EUROPE'S BATTERY VALUE CHAIN BETWEEN GROWTH AND COMPETITIVE PRESSURE

In 2025, the global battery market continued to grow significantly, driven by electromobility and, increasingly, by stationary battery storage. At the same time, the expansion of cell manufacturing capacity in Europe is gaining momentum. Available production capacity stands at just over 260 GWh per year (GWh/a) and could rise to over 500 GWh/a in the coming years. However, actual market impact depends on successful ramp-up, capacity utilisation, cost positions, supply contracts and technological compatibility. In addition, Europe's battery industry faces further challenges: imports from China have risen in recent years, LFP as well as prismatic and cylindrical cell formats are changing market requirements, and the development of cathode and, in particular, anode active material capacities in Europe is lagging behind cell manufacturing.

Electric mobility and the battery market are growing rapidly

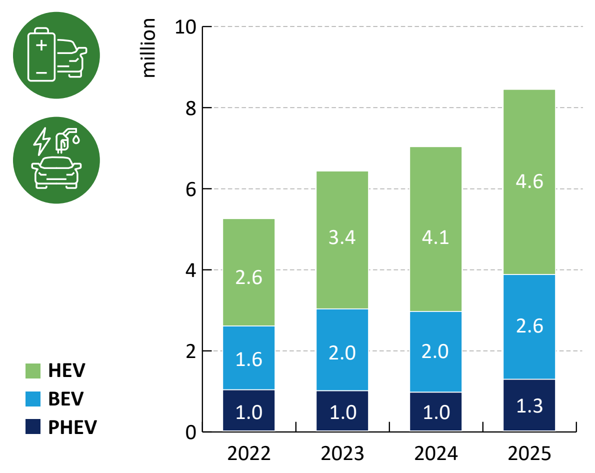
The International Energy Agency (IEA) estimates that the global battery market grew by around 25% year-on-year in 2025 to 1,600 GWh, reaching a market volume of over USD 150 billion (approx. EUR 130 billion). The electric vehicle market is the biggest driver of this growth. According to SNE Research, over 21 million electric vehicles (battery electric vehicles (BEVs) and plug-in hybrids (PHEVs)) were sold worldwide in 2025, representing an increase of around 20% compared to the previous year. China is the largest sales market, accounting for two-thirds of the total. A total of 1,187 GWh of batteries were installed in electric vehicles registered worldwide, representing a 30% increase on the previous year.

The electric vehicle market in Europe (EU + EFTA + UK) has seen similarly strong growth. In 2025, 2.6 million BEVs and 1.3 million PHEVs were newly registered (Figure 1). Assuming that BEVs have an average battery capacity of 60 to 70 kWh and PHEVs 20 to 25 kWh, the battery demand for newly registered vehicles amounted at approximately 200 GWh. Added to this are 4.6 million hybrid vehicles (HEVs) without an external charging function. However, these have a significantly smaller battery (1–2 kWh) compared to BEVs and PHEVs, meaning their contribution to battery demand is in the single-digit percentage range. In terms of the overall market, BEVs accounted for 19%, PHEVs for 10% and HEVs for 34% of new registrations.

The positive trend is set to continue in 2026. In the first quarter, around 25% more BEVs and just over 30% more PHEVs were registered in Europe than in the corresponding period of the previous year. Should this trend continue, more than three million new BEVs and 1.5 million new PHEVs could be registered in Europe by the end of 2026, with battery demand rising to over 230 GWh.

Within Europe, Germany is not only the largest sales market for BEVs and PHEVs, but also the largest producer. In 2025, nearly 550,000 BEVs (+43% year-on-year) and more than 300,000 PHEVs (+62% year-on-year) were newly registered. Production rose to 1.2 million BEVs (+15% year-on-year) and almost 450,000 PHEVs (+54% year-on-year). This made Germany the second-largest production hub for electric vehicles worldwide in 2025.

Figure 1: New car registrations EU + EFTA + UK.

