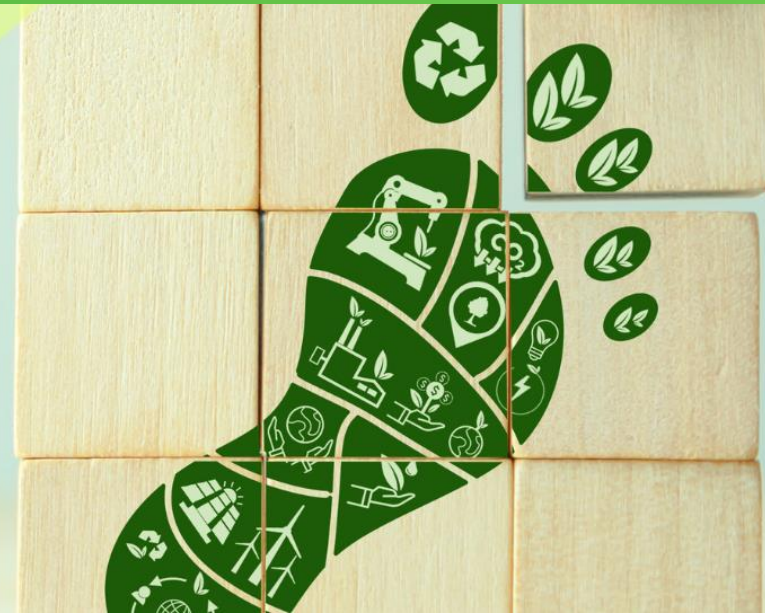


Strategic Decision Webinar: The Flow Batteries Working Group on Carbon Footprint Calculation

