Implementing circularity for EV batteries: Barriers and policy lessons from pilot cases

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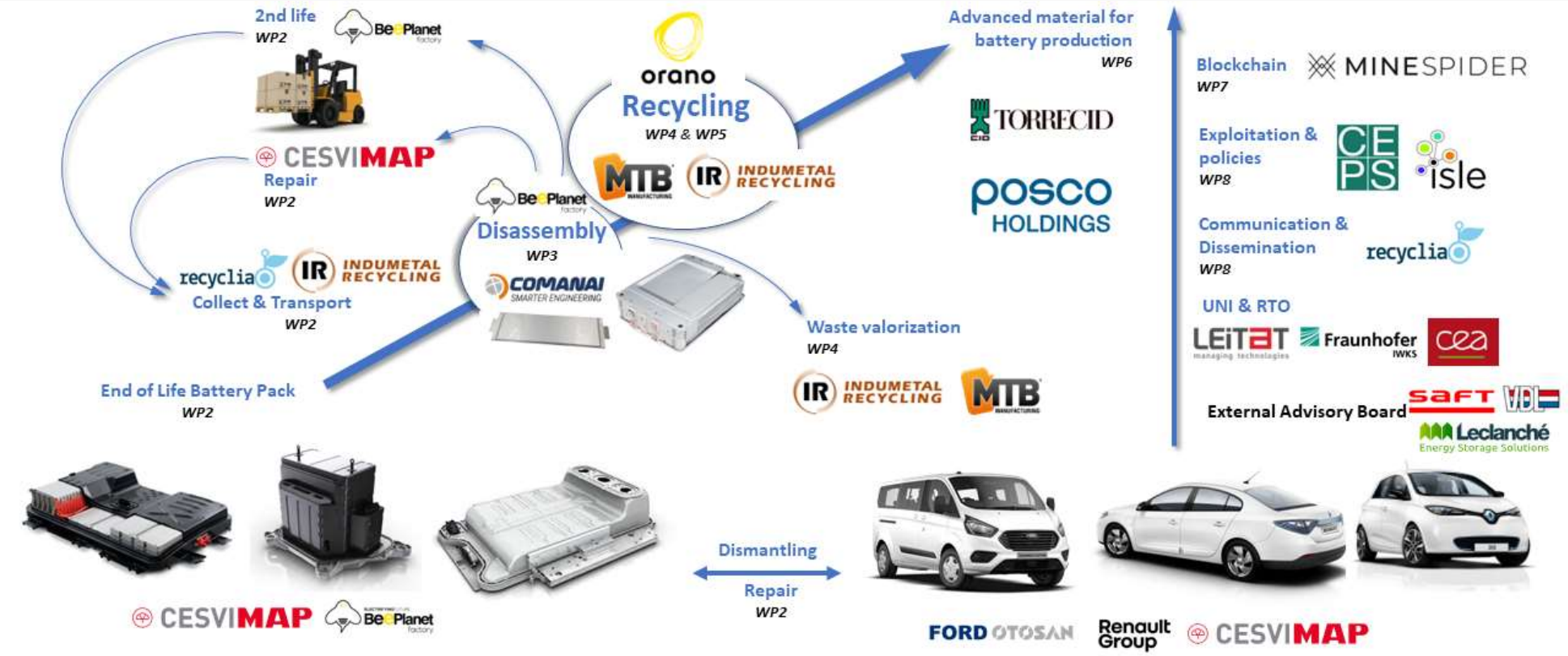
- Independent European think tank based in Brussels, founded in 1983
- Objectives:
  - Policy-oriented research
  - Forum for discussion
- Strong in-house research capacity and an extensive network of partner institutes throughout the world
- Focus areas:
  - Energy & Industry Transition
  - Technology options for decarbonising the EU industrial landscape
  - The international dimension of the green transition