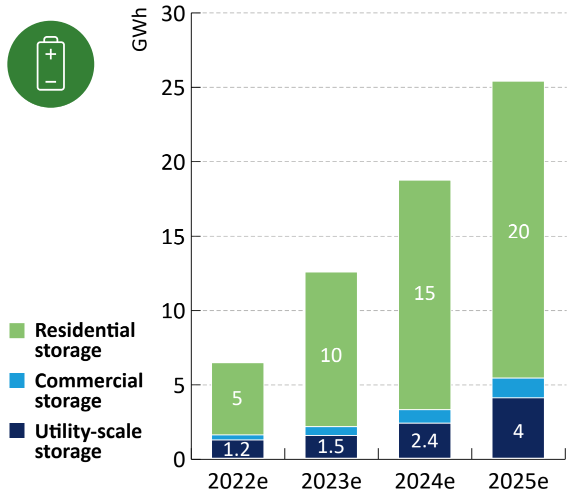


Source: ACEA

Stationary battery energy storage systems: A second growth driver

Stationary battery energy storage systems (BESS) play a central role in the decarbonisation of the energy supply and the integration of renewable energies. According to

Figure 2: Installed BESS storage capacity in Germany.



Source: Battery-Charts.de

Stationary battery storage systems can be divided into three categories, with residential and commercial storage sometimes grouped together as 'behind-the-meter' applications. Table 1 provides an overview of the storage types, their capacities and use cases

Table 1: Categorisation of stationary battery energy storage systems.

Storage type	Typical storage size	Main applications
Residential storage	2–20 kWh	• Increasing self-consumption of self-generated solar power • Emergency power supply
Commercial storage	20–1000 kWh (1 MWh)	• Increasing self-consumption • Peak load shaving • Charging of electric vehicles
Utility-scale storage	> 1 MWh	• Grid stabilisation through the provision of frequency containment reserve (FCR) • Electricity market (energy arbitrage)

the IEA, BESS now account for more than 15% of global battery demand. BESS are thus the second-largest growth driver after electromobility.

In Europe, around 77 GWh of battery storage capacity was installed by the end of 2025, representing an increase of 27.1 GWh over the previous year. In Germany, installed storage capacity totalled 26 GWh by the end of 2025, with residential storage accounting for the largest share at 20 GWh, followed by utility-scale storage (4.4 GWh) and commercial storage (1.4 GWh). Overall, installed storage capacity has thus risen by 36% compared with the previous year.

Utility-scale storage systems recorded the highest relative growth in 2025. Utility-scale storage projects require extensive planning and permitting procedures. Where a new grid connection is needed, approval and construction can take several years. Nevertheless, strong growth is still expected in this sector. By the end of 2024, German transmission system operators had received 650 connection requests for utility-scale BESS.

In technological terms, lithium iron phosphate (LFP) is the dominant battery chemistry, accounting for around 90% of the global BESS market. LFP is characterised by its lower price and better cycle stability compared to nickel-based cathode active materials (CAM). In future, sodium-ion batteries could also gain in importance, as they offer, among other things, very good safety characteristics and better charging behaviour at low temperatures.

Lithium-ion cell production in Europe is being further expanded

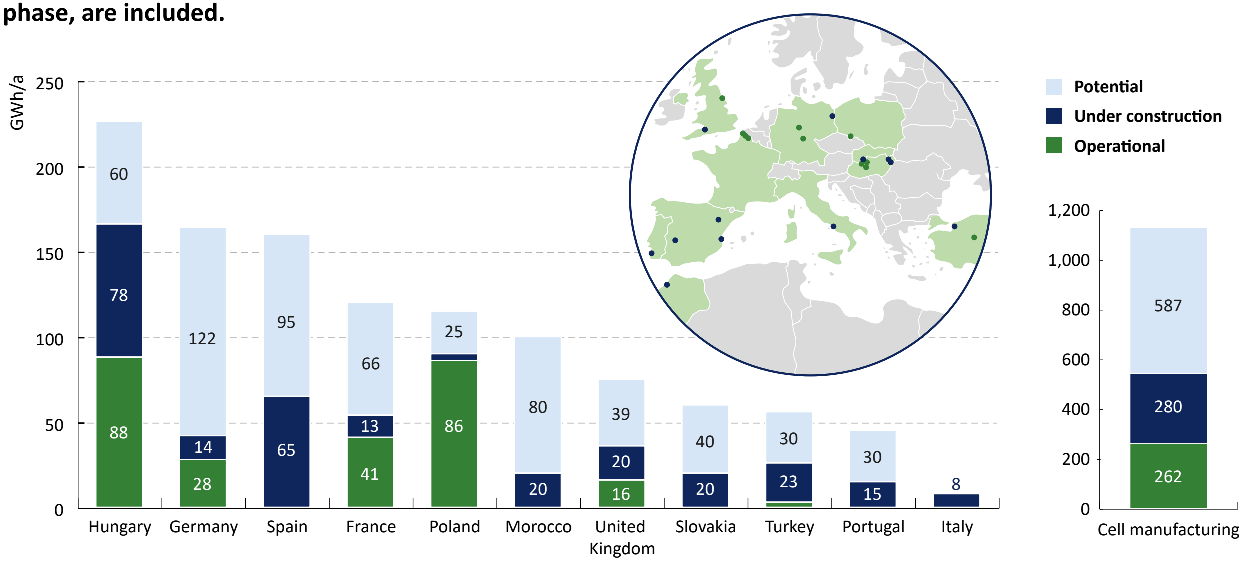
In Europe, electric vehicle registrations – and with them demand for batteries – returned to a growth trajectory in 2025. Added to this is a growing BESS market. In the following section, we outline how cell manufacturing in the EU, as well as in the United Kingdom (UK), Turkey and Morocco[1] is developing to supply these markets. The focus is exclusively on projects that are already at an advanced stage, i.e. that have at least reached the construction