12 June 2024 | 16:00 CEST



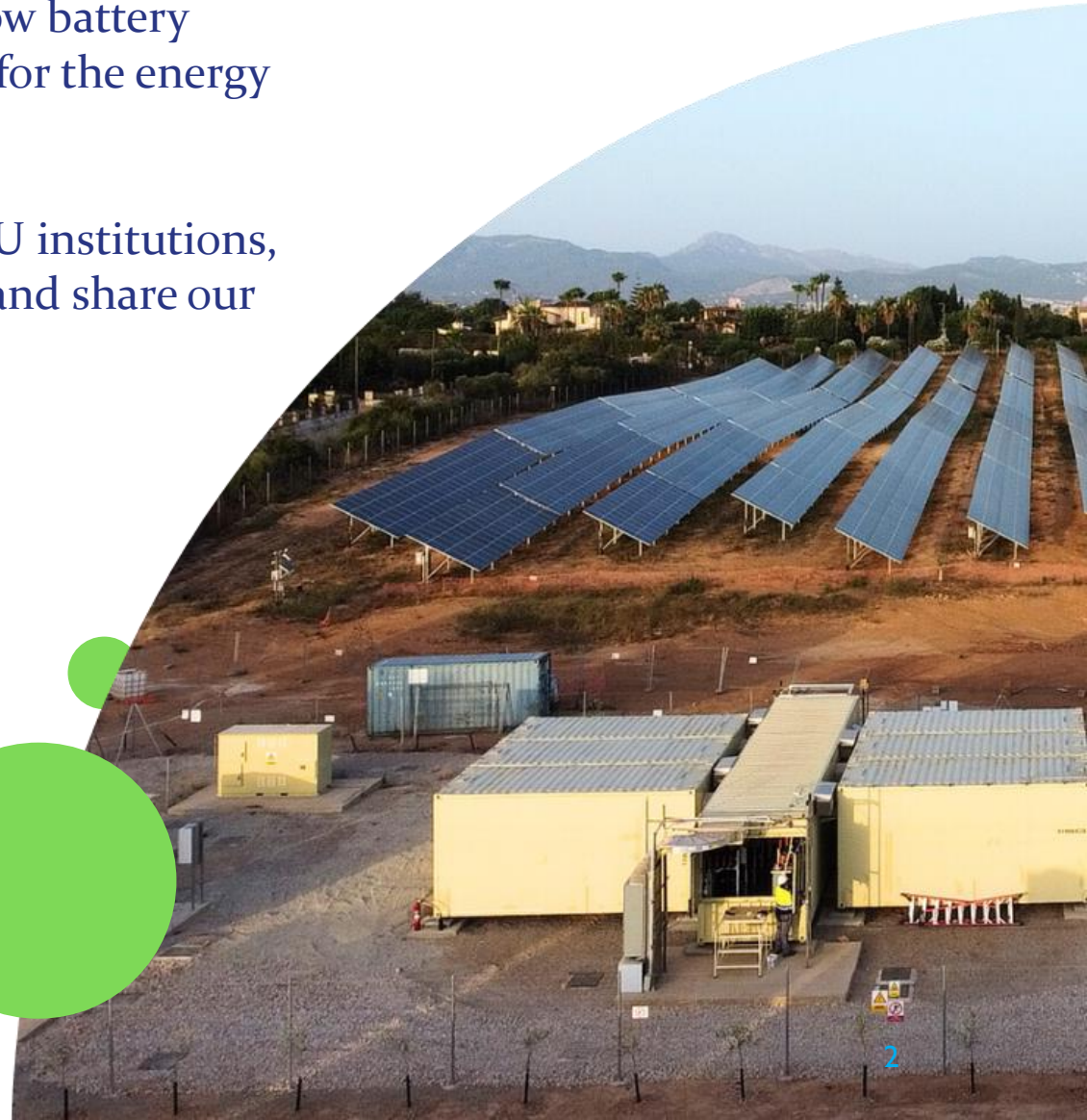
About Flow Batteries Europe

Established in 2021, Flow Batteries Europe (FBE) represents flow battery stakeholders with a united voice to shape a long-term strategy for the energy storage sector.

FBE boasts strong connections within both the industry and EU institutions, which enables us to lead a working group on carbon footprint and share our feedback with the EU decision-makers.

For more information, please contact:

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www.flowbatterieseurope.eu



Background: The Batteries Regulation and Carbon Footprint Declaration

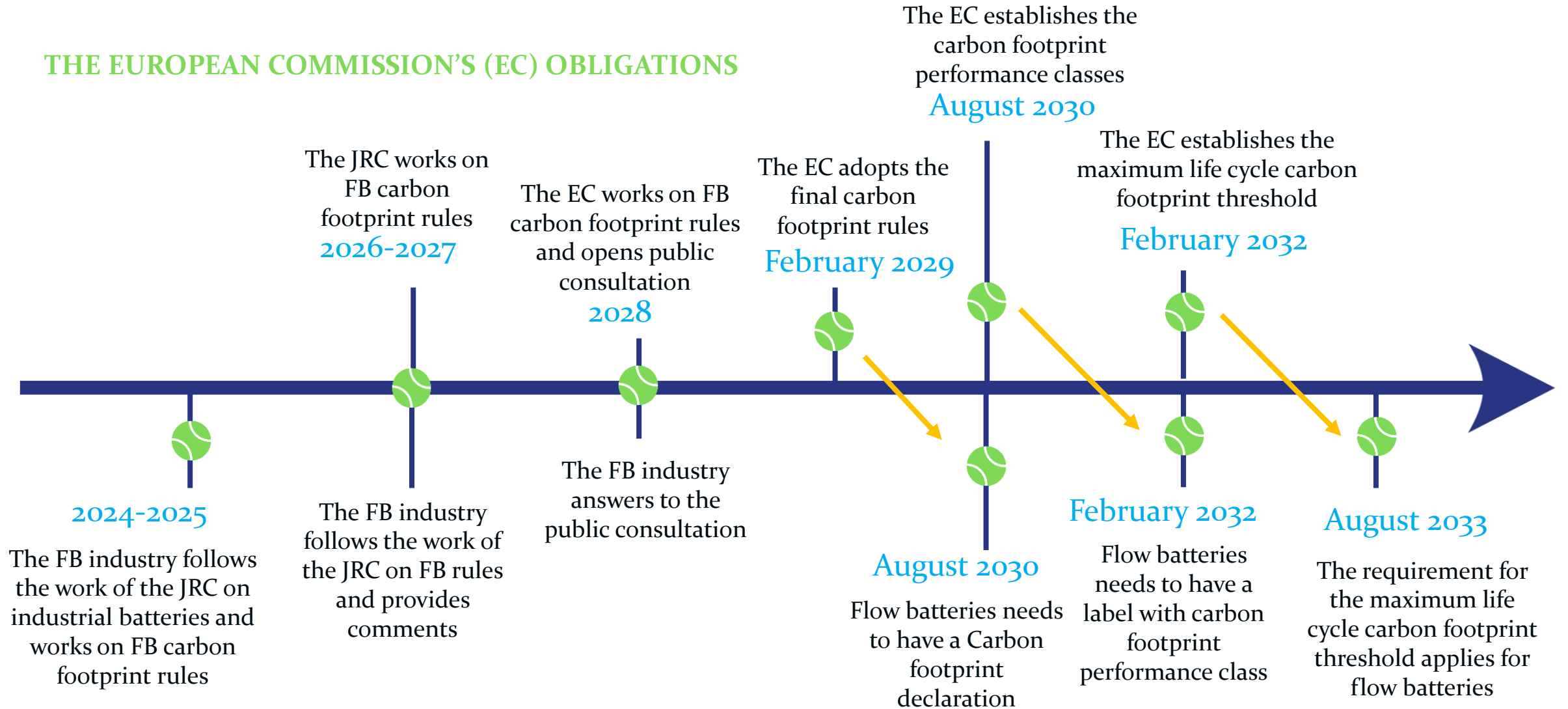
The Batteries Regulation entered into force in August 2023. It requires that as of February 2030 – every flow battery must have a carbon footprint declaration.