BATRAW scope

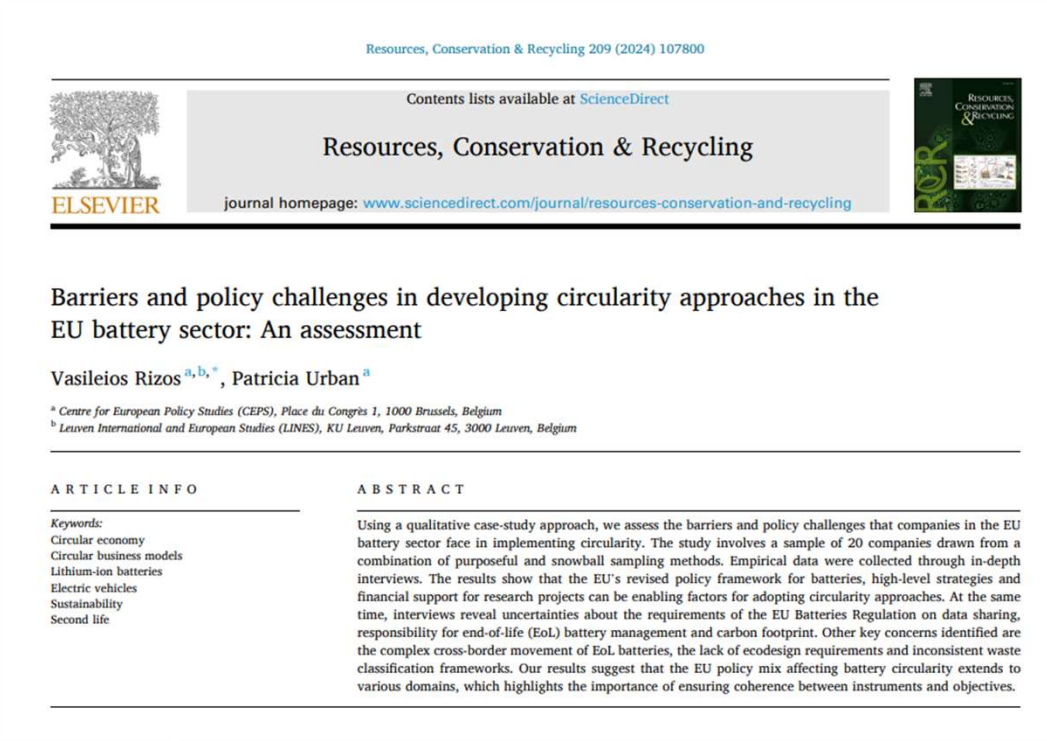


The new EU Battery Regulation

- The EU Battery Directive (2006/66/EC): Introduced minimum collection targets and recycling efficiency requirements for batteries and responsibilities for producers that put batteries in the market
- Given the new types of batteries entering the market and industry developments there was a need for a new EU piece of law on batteries
- The new EU Battery Regulation replacing the Battery Directive was formally approved in December 2022
- Key features of EU Battery Regulation
  - Sets a common set of rules for batteries irrespective of whether they come from
  - Focuses on improving recycling and promoting circular economy
  - Introduces core information requirements with the objective to boost transparency across supply chains
  - It distinguishes the electric vehicle batteries as a separate battery category, along with the existing portable, automotive and industrial batteries

Barriers to implementing circular economy business models for electric vehicle batteries

- Based on inputs from a sample of 20 companies across the full battery value chain including BATRAW partners
- Data collected through in-depth interviews resulting 141 pages of transcript



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Barriers and policy challenges in developing circularity approaches in the EU battery sector: An assessment

