



# MOBILITY ECOSYSTEM: LITHIUM-ION BATTERIES

## DEFINITION

Lithium-ion batteries (or other batteries using similar chemistries) are devices for energy storage and deployment. Within the mobility ecosystem, they are employed as clean alternatives to traditional internal combustion engines for the reduction of CO<sub>2</sub> emissions.

## SME SIGNIFICANCE



### NUMBER OF SMEs IN THE EU27 VALUE CHAIN

ca. **660** active in the manufacturing of batteries and accumulators (NACE C27.2)

### SHARE OF SMEs OVER TOTAL

**99%**



### EMPLOYMENT BY SMEs

**16%** of personnel

### ADDED VALUE OF SMEs OVER TOTAL

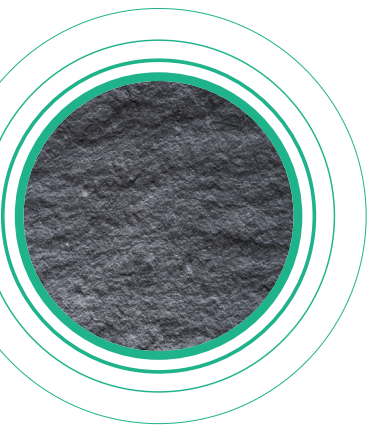
**48%**

# LITHIUM-ION BATTERIES

## EU VALUE CHAIN

### PHASE 1

#### RAW AND RAW MATERIALS



- The EU's import reliance ranges from 86% for cobalt to 100% for natural graphite. Battery-grade material refining is mostly concentrated in China (60% of the total global production for refined cobalt and 93% for graphite-active materials).
- EU primary production ranges from 0.1% of the global total for lithium, manganese and natural graphite, to 1.7% for nickel
- EU Member States have some mining capacity for lithium (Germany, Czechia, Spain, Austria, Poland, Portugal), nickel (Greece, Finland, Sweden) and cobalt (Finland, Portugal, Sweden, Spain) EU Member States have some refining capacity for nickel (Finland and Greece) and cobalt (Finland and Belgium).

### PHASE 2

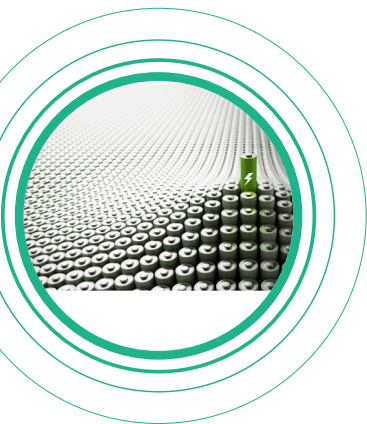
#### CELL MANUFACTURING



- The majority of firms operating in this phase of the value chain are non-European (e.g. CATL and Semcorp from China, Toray from Japan, Samsung SDI and LG Chem from Korea).
- The EU foresees an increase in production capacity from 175GWh in 2023 to 1,600GWh in 2030, with 43% of the expected production coming from EU capital-backed firms, such as Swedish Northvolt.
- Cell manufacturing is concentrated in Central European Countries: Germany, Poland, Hungary, and France, with some capacity in peripheral Member States: Sweden, Spain, and Italy.
- The high costs required for scaling production make the involvement of SMEs in this phase more difficult. SMEs are mostly involved in support activities, R&D, pilot lines testing, and supply of specialised machinery.

### PHASE 3

#### END-USE APPLICATIONS



- Around 70% of battery applications are for mobility.
- In mobility, the sector is mainly dominated by a few original equipment manufacturers (Tesla, Volkswagen, Stellantis, etc.).
- SMEs are more active in the e-bikes segment.

### PHASE 4

#### RECYCLING AND SECOND-LIFE USE



- SMEs constitute the first point of contact for electric vehicle owners when batteries need a repair or a replacement.
- SMEs are more likely involved in mechanical recycling (e.g. disassembly system for battery packs) rather than metallurgical recycling (i.e. recovery of metals from batteries), which is machinery-intensive and requires significant upfront investment.

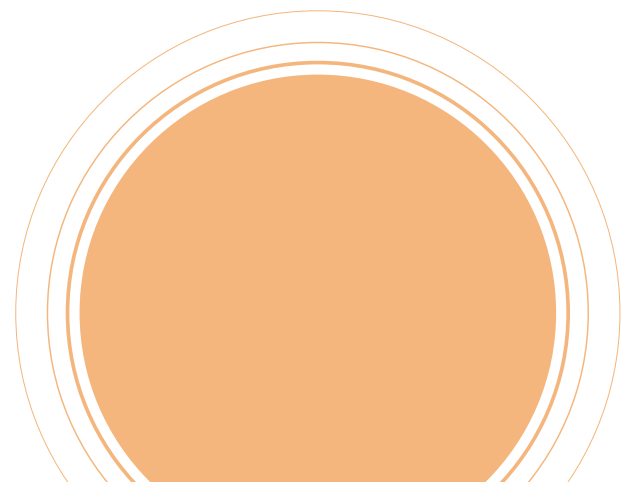
# STRENGTHS AND VULNERABILITIES

## EU STRENGTHS

- The EU has a strong and developing network thanks to the **European Battery Alliance**, which fosters collaborative efforts and makes access to funding opportunities easier, especially among SMEs.
- There already exists an **extensive body of policy** aimed at supporting this industry, both at the national and European levels as part of the green transition.
- Battery manufacturers can rely on an already **established and competitive automotive industry** with some key global players (Stellantis, Volkswagen, Renault) that are pushing for the electrification of mobility.

