



Flow Batteries in Europe

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Innovation Symposium

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FLOW
BATTERIES
EUROPE



Flow Batteries Europe

- Members-led trade association based in Brussels;
- Represents flow battery stakeholders at European level;
- We aim to shape the legal framework for flow batteries at the EU level, contribute to the EU decision-making process as well as help to define R&D priorities.

For more information, please visit:
www.flowbatterieseurope.eu

Flow battery projects in Europe

Oxford, UK

Invinity
5 MWh VFB hybrid system,
decarbonisation project



Seraing, Belgium

Sumitomo Electric
1.7 MWh VFB,
Microgrid



Aalst, Belgium

Invinity
800 kWh VFB,
integrated solar PV



Rüsselheim, Germany

CellCube
400 kWh VFB;
Microgrid, PV integration



Öskü, Hungary

Invinity
1.5 MWh VF, solar
shifting and ancillary
services



Mallorca, Spain

Largo Clean Energy
6.1 MWh VFB, solar
panel integration



Flow battery projects map coming soon at:
www.flowbatterieseurope.eu

European companies
in the flow battery
sector

prolux SIEMENS energy

EM KEMIWATT
Your energy bank

VANEVO AMER-SIL

Norge Mining Ecolyte

voltstorage
cmbly REDOX

volterion

GORE StorTera

HalioGen Power RIVUS
power that flows

cellcube
BUILDING ENERGY STORAGE INFRASTRUCTURE

Stolthaven Terminals

FlexBase Bryte BATTERIES

En Chemours™

INVINITY
ENERGY SYSTEMS

Jena Flow Batteries SCHMALZ

pinflow energy storage OXKEM UP
unbound potential

... and many more

500 MW flow battery storage project planned in Switzerland

World's largest flow battery facility

- 500 MW output, located in Switzerland
- Construction to begin in early 2025

Supports green energy & grid stability

- Powers an AI data centre using mainly green energy
- Located at "Star of Laufenburg," a key electricity grid node for France, Germany and Switzerland

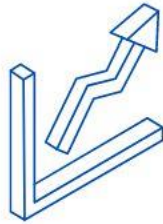


The growing need for flow batteries in Europe



Decarbonisation & climate neutrality goals

- Europe's commitment to climate neutrality by 2050
- Growing reliance on renewable energy sources



Energy storage projections

- Storage capacity expected to exceed: 200 GW by 2030; 600 GW by 2050
- Projected CAGR of about 18-19% of the European flow battery market in 2023-2030



Advancements in grid resilience & flexibility

- Increasing energy demand and need for balancing supply and demand
- Efforts for enhanced energy security and independence

Policy insights: how flow batteries are regulated in the EU

The Flexibility Needs Assessment in the EU

Member States of the EU are required to assess their flexibility needs and the EU is working on the most practical and applicable way to do this. The level of investment by EU countries in different energy storage technologies will also depend on this.

The Electricity Market Design (EMD) reform entered into force in July 2024:

- The deployment of renewables calls for **flexibility solutions** to ensure their integration into the grid.
- To foster non-fossil flexibility, **assessments of flexibility needs** will be conducted bi-annually at both the national and European levels.
- Assessments are based on input from TSOs and DSOs and a common **European methodology**.
- Where national non-fossil **flexibility objectives are not met through market-only mechanisms**, Member States may introduce **flexibility support schemes**.

The EU Batteries Regulation

In force since August 2023, it covers the full value chain of EV, LMT, and industrial batteries (including flow batteries), with secondary legislation to be adopted in the coming years.