- The Commission, with the support of the Joint Research Centre (JRC) shall adopt the methodology for calculation of the carbon footprint for every battery type.
- In June 2023 the JRC published the draft Rules for Electric Vehicle Batteries (CFB – EV), in December – for industrial batteries (except batteries with external storage). Please find these documents on [this page](#).
- The JRC will begin developing a methodology for batteries with external storage – no earlier than in 2026. However, the industry needs to be prepared to provide the JRC with expertise.



Estimated Timeline

THE EUROPEAN COMMISSION'S (EC) OBLIGATIONS



THE FLOW BATTERIES INDUSTRY'S (FB) OBLIGATIONS

How the methodology was developed for other battery types?

The methodology for carbon footprint calculation of EV batteries is based on the Product Environmental Footprint Category Rules (PEFCR). The industry has been working on this since 2018.

The methodology for carbon footprint calculation of industrial batteries (excluding batteries with external storage) will be based on the standard currently being developed by the industry.

However, there has been no similar background work for the flow batteries industry. That is why we propose to begin this work internally, discussing important aspects for the industry and reaching agreements before moving to the next stage of discussions with EU institutions.



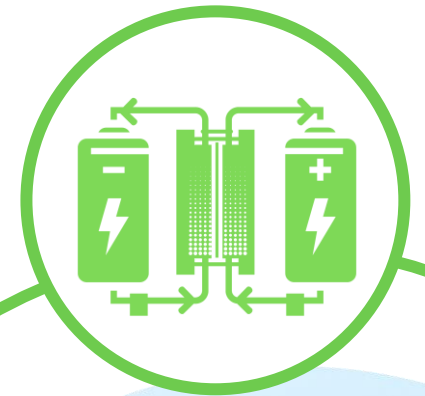
The carbon footprint calculation rules for flow batteries – how to do it?

FBE proposes to establish a working group on carbon footprint rules for flow batteries. This will be led by a professional consultancy – an externally hired party. However, FBE will be responsible for maintaining contact with EU institutions and organising additional discussion meetings if needed.

- Stakeholders will meet 1-2 times a month.
- The rules will be tested on two chemistries: organic and metal-based flow batteries.
- Six companies will provide data.

Cost and Timeline

The cost per participant will be €4,500 + VAT. This will cover the cost of hired professionals. The project will last approximately one year.



Initial Project Steps

Before initiating the project, FBE took several preparatory steps, including analysing the flow battery value chain, raising industry awareness about carbon footprint methodologies, and researching potential external consultancies to support our industry in this initiative.



STAKEHOLDER MAPPING

Project will engage stakeholders across the FB supply chain, covering diverse chemical compositions.



PROJECT PROMOTION

It is open to both members and non-members of our association.



INTRODUCTION WEBINAR

The expert will explain project management, timeline and deliverables – 12 June 2024, at 16:00 CEST.



PROJECT KICK-OFF

The project is scheduled to start in the second quarter of 2024 and last for one year.



ecomatters

CF methodology for flow batteries

Date: 12-6-2024

Project number: P23128

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**FLOW
BATTERIES
EUROPE**

Background

Flow Batteries Europe

The battery industry is now facing the new Batteries Regulation. In the Batteries regulation, one of the sustainability parameters to be calculated and communicated is the carbon footprint of the batteries (CFB) specified in Article 7 of the Batteries Regulation. These CFB rules for flow batteries (CF FB rules) will be eventually developed by the JRC based on the EF methodology (EF method as in the EC Recommendation 2021/2279).

FBE would like to do a preparatory study to develop their own version of these CF FB rules (in line with the JRC framework) and test these out for two of flow battery technology types: metal- and organic-based chemistry.

This preparatory study enables flow battery industry to take the lead in:

- Determination of key methodological choices that are not yet specified for the FB product group
- Ensuring that the rules facilitate CF calculation of different FB manufacturing technologies
- Getting insight in most relevant sources of impact, as preparation for policy discussions
- Showing the influence of the operational lifetime of FB in the impact results
- Preparing the engaged industry for data collection requirements and understanding of the EF method



Goal and scope

Goal

The goal of this project is to explore possible “Rules for Carbon Footprint of Flow Batteries” (CF FB rules) and to test the developed rules for 2 types of flow batteries.

