

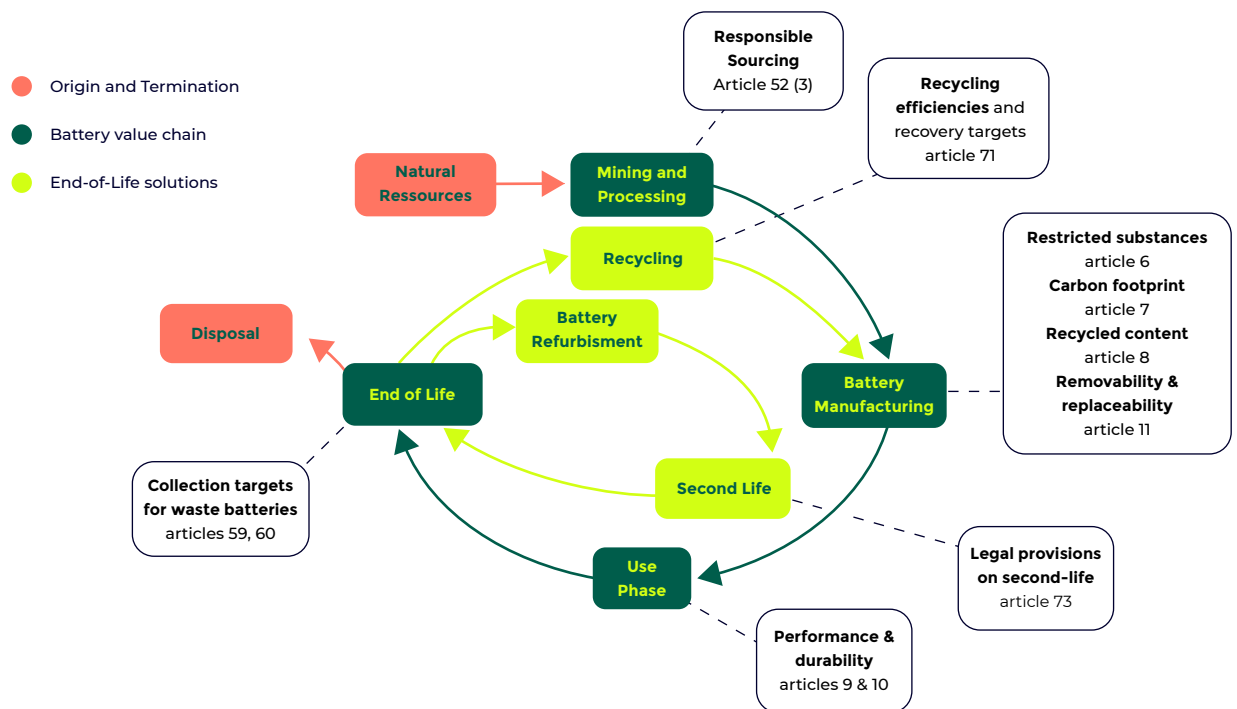
Battery Passport Roadmap

A practical guide to prepare for and
implement the future requirements
of the EU Battery Regulation

The EU battery passport explained: a part of the Battery Regulation affecting many actors