Battery Passport

Carbon footprint

Due diligence policy

Performance and durability

Recycling targets

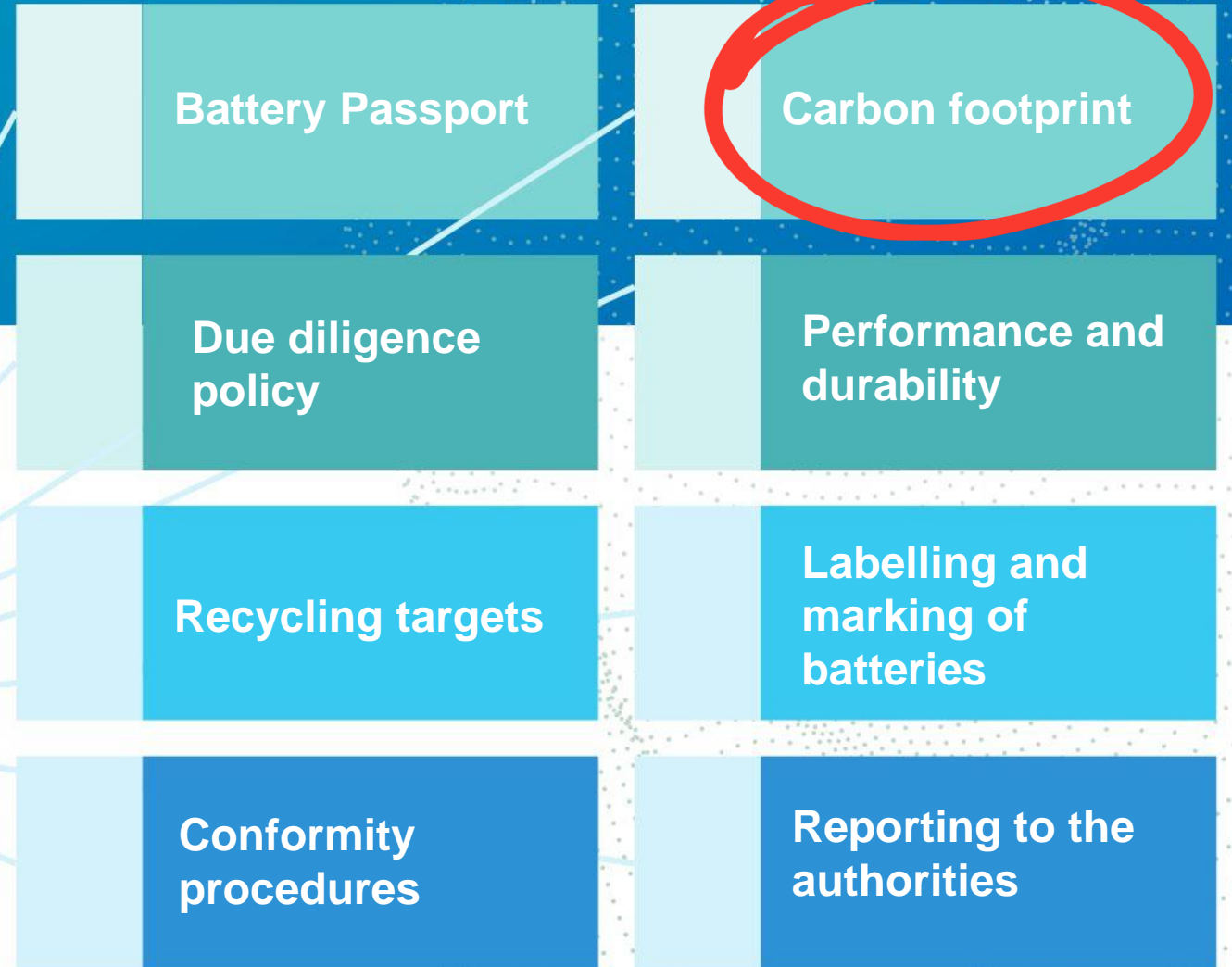
Labelling and marking of batteries

Conformity procedures

Reporting to the authorities

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The Working Group on Carbon Footprint Calculation for Flow Batteries

Flow batteries placed on the European market will be required to have a Carbon Footprint Declaration starting in 2030. In response, FBE is launching a working group to develop a carbon footprint calculation methodology for flow batteries.

Starting in November 2024, and you are welcome to join!

Contact: b.virsumirska@flowbatterieseurope.eu

Objectives of the project:



Influence: to co-create the final carbon footprint calculation rules for flow batteries.



Collaborate: to work closely with industry stakeholders to ensure the methodology meets specific requirements and is rigorously tested.