This project is considered preparatory work for future engagement with the JRC. The JRC will develop the official final CF FB rules required for the preparation of the carbon footprint declaration, as mandated by the Batteries Regulation. To be well prepared and aligned within the industry, FBE wants to go through the process and do a preparatory study by developing flow battery industry perspective on the CF FB rules before going through this process with the JRC.

Scope

This project supports FBE with the development of CF FB rules for two subcategories.

1. Metal chemistry-based flow batteries
2. Organic chemistry-based flow batteries

The CF FB rules will be analysed and developed via:

- CF FB rules document, based on the JRC policy report “Proposal for the rules for the calculation of the Carbon Footprint of rechargeable Industrial Batteries except those with exclusively external storage (CFB-IND)”
- Two CF FB studies in accordance with the CF FB rules.

Methodology

- The CF FB models will be developed in alignment with **the JRC policy report** “Proposal for the rules for the calculation of the Carbon Footprint of rechargeable Industrial Batteries except those with exclusively external storage (CFB-IND)”
- The CF FB models will be based on the **life cycle stages defined by the Batteries Regulation** (raw materials acquisition and pre-processing, manufacturing, distribution, end-of-life), giving insight in the climate change impacts (GWP) from cradle to grave (see figure below).
- The background datasets used will be taken from **Ecoinvent** databases, or other relevant and high-quality datasets if readily available.
- Development of (EF compliant) background datasets are out of the scope of this project.
- Development of **specific end of life investigation of materials is out of scope**. As a default, the data and approach from JRC policy report “Proposal for the rules for the calculation of the Carbon Footprint of rechargeable Industrial Batteries except those with exclusively external storage (CFB-IND)”. In case data is missing, an assumption will be made in a joint effort with FBE.
- In principle we will use **Gabi software** to prepare the LCA models, upon request we could also use other LCA software such as Simapro.

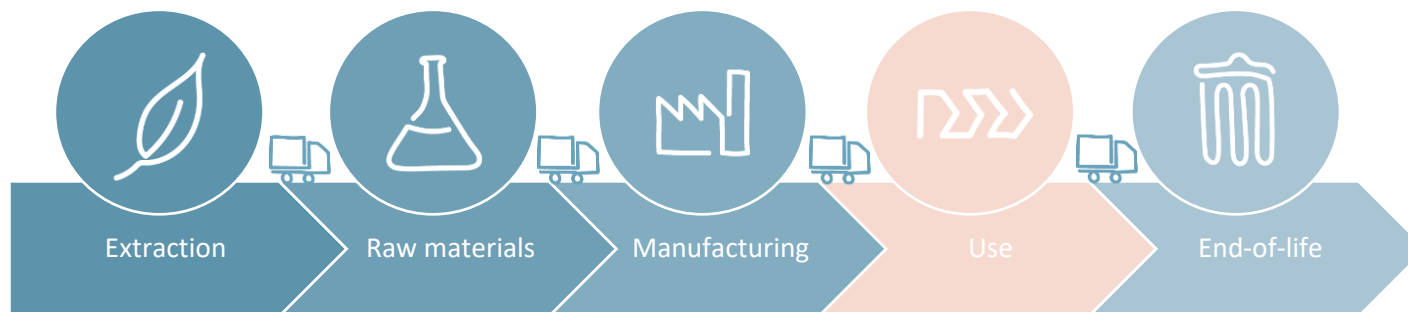


Figure: A product's full life cycle from cradle to grave. Please be aware that the Batteries Regulation has excluded the use phase from the carbon footprint calculation methodology for all battery types. The flow battery industry needs to ensure that the longevity of flow batteries is considered in other aspects of carbon footprint calculations.

Setup FBE - Ecomatters

FBE Team:

- **FBE Secretariat**

Commissioner of the project. This is the main contact with whom Ecomatters engages for project planning and final decision making.

- **FBE CF Technical committee (TC)**

Technical Committee comprising 6 or 7 members, including the FBE technical Secretary, that that will be established to facilitate the technical work on this project. This is the technical contact with whom Ecomatters collaborates on a regular basis.

- **FBE community**

Wider community of those interested in the progress of this project, but who are not involved in the technical work.

- **Data providers**

A selected number of FBE member organisations that manufacture the relevant flow battery systems who will provide the data for the average or representative Flow battery study.

Ecomatters team and roles



Max Sonnen

*Project director &
Quality assurance*



Brienne Wiersema

LCA & PEF consultant



Wouter van Kootwijk

LCA & PEF consultant

Activities

The main point of contact is the FBE secretariat. In case of methodological issues or discussion between participants in the working group hindering the project progress, a practical solution will be agreed between the FBE secretariat and Ecomatters (EM) to ensure project progress.