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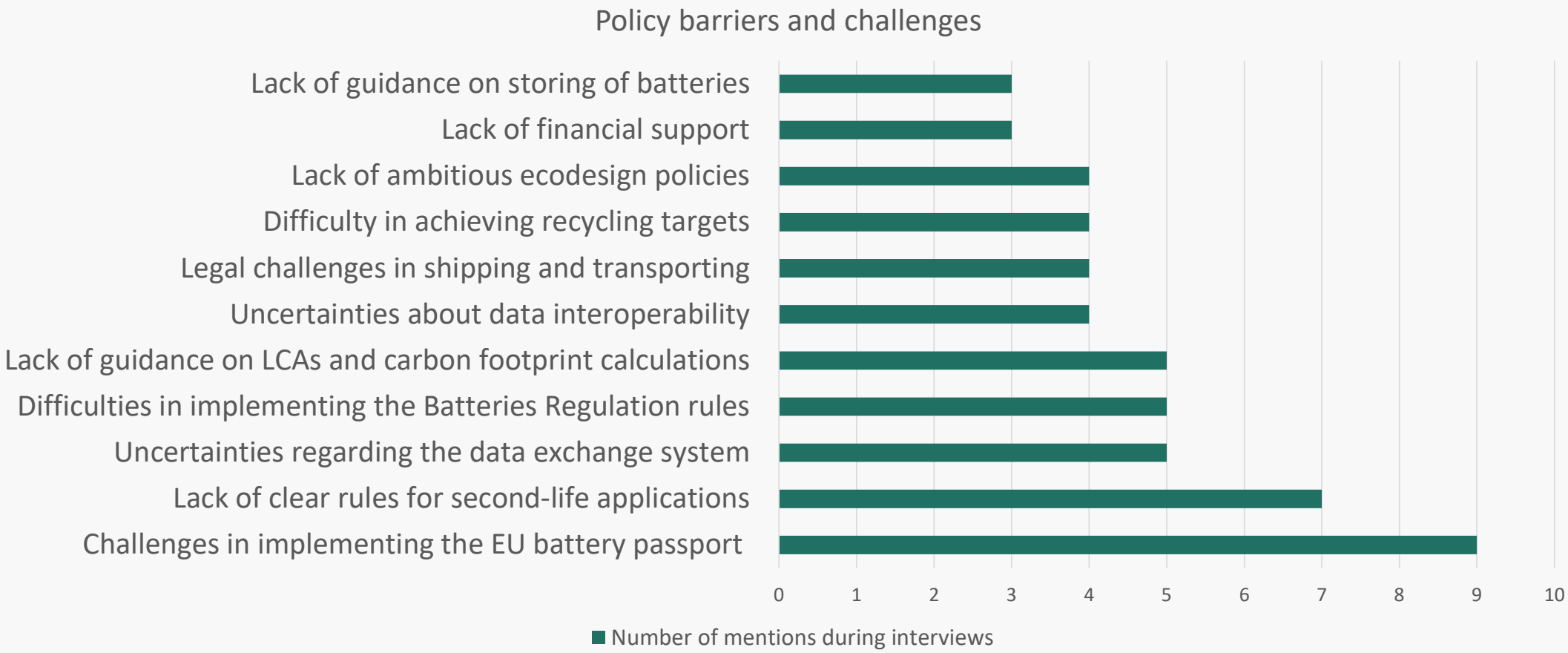
ABSTRACT

Using a qualitative case-study approach, we assess the barriers and policy challenges that companies in the EU battery sector face in implementing circularity. The study involves a sample of 20 companies drawn from a combination of purposeful and snowball sampling methods. Empirical data were collected through in-depth interviews. The results show that the EU's revised policy framework for batteries, high-level strategies and financial support for research projects can be enabling factors for adopting circularity approaches. At the same time, interviews reveal uncertainties about the requirements of the EU Batteries Regulation on data sharing, responsibility for end-of-life (EoL) battery management and carbon footprint. Other key concerns identified are the complex cross-border movement of EoL batteries, the lack of ecodesign requirements and inconsistent waste classification frameworks. Our results suggest that the EU policy mix affecting battery circularity extends to various domains, which highlights the importance of ensuring coherence between instruments and objectives.