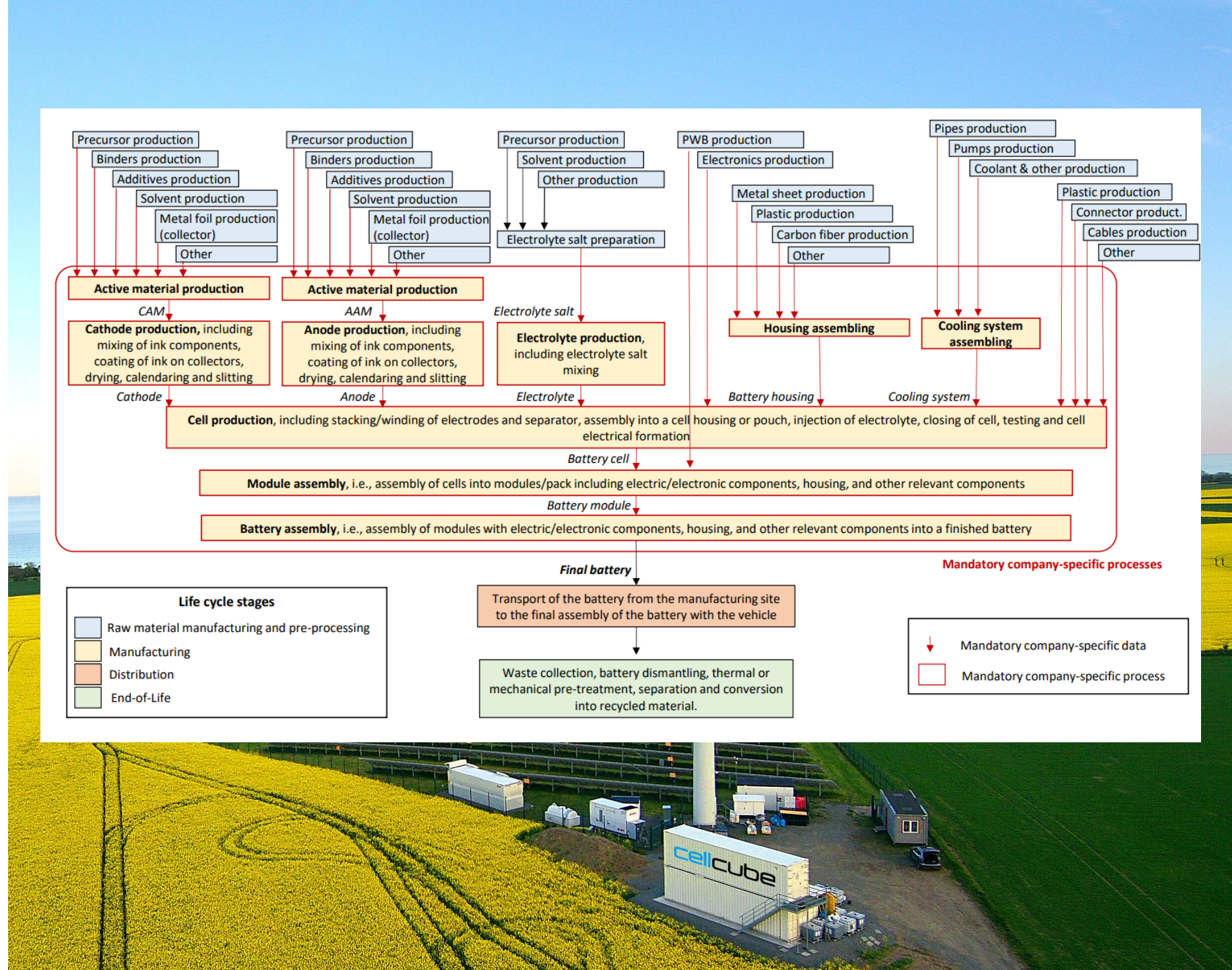
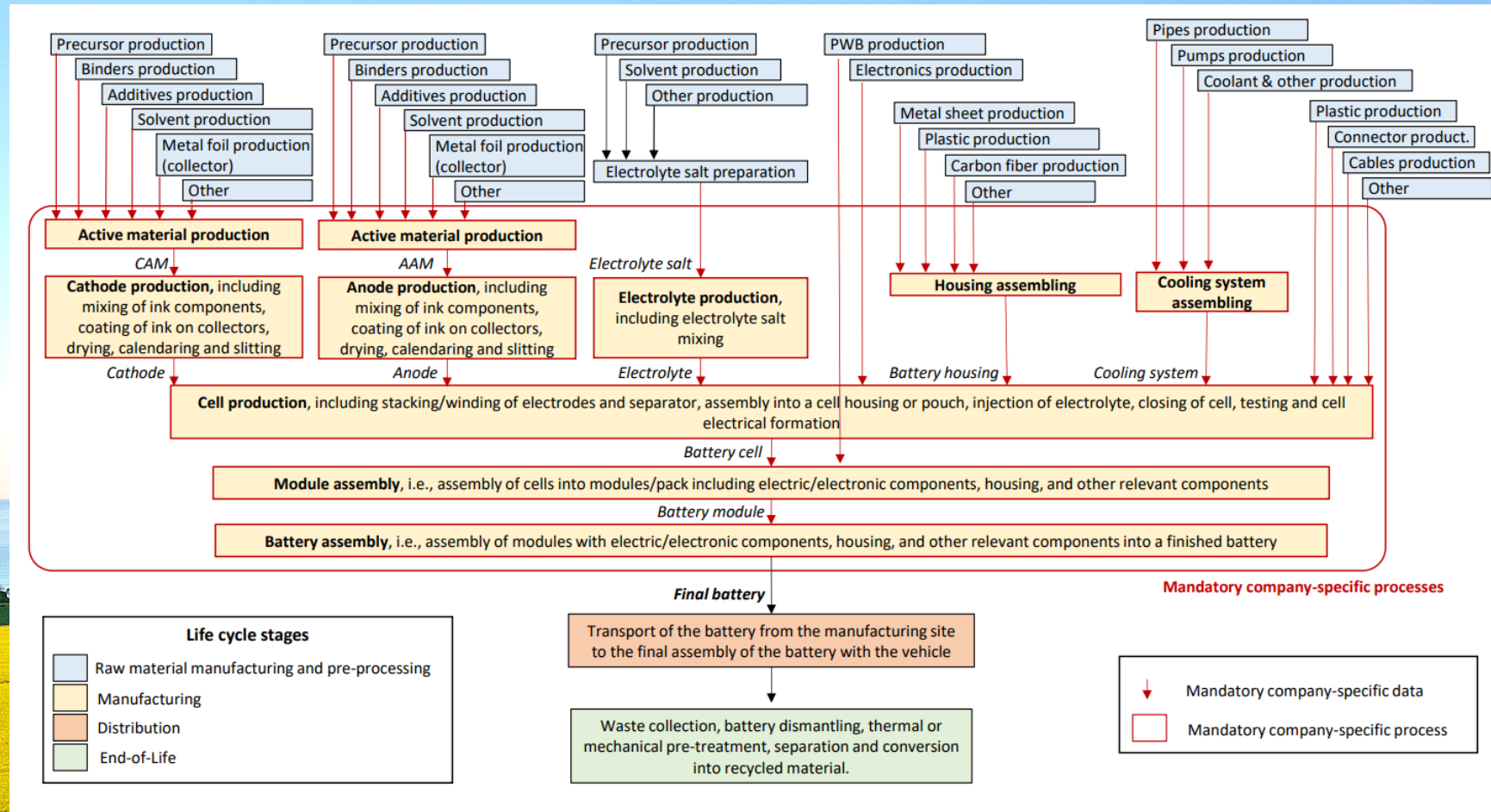
Prepare businesses: to equip companies with data analysis and processing skills essential for future carbon footprint calculations.