No	Activities	Who?
1	Draft CF FB rules <ul style="list-style-type: none"> • Project kick-off • Define a list of requirements to be included in CF FB rules (from other frameworks/standards/policies) • Define product categorization & main methodological choices (functional unit, system boundaries, etc.) • Develop a draft CF FB rules based on outcomes of the above activities • Working group feedback on draft CF FB rules* • Project progress update meeting 	EM & FBE FBE EM & FBE EM FBE EM & FBE
2a	Data collection CF FB study <ul style="list-style-type: none"> • Identify industry representatives for data collection • Develop data collection templates and instruction session for the data collection 	FBE EM
2b	Data collection support CF FB study per data provider <ul style="list-style-type: none"> • Data collection per data provider, assuming 6 data providers • Support data collection and data integration (1 day per company, 1 round of data collection) 	Data providers EM
3	CF FB study* <ul style="list-style-type: none"> • Calculate and develop Draft CF FB report • Presentation of preliminary results • Provide written feedback on draft CF FB study (review by working group) • Finalize models and final CF FB study 	EM EM (& FBE) FBE EM
4	Final CF FB rules <ul style="list-style-type: none"> • Prepare the final CF FB rules based on the CF FB study • Presentation deliverables • Excel tool 	EM EM (& FBE) EM

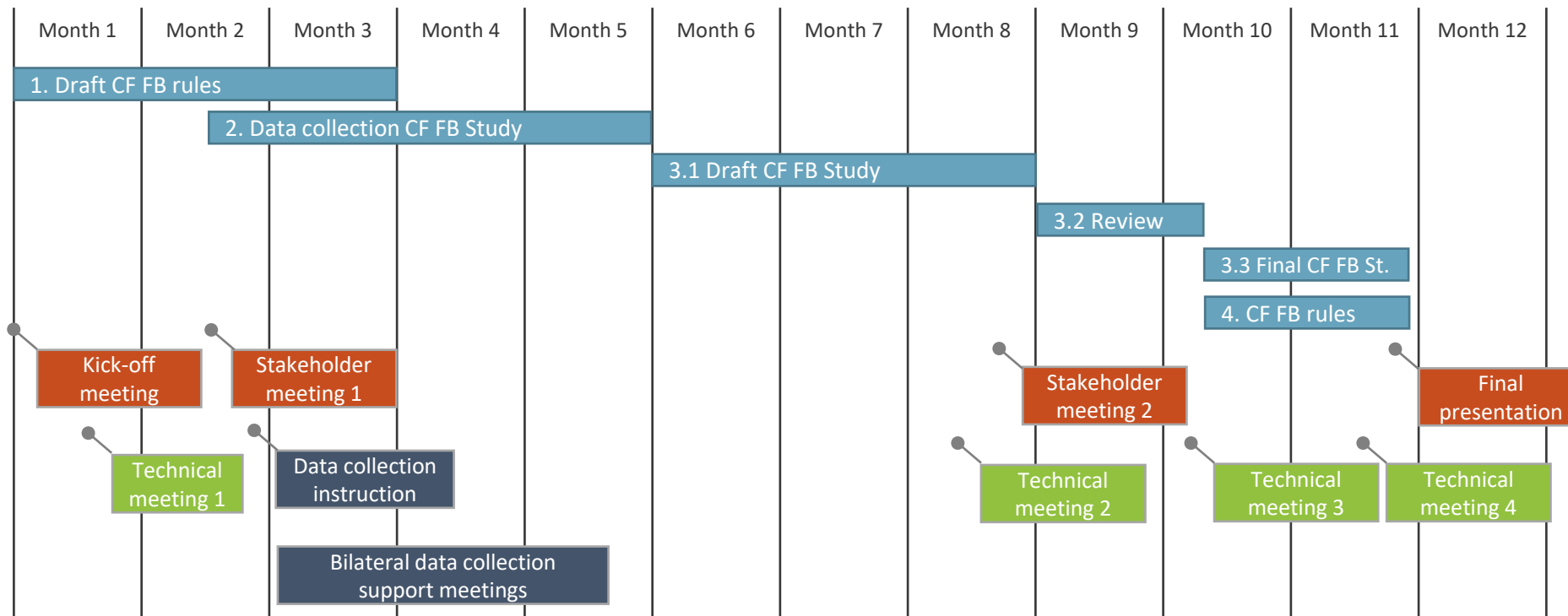
Meetings

The following meetings (in chronological order) are suggested. The exact planning of meetings will be agreed upon at the start of the project.