Sustainable growth of battery production

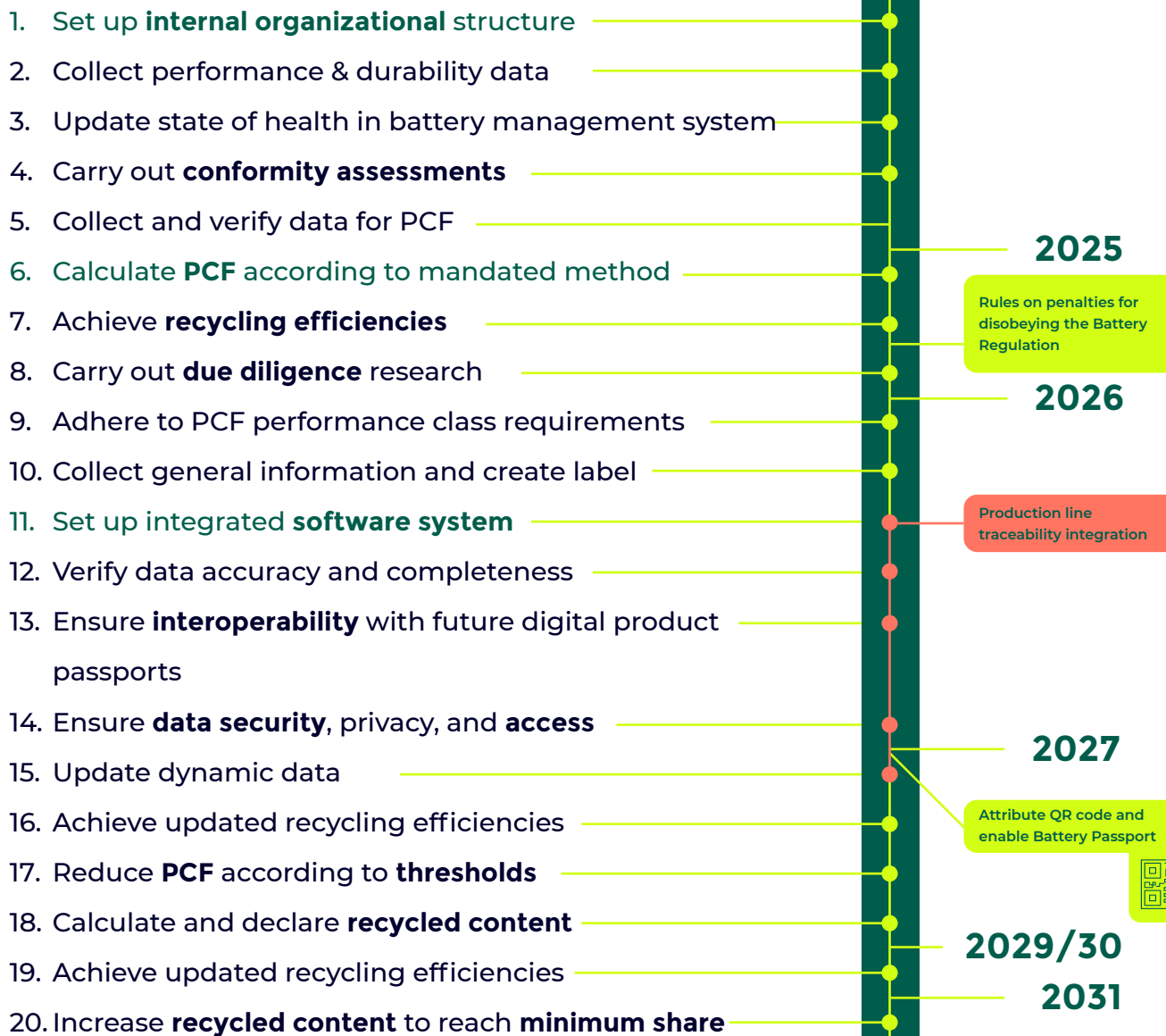
- By 2030, the EU expects to serve 17% of global battery demand
- From 18 February 2027, all batteries placed on the market or put into service in the EU must carry a battery passport for which the economic operator bears responsibility
- Actors impacted by the battery regulation along the value chain include automotive OEMs, battery manufacturers, -recyclers, and critical mineral producers
- The EU Battery Passport shall track and trace a battery's life cycle and ensure that rising battery demand does not result in a parallel increase of environmental and social risk



► **Article 77 and 78** specify the shape and content of the EU Battery Passport

Source: Regulation (EU) 2023/1524. "Concerning batteries and waste batteries."

How to practically implement the EU battery passport:



Note: Proposed approach based on requirements for EV batteries from the EU Battery Regulation

Companies face a variety of challenges when implementing the EU battery passport

Tasks are expected to be delegated top-down from automotive OEMs

1 Data collection

- **Primary data** collection along often complex global supply chains with a variety of actors
- **Verification** of collected data
- Proficiency in mandated **calculation methods**
- Ensuring **data privacy** for all stakeholders with a solid software system
- Establishing **centralized software system** that can be scaled up & consolidate all gathered data

2 Regulations

The European regulatory environment can be hard to navigate sometimes, because of the variety of directives, policies, and regulations that exists.

Over the next years, the EU continues to supplement the EU Battery Regulation with different **delegated- and implemented acts** that specify the rules set out in the Regulation.

3 Organization

Because of the scope of the EU Battery Passport across the organization, it is necessary to set up a cross functional team with experts from different departments.

For example:

- **Procurement** – supply chain overview
- **Sustainability** – carbon footprint and circularity
- **ESG** – due diligence
- **R&D** – recycling efficiencies
- **Production** – general information and labels

Implementing the EU Battery Passport requires different efforts in diverse areas



Different data attributes can be clustered into 7 categories that require different experts and shall be available to specified audiences through the centralized software system.



- Publicly accessible info relating to the battery model



- Accessible only to interested persons and the commission



- Accessible to notified bodies, market surveillance authorities and the commission



- General Information



- Materials & composition



- Labels & certifications



- Due diligence



- Carbon footprint



- Performance & durability



- Circularity

Example of delegated acts supplementing the EU Battery Regulation: PCF calculation

Context of the delegated act draft on carbon footprint calculation methods

- A delegated act for the methodology of carbon footprint calculation of EV batteries was released as a draft in May 2024
- The Product Environmental Footprint (PEF) method¹ is leading, with the climate change impact category as the only relevant focus
- A standardized method ensures correct comparisons between the PCF of different production processes and cell chemistries within the industry

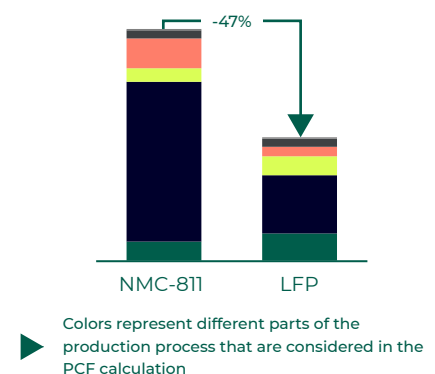
“The company-specific data to be collected for the creation of company-specific datasets shall include all known inputs and outputs for the processes concerned.”