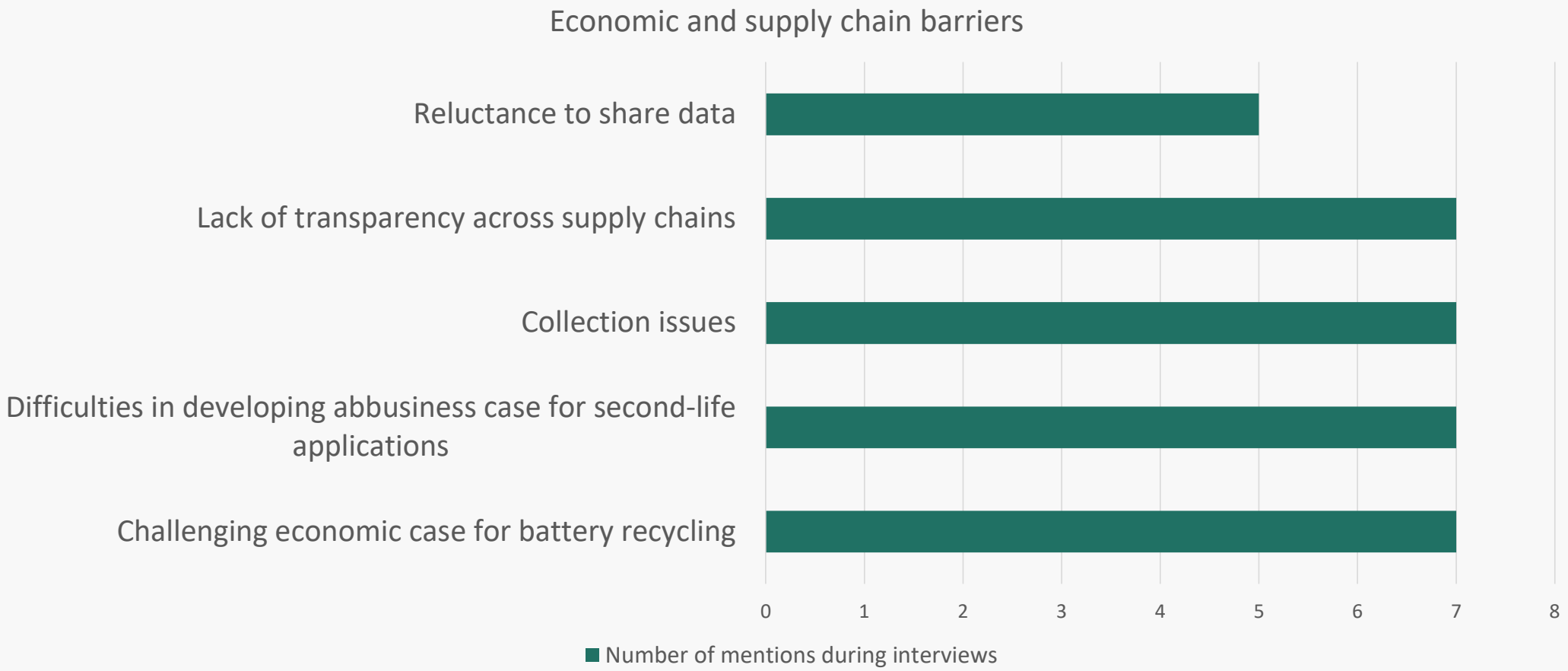
Source: Rizos, V. & Urban, P. (2024a)

Barriers and challenges emerging from the EU policy framework on batteries



Source: Rizos, V., & Urban, P. (2024a)

Barriers and challenges emerging from the EU policy framework on batteries



Source: Rizos, V. & Urban, P. (2024a)

The new EU Battery Regulation: key requirements and timeline

Requirements	Approximate timeline
Sustainability and safety	
Carbon footprint declaration	2024
Carbon footprint performance class	2026
Carbon footprint threshold	2027
Minimum recycled content rates (cobalt, lead, lithium and nickel)	2030, 2035
Supply chain due diligence	2024
Labelling and information requirements	
Date of manufacture, chemistry, critical raw materials	2027
Battery passport (QR Code)	2026,2027

The EU battery passport

- The Battery Passport will provide via a QR code in a digital representation of a battery's life, including information about its composition, product and safety details
- A key objective of having a passport for each battery is to facilitate reuse, repurposing, remanufacturing or recycling of batteries
- Core types of information to be included in the passport
  - Material composition of the battery, chemistry, hazardous substances, critical raw materials contained in the battery
  - Carbon footprint information
  - Due diligence report on responsible sourcing
  - Values for performance and durability parameters
  - Information on the state of health of the battery