Meetings*	Suggested participants	Goals
Project management	EM + FBE secretariat	On a monthly basis Ecomatters (EM) and FBE will have an update meeting to discuss the progress, planning, deliverables and priorities of the ongoing activities.
Kick-off meeting	EM + CF TC (+ working group)	Introductions, agree on detailed timelines, project development process.
Technical meeting 1	EM + CF TC	Technical workshop to define product categorization & main methodological choices for the CF FB rules, as well as the composition of the CF FB studies for 2 subcategories. Engage with data providers timely.
Stakeholder meeting 1	EM + FBE community	Update wide community on project progress; draft CF FB rules & planning for CF FB study.
Data collection instruction	EM + data providers	Instruct the data providers about the data collection template and the data collection process.
Support data collection	EM + data providers	Provide bilateral support to the data providers when they have questions about data collection.
Technical meeting 2	EM + CF TC	Technical meeting to present the draft CF FB study and preliminary results, enabling the CF TC to provide feedback.
Stakeholder meeting 2	EM + FBE community	Update task forces on project progress; CF FB study preliminary results.
Technical meeting 3	EM + CF TC	Technical meeting to discuss the feedback on the CF FB study and to discuss development of the final CF FB rules.
Technical meeting 4	EM + CF TC	Technical meeting to present the final deliverables, enabling the CF TC to provide feedback before the final presentation.
Final presentation	EM + FBE community	Presentation of the final CF FB rules & future development recommendations.

High level timeline

The activities are planned to be executed during 2024 and 2025. The high-level time estimate for this study is 12 months. A detailed timeline will be agreed after project approval. Delay in certain activity could result in a respective delays to later activities.



Deliverables

The following deliverables will be provided as the project output:

1. Final CF FB study report for 2 flow battery systems

Carbon footprint study report on the 2 flow battery systems based on the CF FB rules.

2. Final Rules for Carbon Footprint of Flow Batteries (CF FB rules) (Flow battery carbon footprint calculation methodology)

Describing the Flow battery carbon footprint calculation methodology needed to perform CF FB studies. This will be based on the JRC policy report “Proposal for the rules for the calculation of the Carbon Footprint of rechargeable Industrial Batteries except those with exclusively external storage (CFB-IND)”.

3. Excel tool for testing the developed calculation models

An Excel tool will be developed where project participants can modify the developed models of the CF FB study. The tool will contain the (dynamic) models of each of the two subcategories. The characterization factors (CO₂ per kg/MJ etc) of the various impacts will be added to the tool to the extent that they are freely available without a licensing fee*.