1 The UK, Morocco and Turkey are included in the analysis because they have trade agreements or trade arrangements with the EU, benefit from short transport routes due to their geographic proximity, and are important trading partners in the automotive industry.

phase or are already operational and, where applicable, are expanding capacity. Furthermore, we only consider sites that have a production capacity greater than 2 GWh/a or will achieve this in the first phase of expansion. Sites that have only been announced or that produce on a smaller scale are not considered. Similarly, sites that are currently on hold are not considered.

According to our research[2], there are currently 23 cell manufacturing sites in Europe, Turkey and Morocco that meet the criteria mentioned. Eleven sites are already operational, whilst twelve are under construction. Twenty-one sites have publicly announced supply agreements with the automotive industry. Two sites are specifically planning to serve the BESS market. The capacity of the cell sites already in production stands at just over 260 GWh/a. Through capacity expansions and the new sites currently under construction, production capacity could rise to over 500 GWh/a within the next two to three years. Should the 23 cell sites realise their full potential in the long term and reach the stated maximum capacity, nearly 1,130 GWh/a could be achieved. Figure 3 shows the geographical distribution of production capacities. Hungary and Poland have the largest available manufacturing capacities. In addition, the largest manufacturing capacities are currently under construction in Hungary, which will enable the country to further consolidate its leading position in Europe in the coming years.

Figure 3: Cell production in the EU + UK + Turkey + Morocco. Only sites that are already in production or under construction and have a production capacity of at least 2 GWh/a, or are planning to do so in the first phase, are included.



Source: Company announcements, own analysis

The 23 sites are operated by 18 different companies. Seven of these 18 companies were among the ten largest cell suppliers to the automotive industry in 2025. Furthermore, three of these 18 companies are joint ventures (JVs), each comprising one Chinese and one European company. The origin of the companies is shown in Figure 4 based on the headquarters of the companies or their parent companies.[3] The majority of operational capacity comes from South Korean companies. Around 20% is provided by European companies and around 13% by Chinese companies. This distribution will change once the newly built and expanded sites commence operations. Chinese companies and joint ventures will then account for larger shares of manufacturing capacity, whilst the shares of South Korean companies will decline.

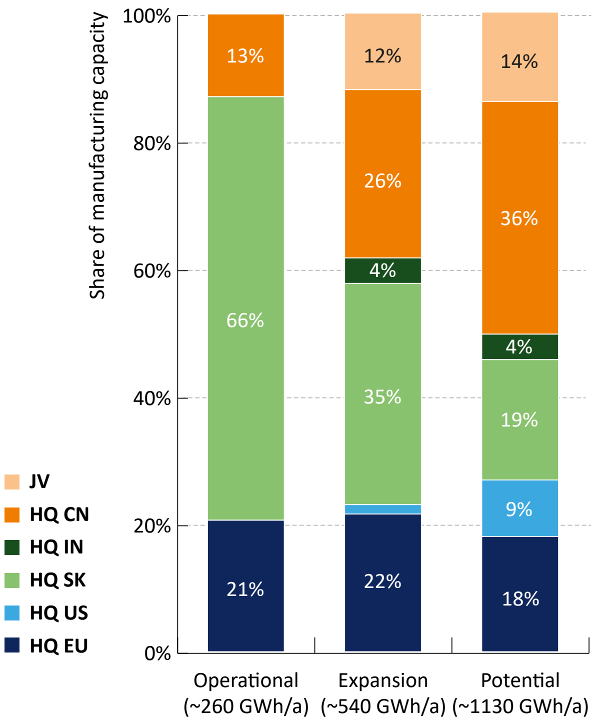
Assuming that all sites under consideration realise their full potential, Chinese and North American cell manufacturers would increase their share of manufacturing capacity. South Korean and European companies would see their