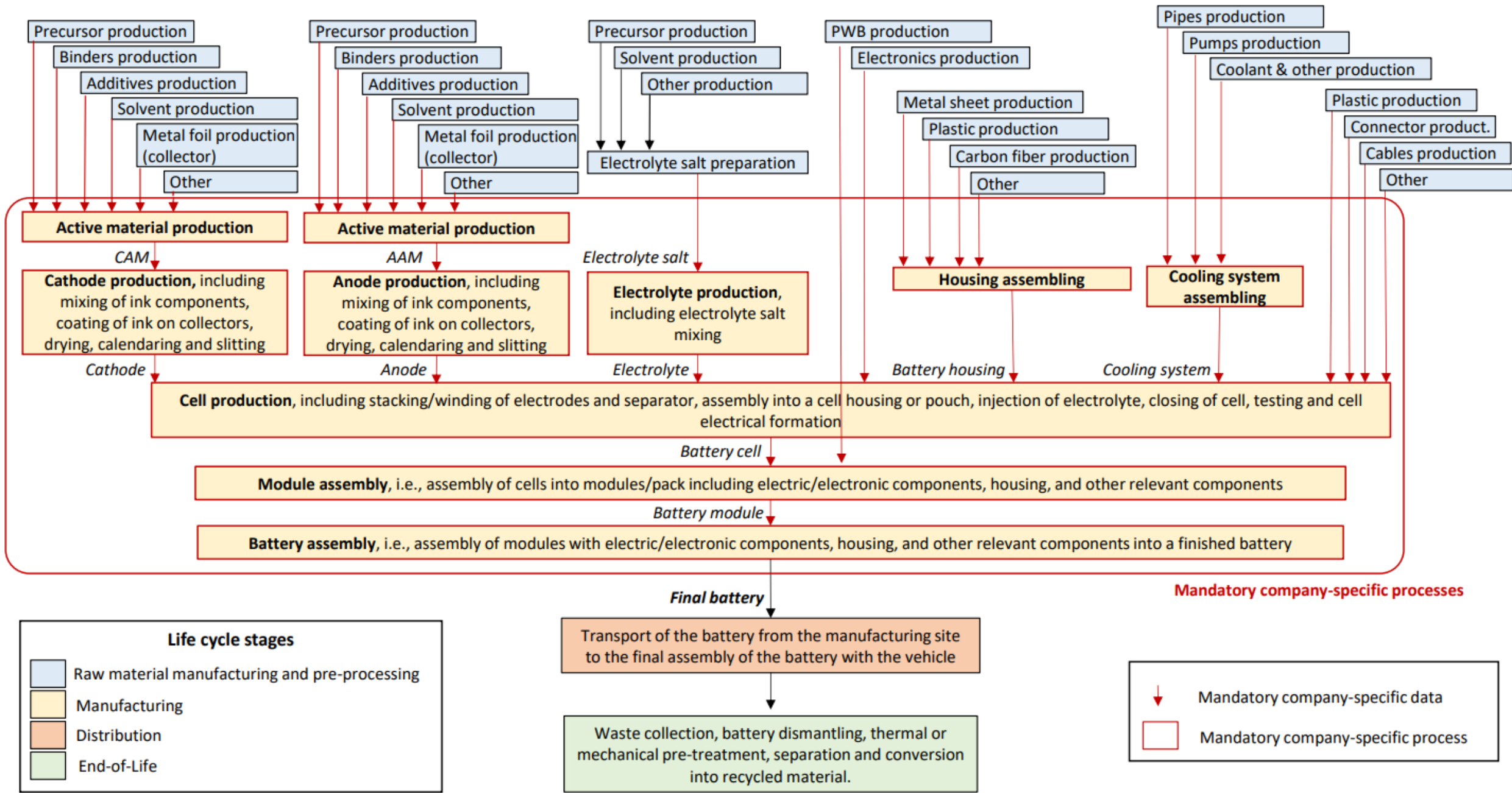
Example: System boundaries of the carbon footprint of a generic EV battery