## EU VULNERABILITIES

- There is limited EU production capacity in the **upstream segments** of the value chain due to critical raw materials and refining capacities being concentrated outside of the EU, such as China, Chile, Congo, South Africa and Australia.
- The majority of cell manufacturing capacity is in the hands of **subsidiaries of non-EU companies**.
- Tier-2 and Tier-3 automotive suppliers, which are most likely to be SMEs, depend a lot on **legacy technologies** such as internal combustion engines and lack the funds and expertise to readily convert their businesses towards the electrification of the sector.
- **Lack of workers** with the necessary skills to contribute to cell manufacturing.
- Due to the **capital-intensive** nature of cell manufacturing, SMEs have little capacity to provide directly contribute.





# EXAMPLES OF POLICY MEASURES INTRODUCED TO ENHANCE OPEN STRATEGIC AUTONOMY


## EU


- Two IPCEIs (**Important Projects of Common European Interest**) involving 17 and 42 companies from seven and 12 Member States, respectively, for a total funding of EUR 6.1 billion. The IPCEIs involve R&D and first industrial deployment activities for the different phases of the value chain: raw and advanced materials research, battery cells, battery systems, and recycling. **SMEs are involved in the IPCEIs in several ways**, ranging from access to facilities for testing to knowledge-sharing for the development of advanced materials, and from supply of products for production in gigafactories to involvement in pilot lines for R&D&I.
- The **Innovation Fund**, financed through the revenues of the European Emission Trading System (ETS), supported eight projects since 2021, worth a total of EUR 354 million, with 5 out of 14 participants being SMEs. In December 2023, the European Commission announced a dedicated instrument for the battery value chain under the Innovation Fund, possibly amounting to EUR 3 billion over three years.
- The **European Innovation Council** operating under the EU Horizon Europe programme provides funding opportunities of up to EUR 2.5 million in grants and EUR 15 million in equity for carefully selected SMEs and start-ups developing cutting edge innovations.
- In December 2023, the European Commission announced a new pilot initiative to provide a **one-stop shop** service for guidance to SMEs in the battery industry to access to EU finance.
- The **2023 battery waste regulation** aims to ensure that batteries have a low carbon footprint, use minimal harmful substances, need less raw materials from non-EU countries, and are collected, reused and recycled to a high degree in Europe, thus increasing the security of supply for raw materials and energy, and enhancing the EU's strategic autonomy.
- Through the **Pact for Skills**, the EU is supporting several projects to develop a skilled workforce in the sector. Examples include Albatts, Drives, and the Automotive Skills Alliance.

## MEMBERS STATES

- **Sweden** provides credit guarantees for green investment.
- **Finland** has established a national battery strategy. However, due to the capital-intensive nature of the battery value chain, SME-specific measures are lacking.

## EXTRA-EU

- **China**: Massive public subsidies to electric vehicle and battery manufacturers (e.g. for carmaker BYD which is estimated to have received more than EUR 2 billion) as part of the green-tech strategy.
  - **USA**: the Inflation Reduction Act (IRA) provides tax credits for companies developing green technologies involving batteries. Some European battery companies (e.g. Freyer) see the IRA subsidies as more attractive and are moving to the US.
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# POLICY RECOMMENDATIONS TO MAXIMISE SME OPPORTUNITIES AND REDUCE RISKS IN OPEN STRATEGIC AUTONOMY

The **one-stop-shop service** for SME funding from EU institutions could also incorporate Member State funding initiatives to avoid information fragmentation. This would allow European SMEs to become acquainted with what type of funding is available across Member States through this simple one-stop-shop.

In the automotive sector, where several suppliers will be required to shift their production focus to support electro-mobility, **mid-caps will play a key role as enablers of this transition**, connecting car manufacturers with tier-2 suppliers. However, opportunities for access to funding for mid-cap firms are limited, and it is important to ensure that mid-cap firms involved in this transition are able to access the required funding opportunities, for instance, through equity funds at the European Investment Bank.

Individual SMEs often do not have the capacity or resources to engage with EU-level business associations and alliances. Hence, **local authorities and collaboration clusters** could work as liaising points between the supranational and regional levels since they represent easier access points for SMEs. Engagement could also take a more hard-policy approach, whereby policy-makers could incentivise the larger battery manufacturers to purchase equipment and enter in commercial agreements with local suppliers. Such an approach could be particularly relevant to boost cluster policies in the battery and automotive ecosystem, especially in cases where the local supply chain is experiencing a crisis period.

European and national legislators could promote and share with SMEs **best practices** about how automotive SMEs can expand into new areas by diversifying production and not be left behind by holding onto legacy technologies. SMEs in mobility could also shift towards niche applications or supply machinery to other companies involved in battery production.

Some public efforts could be put into assisting companies in ensuring that their products are **compliant with the new Battery Regulation**, such as calculation of the carbon footprint and labelling requirements, while reducing the burden on SMEs.

## Data sources:

Data on mining and refining capacity comes from the [Raw Material Information System](#) and IPCEI studies

- [Build-up of the battery industry in Europe – Status quo and challenges](#)
- [The importance of regional value creation structures in the battery industry.](#)

Data on the number and share of SMEs in the sector comes from [Eurostat](#)

Data on Chinese subsidies comes from a [KIEL Policy Brief](#)

US measures exist both at the federal and state levels. For a more thorough list of measures at the federal level, which addresses both battery- and fuel cell-powered vehicles, see: [https://afdc.energy.gov/laws/fed\\_summary](https://afdc.energy.gov/laws/fed_summary).