2 The information and analyses presented are based on our own location monitoring, in which we aggregate publicly available information on cell projects and the value chain in Europe.

3 HQ EU (European Union): ACC, FAAM, Pomega, PowerCo, Verkor | HQ US (United States of America): Tesla | HQ SK (South Korea): LG ES, Samsung SDI, SK On | HQ IN (India): Agratas | HQ CN (China): AESC, CALB, CATL, EVE, Gotion | JV: Gotion Inobat, Contemporary Star Energy, Siro

shares of manufacturing capacity decline, although the loss for European companies would be smaller. However, realising the full potential is subject to high levels of uncertainty, as the expansion of cell manufacturing sites depends heavily on market ramp-up, the resulting demand and signed supply contracts. Furthermore, inexperienced companies in particular must demonstrate that they can produce cells to a high standard and at high speed, with low scrap rates, on a GWh scale, in order to remain competitive against their rivals. Achieving this level of performance is essential for successfully implementing further expansion phases.

Figure 4: Share of manufacturing capacity broken down by location of the company's/parent company's headquarters (EU: European Union, US: United States of America, SK: South Korea, IN: India, CN: China).

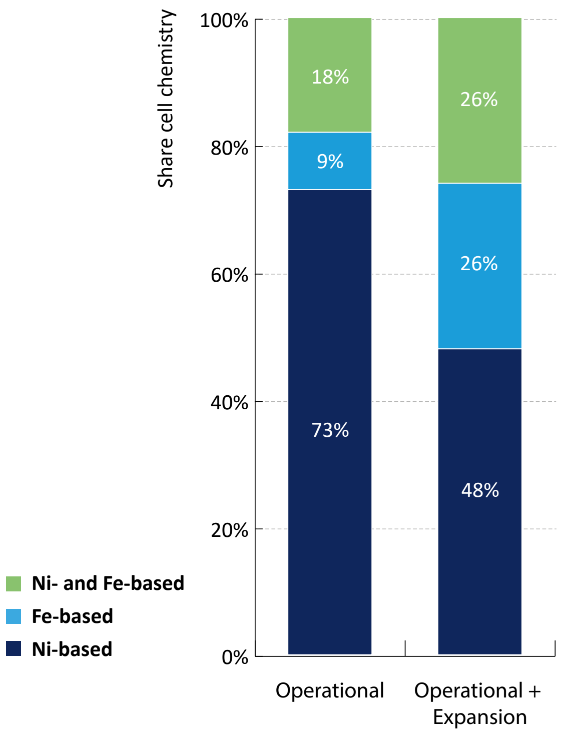


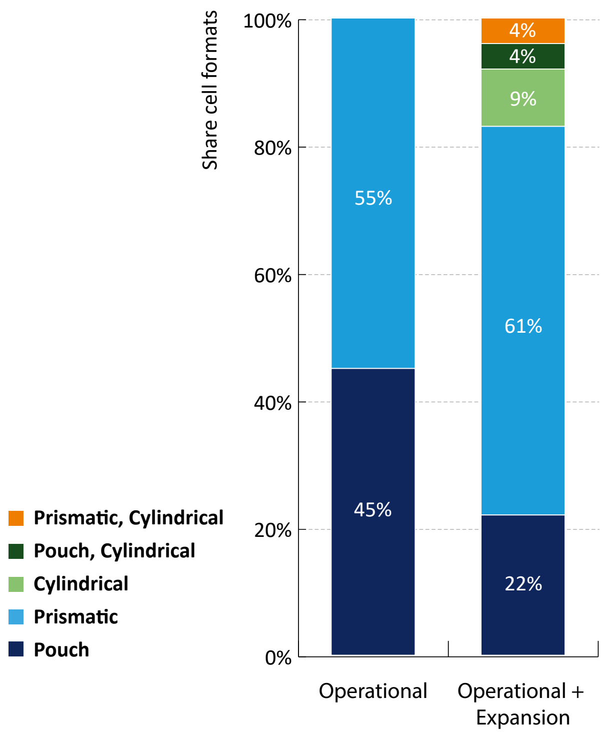
Source: Own analysis

LFP as well as prismatic and cylindrical cell formats are gaining importance in Europe

