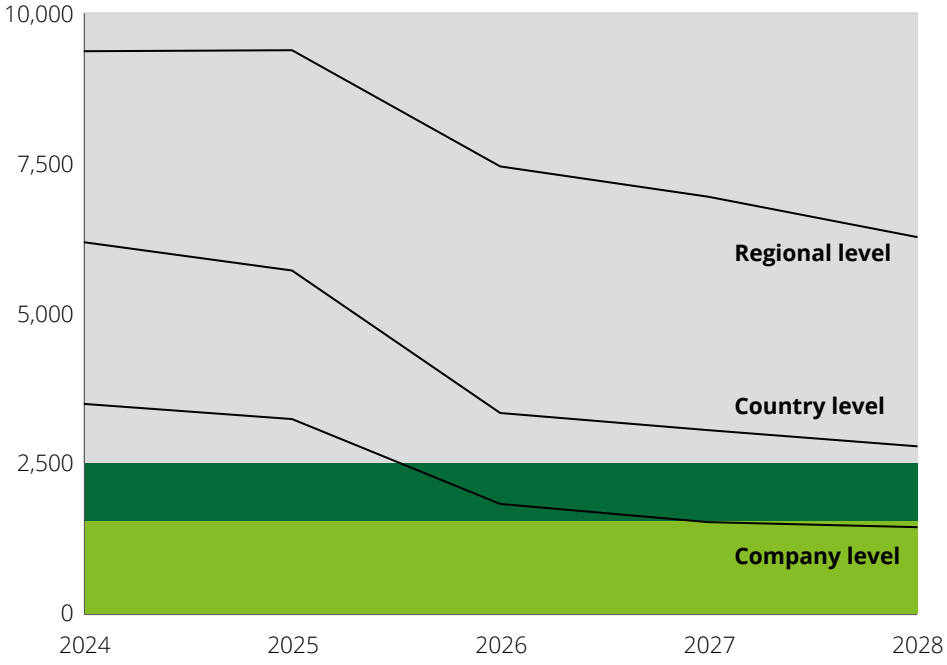
To complement the graphical assessment, we use the Herfindahl-Hirschman Index (HHI), a widely accepted metric for market concentration. The HHI is calculated by summing the squares of market shares, giving more weight to dominant players. In battery production, where capital intensity and geopolitical exposure are high, even moderate concentration levels can pose significant risks.

The interpretation of HHI values follows established regulatory benchmarks. An HHI below 1,500 indicates an unconcentrated, competitive market. Values between 1,500 and 2,500 suggest moderate concentration, potentially with some pricing power and strategic influence. An HHI above 2,500 signals a highly concentrated market, typically dominated by a few players, with reduced competition and increased vulnerability to pricing manipulation and supply disruptions.

Our analysis reveals a stark divergence between HHI values when calculated by manufacturer region of origin or at company level. In 2024, the company-level HHI stood at 3,889, placing the market firmly in the highly concentrated zone. When grouped by region of origin, the HHI rises sharply to 9,992, an almost monopolistic position, highlighting Europe's dependency not just on individual firms, but on entire foreign ecosystems. As new players are expected to start production in the coming years, the company-level HHI will likely enter a healthier field and achieve status as an unconcentrated market around 2028. Nevertheless, at regional and country level, the playing field remains highly concentrated and dominated by Asian players, as both values remain clearly above the 2,500 HHI threshold, even towards the end of the decade.

This discrepancy is not merely mathematical, it is strategic. While no single company may dominate globally in the future, the aggregation of market share by region of origin reveals regional monopolization, unsurprisingly from Asia. From the supply chain and policy perspective, this is a far more serious concern.

Fig. 5 – HHI analysis of battery production in Europe over time
(Scenario 1, at company level, and also by region and country of origin of active players)



Highly concentrated market HHI > 2500
Moderately concentrated market 1500 < HHI < 2500
Unconcentrated market HHI < 1500

Source: Deloitte Analysis, GlobalData, 2025

The Herfindahl-Hirschman Index (HHI) is a widely used measure of market concentration. It is calculated by summing the squares of the market shares of all firms (or regions) in a market. The HHI ranges from 0 (perfect competition) to 10,000 (monopoly).

In this study, HHI is used to assess both company-level and regional concentration in the European battery production industry, providing insights into competitive dynamics and geopolitical dependencies.

It implies that even if new players enter the market and gain market share, the underlying geopolitical concentration will remain unchanged unless Europe and other western companies can build their own competitive production capacities.