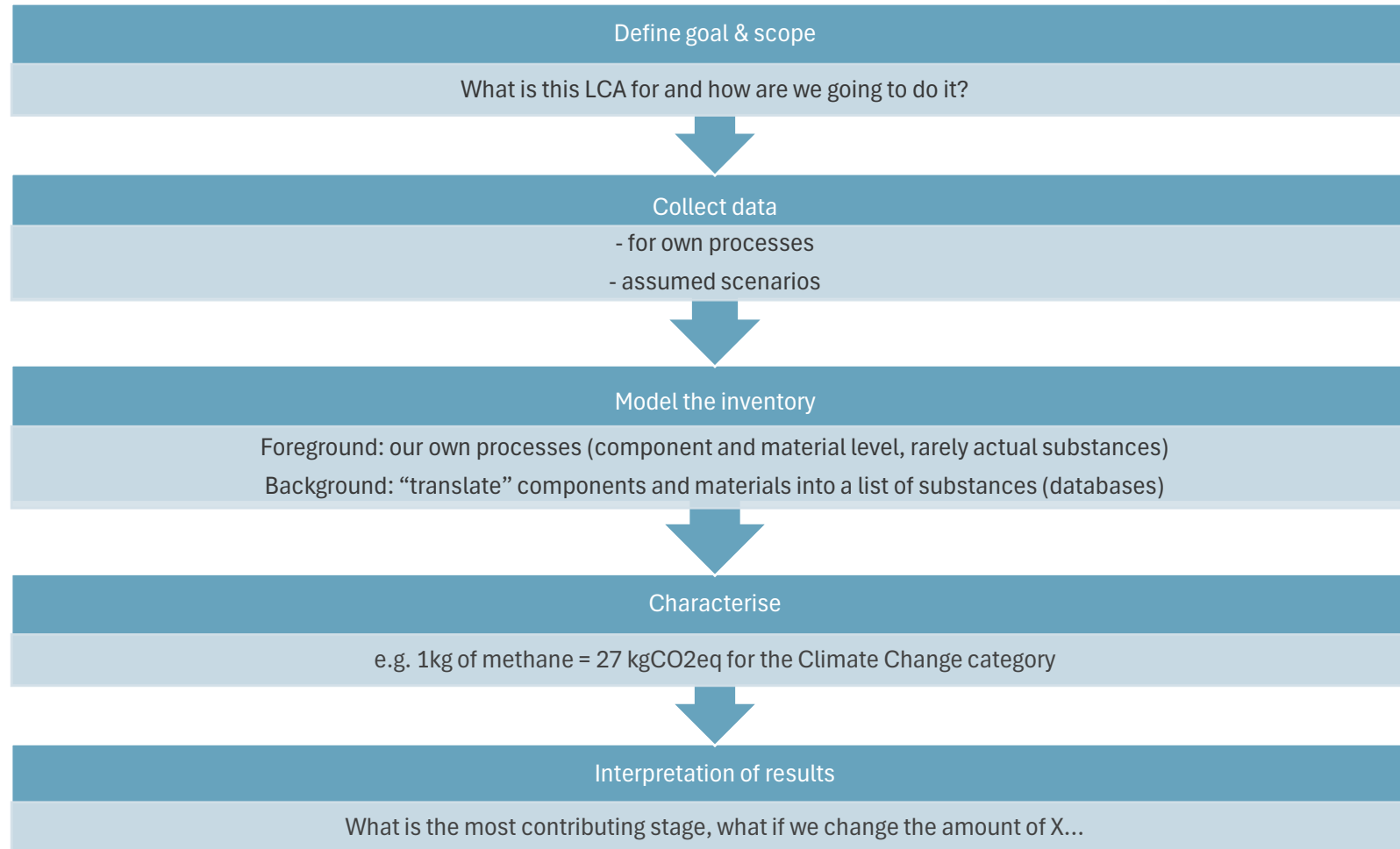
To discuss or further clarify

This preparatory study enables FB industry to take the lead in:

- Determination of key methodological choices that are not yet specified for the FB product group
- Ensuring that the rules facilitate CF calculation of different FB manufacturing technologies
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Annex slides

How to do an LCA



Functional unit

Product by itself is meaningless, it is a function that the product provides makes it needed. E.g.

one uses paint to coat the wall and for colour and protection.

one uses a dishwasher to get the clean dishes and utensils

As different product perform their functions differently, it is more fair to assess not the environmental impact of the product itself, but the function it provides.

Functional unit - is the quantified performance of a product system, qualitatively and quantitatively describing the function(s) and duration of the product in scope.

- what is the function provided (coat the wall; wash the dishes)
- how much of this function is provided (1m²; 20 dishes)
- expected quality (to the 98% opacity; clean of the residue)
- duration (for 50 years; one time)

Thus, the product's impacts are to be scaled (up- or down) to the number of the functional units.

*The portion of the product needed to provide one functional unit is **Reference flow**: 0.15kg of paint; 5E-7 dishwasher*

In some cases, the LCA is performed on a **Declared unit**: a particular defined quantity of the product. Often, when it is an intermediate product and the final function cannot be defined. E.g. 1 kg of polypropylene.

Product Environmental Footprint (PEF)

What is PEF?

- The Product Environmental Footprint (PEF) is an LCA methodology to quantify the environmental impacts of products (goods or services).
- Main goal of the PEF is **harmonization** of LCA calculations across products, industries and geographies (Europe)
- Designed by the **EC Joint Research Centre** to enhance green products on the market
- It builds on existing approaches and international standards. More encompassing than EN15804.
- Includes the calculation of total environmental impact in a **single score** , facilitating environmental labelling.