Highlights of the delegated act draft

The system boundary includes life cycle stages:

1. Raw material acquisition and pre-processing.
2. Main product production.
3. Distribution.
4. End of life and recycling .

PCF comparison for different cell chemistries (kg CO₂ /kWh)



The national average electricity consumption mix shall be used to calculate the carbon footprint

“The recycled content and the waste generated during all life cycle stages shall be modelled with the use of the circular footprint formula (‘CFF’)”

Documentation for the verification of the carbon footprint study by the notified body is required and will likely be enforced top-down in the value chain by OEMs

¹) available in the Life Cycle Data Network (LCDN) on the European Platform on Life Cycle Assessment (LCA)

Implementing the battery passport creates a window of opportunity for firms

1 Digital Product Passport Readiness

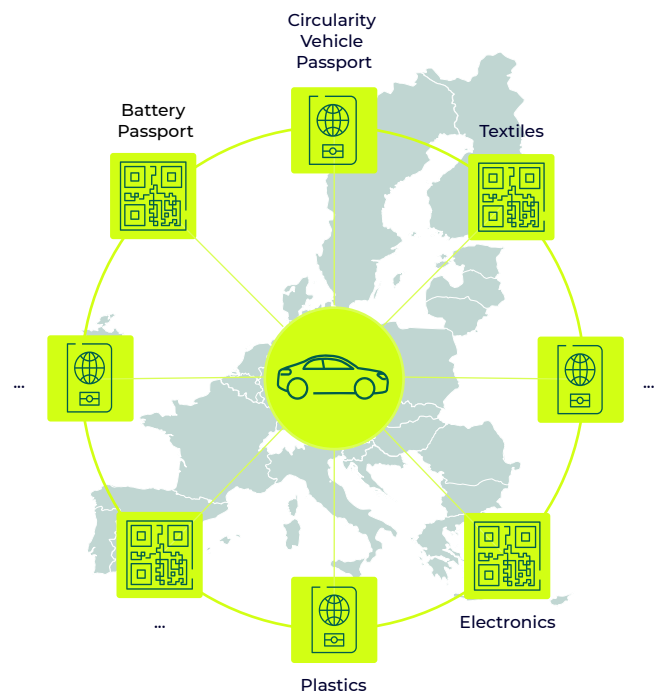
The EU has announced the implementation of different “Digital Product Passports” (DPP) for a variety of product groups within the Ecodesign for Sustainable Products Regulation (ESPR) and a “Circularity Vehicle Passport” in the Circular Vehicle Regulation Proposal.

Successful implementation of the Battery Passport by establishing a comprehensive software system will ease the integration of further DPPs over the next years.

2 Process optimization

Data-based decision-making supports...

- reduction of emissions across the entire supply chain
- strategic procurement through supplier assessments
- expansion of second life applications



3 Consumer awareness

Demonstrating a high level of sustainability can support and/or influence a consumer's buying decision on a B2B and B2C level

The implementation opportunities of the battery passport fit a long-term strategy

Conclusion: the battery passport roadmap is a guide through challenges to opportunities

It is not only important to consider all steps towards the implementation of the battery passport, but also to look beyond that milestone to future digital product passports



Involve the right people

A cross functional team is key to consolidate the expertise that is needed for the implementation of the EU battery passport



Build for scalability

A scalable software solution that can integrate different digital product passports will ease the implementation of future regulations throughout the entire international supply chain



Stay up-to-date

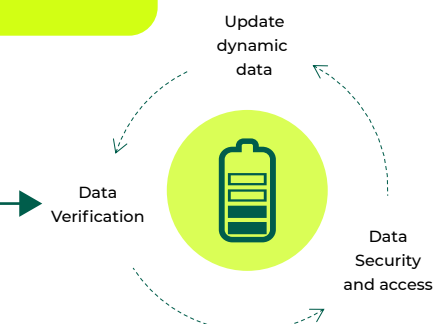
Further delegated- and implemented acts will supplement the EU Battery Regulation over the next years



Implementing the Battery Passport requires input of all actors in the value chain; for example, for the carbon footprint calculation of the battery production



Raw Material Extraction Material Production Electrode Manufacturing Cell Production Module & Pack Assembly Product Integration 2nd Life & Recycling



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