Without such efforts, European OEMs risk becoming permanent price takers, unable to influence cost structures and exposed to volatile supplier pricing. This could result in reduced margins and a diminished ability to compete effectively, particularly in cost-sensitive market segments. Therefore, strategic autonomy in battery production is a matter not only of resilience, but also of preserving profitability and market relevance.

It is important to note that HHI values by region will naturally be higher than company level HHI values. This is due to the smaller number of regions compared with individual companies. Fewer players in the calculation inherently lead to higher concentration scores. While this makes it unrealistic to expect regional HHI values to fall below the 1,500 threshold typically associated with unconcentrated markets, the metric still provides valuable insight. From a European perspective, the goal should not be to eliminate concentration entirely, but to reduce it to a level where Europe holds a meaningful share of production and influence. Lowering the regional HHI by increasing Europe's share would signal a more balanced and resilient global battery landscape, with greater strategic autonomy and reduced vulnerability to external shocks.

To interpret these findings, we consider three strategic scenarios for Europe's battery industry by 2028, each reflecting different levels of market share and corresponding market concentration outcomes (based on regional HHI values):

Fig. 6 – Overview of future scenarios around the European battery production industry

Scenario	1. Passive trajectory	2. Limited advancement	3. Strategic sovereignty
Description	Europe fails to take coordinated action. Battery investments remain fragmented, and most announced projects are delayed, downsized, or cancelled. European firms continue to rely heavily on imports from Asia, and domestic production capacity stagnates	European firms secure a moderate share of global battery production through selective investments, joint ventures, and public-private partnerships. Some domestic capacity is built, but the ecosystem remains partially dependent on foreign technology and materials	Europe achieves a strong market share through coordinated industrial policy, large-scale investment, and leadership in next-generation battery technologies. A robust domestic ecosystem emerges, supported by secure raw material access and advanced recycling infrastructure
Market share of European players in 2028	**<25%**	**30%–35%**	**>40%**
HHI value by region in 2028	**>5,000** Very high market concentration	**~3,500** High market concentration	**~3,000** Approaching moderate market concentration
Impact on product portfolios	Limited access to advanced battery formats and chemistries restricts innovation. European players struggle to compete in high-performance or cost-sensitive segments	Access to newer battery formats improves, but innovation cycles are still driven externally. Differentiation is possible but limited	Strong differentiation through advanced battery formats (e.g., CTB, 800V systems). OEMs lead in performance, range, and sustainability
Pricing impact	**Price taker without negotiation potential:** High exposure to supplier pricing, limited ability to influence cost structures	**Price taker with limited negotiation potential:** Some leverage through partnerships, but still dependent on external ecosystems	**Negotiation potential:** Greater control over pricing and supply terms through domestic capacity and technological leadership

Technology levers to support strategic sovereignty

While market share and ecosystem control are critical, Europe's ability to achieve battery sovereignty will ultimately depend on its capacity to innovate. The scenarios outlined above highlight the strategic importance of scaling domestic production of light vehicle batteries, a market which is rapidly growing. In 2024, we estimated its size at around €16.3 billion, based on average battery sizes, prices and weighted sales numbers across vehicle segments. Despite falling prices, we expect this figure to more than triple by the end of this decade and reach an estimated €54.0 billion by 2030 (see Figure 7).

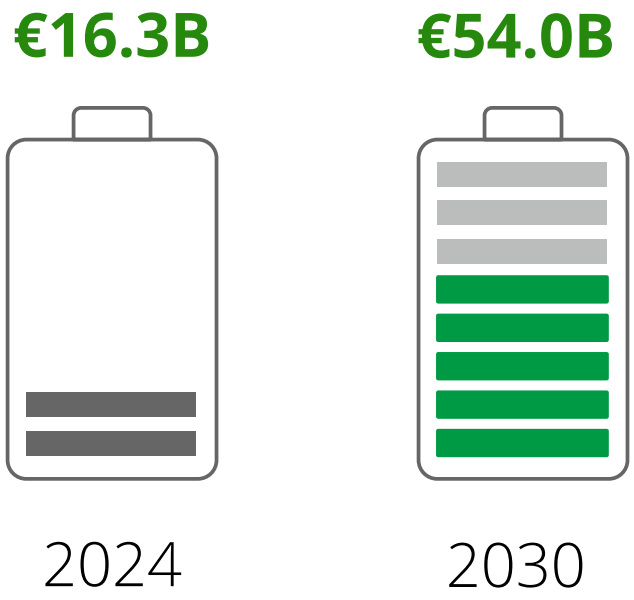
But scale alone is not enough: To achieve higher competitiveness and reduce technological dependency, Europe must invest in next-generation battery technologies. This imperative is reflected in the EU's Clean Industrial Deal, which earmarks €350 million under Horizon Europe (2025–2027) specifically for R&D in advanced battery systems. Such investments are essential to enable European OEMs and suppliers to differentiate, reduce costs, and secure long-term competitiveness. We identify two key technological levers that can help Europe move from dependency to leadership.