Whilst Europe currently produces mainly cells with nickel-based cathode active materials (Ni-CAM), such as NMC, NCA or NMCA, iron-based cathode active materials (Fe-CAM), such as LFP, are expected to gain importance in the future. Currently, 73% of operational sites use Ni-CAM to manufacture cells, 18% use both Fe-CAM and Ni-CAM, and

Figure 5: Share of sites using specific cell chemistries and cell formats.





Source: Own analysis

9% rely exclusively on Fe-CAM. If the sites currently under construction come into operation, only 48% of sites would use Ni-CAM exclusively. The proportion of production sites using Fe-CAM and Ni-CAM or Fe-CAM alone will each rise to 26%.

In terms of cell formats, the market is shifting from pouch cells towards prismatic and cylindrical cells, which offer advantages in cell-to-pack and cell-to-chassis concepts due to their sturdier outer casing. Currently, 45% of sites produce pouch cells and 55% produce prismatic cells. In future, 61% of sites will produce prismatic cells and only 22% will produce pouch cells. 9% of sites will produce cylindrical cells and 8% of sites will produce more than one cell format.

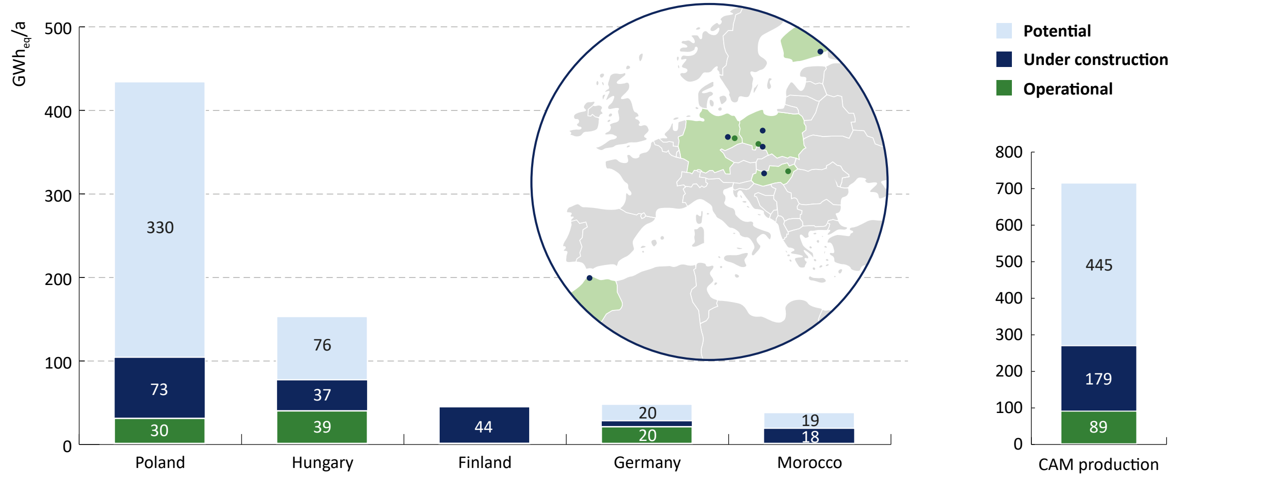
Imports of lithium-ion batteries from China have risen significantly in recent years

A comparison of available production capacity (around 260 GWh/a) with the automotive industry's estimated battery demand for 2025 (approximately 200 GWh) might suggest that Europe already meets a large proportion of its demand from factories within Europe. However, this is not the case. Firstly, nominal production capacity does not correspond to actual production. Capacities cannot be utilised to 100% due to scrap and inefficiencies such as maintenance. Furthermore, companies commissioning a gigafactory for the first time may need several years before production is successfully scaled up. Finally, capacities are only utilised if there is a direct supply relationship with a customer.