Other types of batteries may have different visualisations of their system boundaries.

Flow battery stakeholders also need to agree on a representative production process.

Each square represents a process, while each arrow represents an activity data (e.g., kg of solvent, kg of additive).





Other regulations: Net-Zero Industry Act & PFAS Restriction Proposal



Net-Zero Industry Act (NZIA)

- In force since June 2024 in response to the U.S. IRA
- 2030 target: 40% EU production capacity for strategic net-zero technologies (incl. batteries)
- **Investment challenges:** 19 technologies competing for funding, some may end up being underfunded



PFAS Restriction Proposal

- EU considers to ban per- and polyfluoroalkyl substances (PFAS), known as “forever chemicals”
- **Challenge for flow batteries:** many VFB use fluoropolymers; a ban without alternatives or derogation period could hinder the green transition

Challenges and opportunities in the European flow battery sector

The European flow battery sector: challenges & opportunities

Challenges

- **Supply chain vulnerabilities**
Dependency on critical materials and potential restrictions
- **Investment gaps**
Need for increased funding and support for flow battery projects at the European level
- **Scalability**
Need for cost reductions and technological improvements to scale up production
- **Developing Business Case**
Importance of creating a compelling business case to attract investors and stakeholders to flow battery initiatives

Opportunities

- **Energy transition support**
Integral role in Europe's renewable energy and decarbonisation goals
- **Need for storage capacity**
Significant growth potential due to increase of RES
- **Innovative solutions**
Potential for advancements in efficiency, recycling, and cost-effectiveness
- **Specific Applications for Flow Batteries**
Technology's safety, durability, and sustainability it well-suited for various applications in Europe



The International
Flow Battery Forum™

International Flow Battery Forum

- The leading event for the flow battery community;
- Covers topics on science, technology and commercialisation of flow batteries;
- Features talks, panel sessions, open discussions, a poster session and a local site visit;
- **Next IFBF: Vienna, 24-26 June 2025.**



For more information, please visit:
www.flowbatteryforum.com

Get in touch!



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Conclusions

- Large market potential for flow batteries
- Ongoing research and innovation
- Numerous leading companies and significant projects underway
- FBE actively engages with European regulators and policy
- **Join our carbon footprint working group for industry impact!**