Pushing towards a more integrated battery design

Traditional battery systems in electric vehicles are typically built using cell-to-module (CTM) architectures, where individual cells are grouped into modules, and these modules are then assembled into a battery pack. Such designs are becoming increasingly inefficient due to added weight, volume, and complexity. By contrast, cell-to-pack (CTP) and cell-to-body (CTB) designs eliminate the intermediate module layer, enabling higher energy density, lower costs, and improved vehicle performance.

These technologies are not only technically superior, they are also gaining market share globally and are expected to gradually replace legacy CTM systems. For European OEMs, this shift offers a strategic opportunity to differentiate their products and reduce reliance on formats dominated by Asian suppliers.

Fig. 7 – Projected size of the BEV battery market in Europe over time
(in billion €)



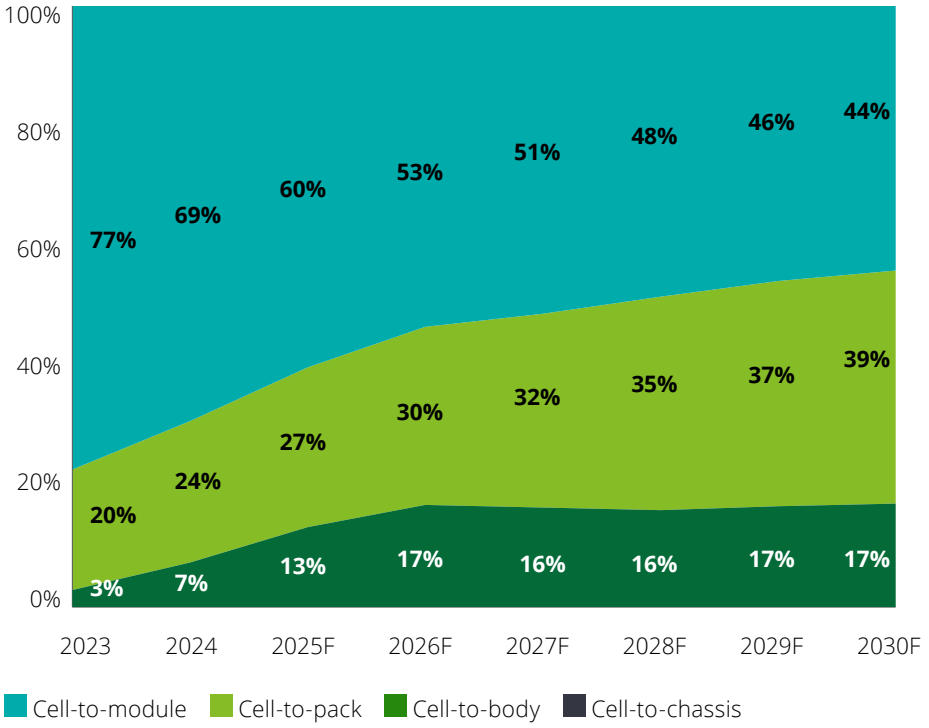
Source: Deloitte E-Mobility Forecasting Model and GlobalData, 2025

Making higher voltage architectures mainstream

While most EVs today use 400V architectures, which are well established and compatible with current infrastructure, 800V battery systems are emerging as a key enabler of high-performance electric mobility. They allow for faster charging, reduced energy losses, and lighter components, making them especially relevant for premium and long-range EV segments.