Opportunities arising from the battery passport

Opportunities

- Develop a better picture of the carbon footprint of battery manufacturing operations
- Test the capabilities of the battery passport tool to then design similar requirements for other products groups
- Support battery recycling through better clarity about the batteries' content and state of health
- Support second-life applications through having access to key battery durability parameters
- Increase consumers' awareness of the environmental impacts of batteries and of their consumption choices
- Support more eco-conscious decisions by consumers
- Develop a level playing field that rewards actors adopting higher sustainability standards
- Provide a form of reassurance about responsible sourcing through due diligence requirements in the battery passport

Source: Rizos, V. & Urban, P. (2024b)

Implementation challenges arising from the battery passport

Challenges

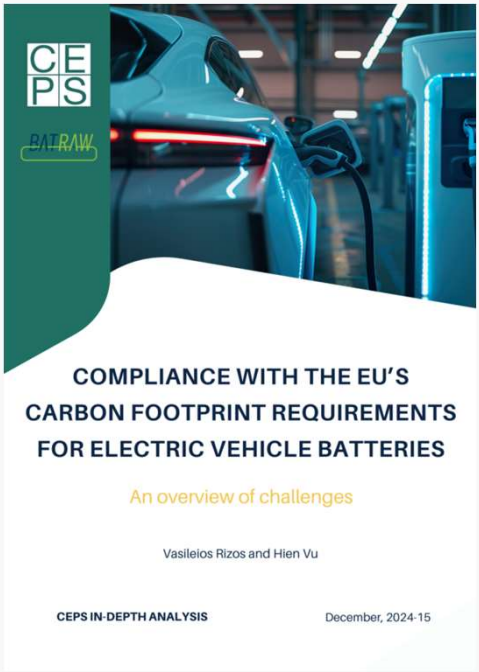
- Practically challenging to collect data from the multitude of companies involved in the various life cycle stages of batteries
- General reluctance to share data due to confidentiality concerns and lack of trust between battery supply chain actors
- Lack of knowledge about the need for building transparent battery supply chains and the upcoming EU Batteries Regulation requirements
- Unclarity concerning the access rights to certain types of data
- Lack of standards to ensure interoperability of data shared among global supply chain actors
- Difficult to assess the reliability and validity of collected data (e.g. on carbon footprint)
- Unclear responsibilities for meeting the battery passport requirements
- Complex to consolidate all required carbon footprint data and produce comparable results

Source: Rizos, V. & Urban, P. (2024b)

Challenges to calculating the carbon footprint (CF) of batteries

List of challenges

- Difficulties in acquiring certain types of CF data from suppliers of battery components and materials
- Lack of clarity regarding the methodologies used by suppliers for calculating certain CF values
- Limited supply chain visibility upstream creating difficulties to collect or verify
- data
- Reluctance by supply chain actors to share CF data due to confidentiality
- concerns
- CF data quality challenges due to data submitted in different reference units
- Challenging to track emissions during the transportation phase of end-of-life batteries
- Limitations of secondary data sources in terms of availability and quality of available data
- Difficult to define the functional unit for the CF calculation of the recycling stage
- Practically challenging to calculate the CF of heavy-duty vehicles with various battery configurations
- Limited in-house expertise for LCA and calculation of batteries' CF
- Disparities between available LCA software



Source: Rizos, V. & Hien V. (2024)

Policy messages

- It will take some time for supply chains to mature and different players to understand the importance of sharing good-quality data
- Supply chain initiatives serving as knowledge-sharing hubs can help break silos across different actors, facilitate data exchange and act as channels for raising awareness about the CF calculation method
- Early availability of secondary data sets before the legal requirements become applicable would enable stakeholders to assess the data quality, select suitable datasets and identify potential data gaps
- The complexities in calculating the CF point to the need for further guidance in areas where existing pilot cases reveal calculation uncertainties (e.g. during the recycling or transportation stages)

The new EU Battery Regulation: Implications or companies

- To comply with the requirements of the Regulation companies will need to obtain data (e.g. on carbon footprint and due diligence obligations) from their upstream supply chain
- This will bring challenges and may lead to the development of industry alliances
- There are examples of companies in Europe that started developing product passports offering full transparency across supply chains
- Securing raw materials access at optimal cost and meeting supply chain transparency requirements will be among the key challenges for battery manufacturers

Sources

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THANK YOU

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