Figure 6: Breakdown of imports of lithium-ion batteries based on HS code 850760 into Germany and the EU.

Source: Eurostat, own analysis.

Figure 7: CAM production in Europe and Morocco.



Source: Company announcements, own analysis

Import data for lithium-ion batteries (LIBs)[4] show that a significant proportion of the batteries traded originate from outside the EU. According to Eurostat data, imports from within the EU (IntraEU) accounted for 50% of Germany's total LIB import value in 2025, while imports from China represented 47% and those from other non-EU countries the remaining 3%. In 2022, by contrast, the EU still accounted for 57% of Germany's LIB import value, compared with 34% for China and 9% for other countries (see Figure 6). China has therefore strengthened its position as a major supplier of lithium-ion batteries in recent years. This becomes even clearer when looking at the physical volume of imports. As battery prices have fallen significantly in recent years, the volume of imported batteries has risen even more sharply. Whilst 54% of the physical import volume still came from the EU in 2022, this figure had fallen to just 39% by 2025. During the same period, the share of physical imports from China rose from 38% to 59%. Figure 6 also shows imports at EU level. There, China accounts for an even larger share.

In the coming years, this trend could slow down again, as Chinese manufacturers are building up production capacity in Europe and neighbouring countries and may increasingly supply the European market from there.

The shift in import shares towards China highlights that the challenge lies not only in building up capacity in Europe, but particularly in ensuring that sites offer the right technology (including cell format and cell chemistry) to a high standard at the lowest possible cost to secure customer offtake. Competitive pressure in Europe is already high, driven solely by the 18 companies operating the 23 sites in the region under consideration, as well as by the continuous advancement of technology and globally active cell manufacturers. This pressure intensifies further when markets – and thus demand – stagnate. Companies setting up cell production for the first time are particularly exposed to this pressure, as they face a cost disadvantage compared to established manufacturers due to a lack of process knowledge and the associated greater inefficiencies. Continuous market growth is therefore essential for the successful establishment of a European battery industry.

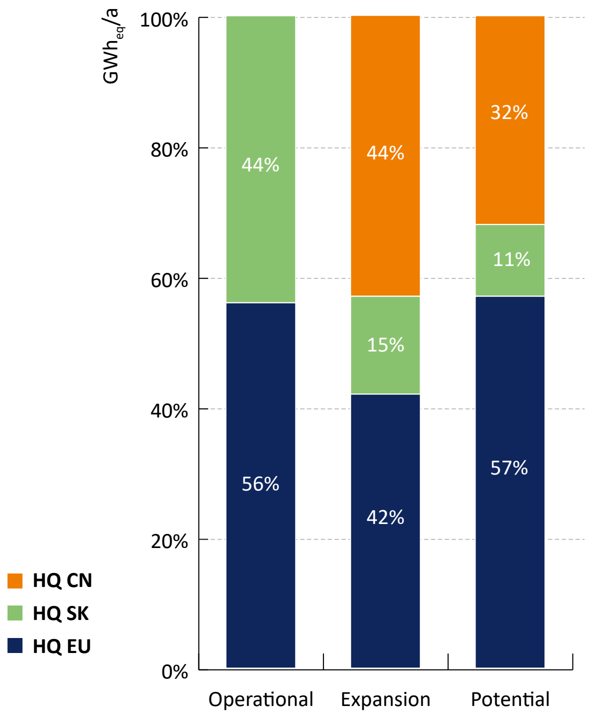
Expansion of anode and cathode active material production lags behind cell production

To strengthen resilience and strategic autonomy, not only cells but also the necessary cell components and materials should be manufactured in Europe. Figure 7 shows locations where cathode active material (CAM) is manufactured. The same criteria are used here as for cell

4 Determination of import volume based on HS Code 850760 (lithium-ion accumulators (excl. spent)) and Eurostat data. LIB includes cells, modules and packs. This code covers LIB for various applications.

production, i.e. only sites that are under construction or already in production and that have a minimum production capacity[5] of 2 GWh equivalent per year (GWheq/a) are taken into account.

Figure 8: Share of CAM production capacity broken down by the location of the company's / parent company's headquarters.