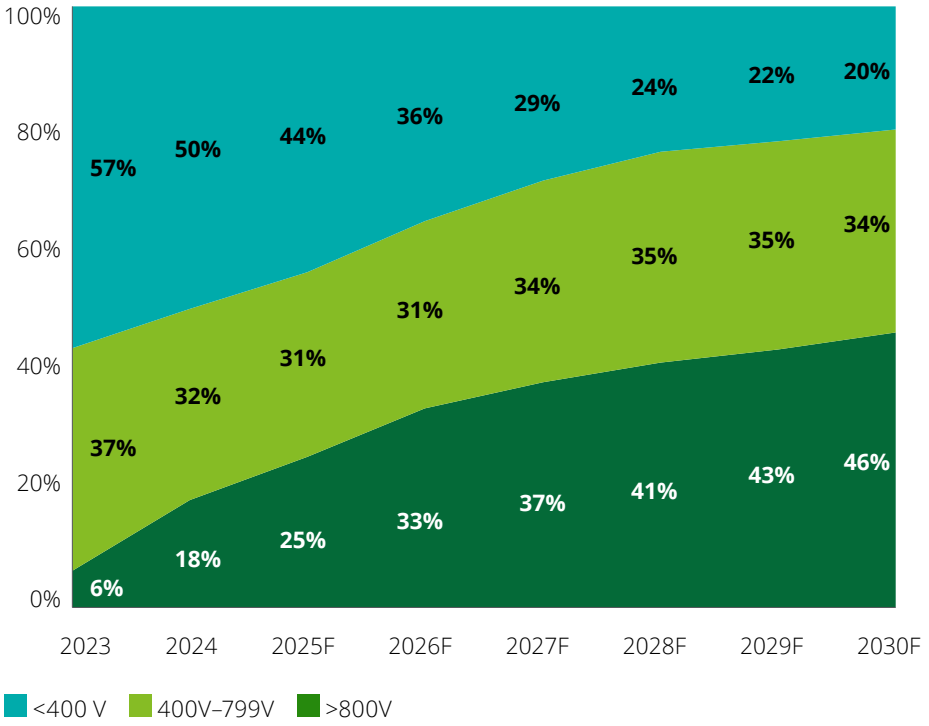
These platforms are already being adopted by leading global players and are expected to become the new standard in high-performance EVs. While challenges remain, such as higher component costs and infrastructure compatibility, targeted investment and ecosystem development could position Europe as a leader in this space and bring costs down. High-voltage platforms are not just a technical upgrade; they are also a strategic lever to compete in the most demanding and profitable segments of the EV market.

Fig. 8 – Battery technology development by integration method from 2023–2032F
(% of production capacity in GWh)



Source: Deloitte Analysis, GlobalData, 2025

Fig. 9 – Battery technology development by system voltage from 2023–2032F
(% of production capacity in GWh)



Source: Deloitte Analysis, GlobalData, 2025

Ensuring Europe's battery sovereignty: a strategic imperative

The race for battery sovereignty is more than a technological challenge, it is a defining factor for the future of Europe's automotive industry. Despite ambitious goals, Europe remains heavily dependent on Asian battery manufacturers, with limited domestic capacity, minimal pricing power, and little control over critical parts of the value chain. If this imbalance persists, European OEMs and suppliers risk long-term competitive disadvantages, exposure to geopolitical risks, and supply chain disruptions.

To change course, Europe must act decisively and strategically. Building a resilient and scalable battery ecosystem requires more than just building production plants, it demands a coordinated effort across five critical dimensions:

1. Securing access to raw materials through strategic partnerships and domestic sourcing
2. Developing processing capabilities to refine and convert raw materials into battery-grade inputs
3. Building technological know-how across cell chemistry, system integration, and power electronics
4. Scaling up production capacity through investment and industrial alliances
5. stablishing recycling infrastructure to close material loops and reduce dependency

These industrial efforts must be matched by the policy support outlined in the EU's Clean Industrial Deal, which provides the financial and regulatory foundation to accelerate progress.

Policy spotlight: The EU's Clean Industrial Deal
Achieving battery sovereignty will require not only industrial initiative but also strong and sustained policy support. The European Union has recognized the strategic importance of battery production and is actively shaping a regulatory and financial framework to accelerate domestic capacity, innovation, and ecosystem resilience.

The Clean Industrial Deal outlines a comprehensive set of measures, including large-scale funding through the Battery Booster package, simplified state aid rules to support clean tech manufacturing, and new legislation to prioritize European content and sustainability in battery production. It also addresses upstream challenges through the Critical Raw Materials Act and strategic partnerships for raw material access. In parallel, the EU plans to invest in circularity, recycling infrastructure, and standardization to improve efficiency and reduce dependency.

All in all, achieving a significant domestic market share in battery cell production of around 40 percent is essential, as depicted in the third scenario in our analysis, "Strategic Sovereignty". Even though regional HHI values may not achieve an unconcentrated market status, bringing them down from current levels is a critical step towards a more competitive and secure battery ecosystem. For Europe, this means building enough capacity and technological leadership to shift the balance of power, thus transforming from a price taker into a strategic player.

Ultimately, success will depend on unified action between industry and government. Streamlined regulation, synchronized industrial policy, and a favorable investment environment are key to accelerating scale-up and attracting long-term capital. The time to build Europe's battery ecosystem and secure the future competitiveness of the automotive industry is now.

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