Source: Own analysis

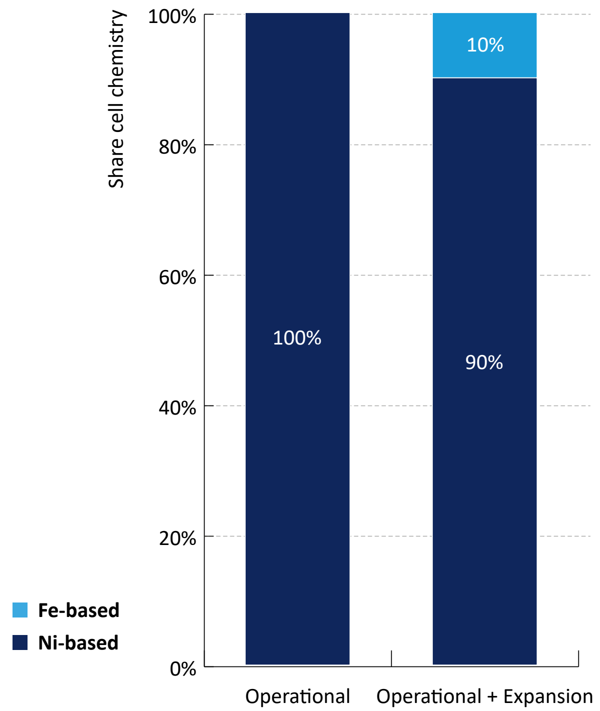
There are ten sites that meet the criteria. Three of the ten sites are operational, whilst seven are currently under construction. The operational, under-construction and potential production capacities are lower than the cell production capacities shown in Figure 3. As with cell production, Poland and Hungary have the largest capacities.

Of the available production capacity, 56% is provided by companies headquartered in the EU and 44% by companies from South Korea. As with cell manufacturing, the share of production capacity held by South Korean companies is expected to decline in the future, whilst the share held by Chinese companies is expected to rise. European companies could lose a small share in the medium term but maintain their share of production capacity in the long term. As with cell manufacturing, realising the potential and thus the long-term forecast is subject to high levels of uncertainty, as the expansion of sites depends, among other things, on market ramp-up, demand and signed supply contracts.

The currently available production capacity is used exclusively for the manufacture of Ni-based CAM. Once the sites currently under construction come online, 90% of the sites will produce Ni-based CAM and 10% will produce Fe-based CAM. Compared to cell production, the trend towards Fe-based CAM is therefore less pronounced among CAM production sites. This could change in the future, as the production of Fe-based CAM is planned in Morocco, Spain and, in the longer term, also in Poland. However, these sites are not yet under construction.

Together with the lower production capacities, this underscores that the expansion of CAM production is not keeping pace with the expansion of cell production.

Figure 9: Proportion of sites producing Fe-based or Ni-based CAM.



Source: Own analysis

5 CAM production capacity is usually reported in tonnes per year. To improve comparability, these mass-based figures are converted into gigawatt-hour equivalents (GWheq), assuming approximately 0.5 GWh per kilotonne of LFP and 0.7 GWh per kilotonne of NMC.

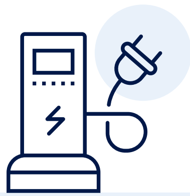
The situation is even more pronounced in the field of anode active material (AAM). To our knowledge, there is only one site in the region under consideration that is currently under construction and is expected to achieve a production capacity of more than 2 GWh_{eq}/a in the first phase. Other large-scale AAM production sites have only been announced so far, while existing production sites in the region remain below the 2 GWh_{eq}/a threshold.

An examination of the upstream value chain underscores that establishing cell manufacturing in Europe is an important first step and a catalyst for reducing dependencies. However, to increase resilience and strategic autonomy, the upstream value chain should not be overlooked, as dependencies here are in some cases even stronger than in cell production.

Europe’s transition to competitive industrialisation is crucial

Europe is making progress in establishing a battery industry. Rising demand from electric vehicles and stationary storage systems is being accompanied by increasing cell manufacturing capacity and a broader industrial base. At the same time, established Asian manufacturers have a significant technological lead over new cell manufacturers from Europe and other countries. It is therefore crucial for the new cell manufacturers not only to build capacity, but also to transfer these capacities reliably and cost-effectively into series production to establish themselves in the long term.

Alongside cell manufacturing, the development of cathode and anode material capacities remains a key prerequisite for reducing import dependency and permanently anchoring value creation in Europe. Europe’s battery industry has growth potential but faces the challenge of successfully managing the transition from capacity build-up to competitive industrialisation.



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