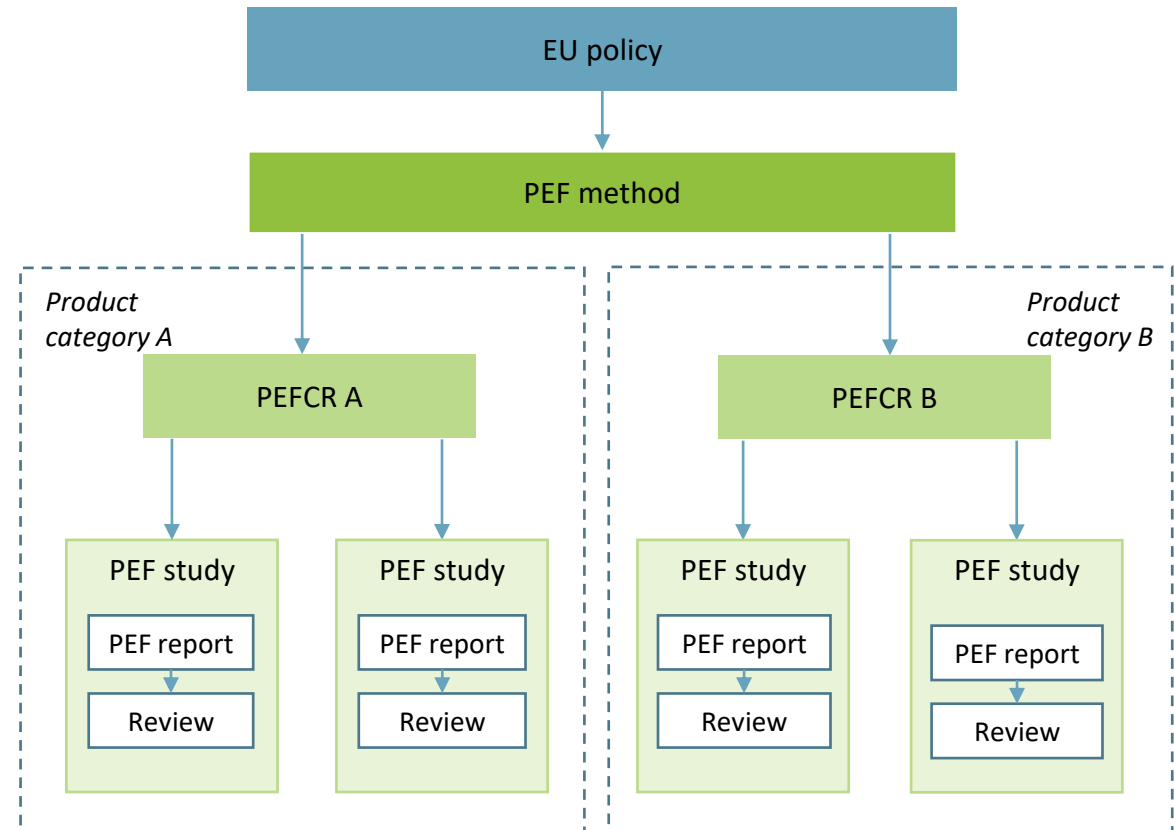
PEF and EU policy

- PEF is expected to be **integrated within various EU policy / regulation**, within next 5-10 years.
- Examples of policies or regulations with references to PEF, or life cycle information in general:
 - The Eco-design for Sustainable Products Regulation (ESPR) as part of the Sustainable Products Initiative (SPI) in the broader Circular Economy Action Plan (CEAP) 2.0
 - The Proposal for a Directive on substantiation and communication of explicit environmental claims (Green Claims Directive)



Product Environmental Footprint Category Rules (PEFCR)

- Category rules (**PEFCR's**) are developed (e.g., by industry associations) to **streamline** PEF studies for product groups
- A PEFCR is a rule-book document that includes:
 - Which functional unit to use
 - Which stages and processes to consider
 - What data needs to be collected
 - Which datasets to use
 - Predefined use scenarios
 - How to model waste treatment
 - Which impact assessment models to use
 - A benchmark based on a representative product (RP)
 - And more...



Strategic Decision Webinar: Project Overview and Invitation to Participate



Prospects Gained

vs.

Losses Faced

- Empowers you to influence the development of carbon footprint calculation rules.
- Helps ensure that the final rules are tailored to meet the specific requirements of the flow battery industry.
- Prepares your business for the introduction of the Carbon Footprint Declaration.
- Helps identify weak points in product development, giving you the opportunity to choose better materials and design features that lead to more environmentally efficient products and technologies.
- Enables you to maintain direct contact with key European flow battery industry players and EU institutions.

- Regulations not tailored to the flow battery industry could limit growth opportunities and market access for flow battery companies.
- Without active participation, the industry loses its ability to shape the rules to be practical, fair, and beneficial.
- Competitors who actively participate in the rule-making process may gain a competitive edge by ensuring the regulations favour their technologies or business models.
- Failure to participate might harm the industry's reputation, making it appear unresponsive to environmental concerns.
- If regulations are found to be unworkable after implementation, making changes can be slow and costly. Being proactive helps prevent such scenarios and ensures smoother implementation.

1. Invitation to the stakeholders consultation meeting with the JRC

The Joint Research Centre (JRC) is conducting studies to provide technical support for the development of the Delegated Acts on the carbon footprint of batteries (CFB) and invite batteries stakeholders to the online workshop to discuss the progress.

Purpose: Support in defining Carbon Footprint Rules for industrial batteries with internal storage.

Date: 8th July 2024 (morning).

Attendance: Limited to selected experts; one representative per organization.

RSVP: Reply by 30th June 2024 to confirm participation or interest to Beata Virsumirska, FBE Policy Officer, b.virsumirska@flowbatterieseurope.eu.

Access: Further information and preparatory documents for the workshop will be available online at: https://eplca.jrc.ec.europa.eu/EU_BatteryRegulation_Art7.html.

2. Invitation to join the project – The Flow Batteries Working Group on Carbon Footprint Calculation

Considering the strategic importance of this project for the entire industry, we are confident that flow battery companies will actively participate.

Following this webinar, you will receive a letter of commitment from us. We kindly request your response by 26th June 2024. Please send the signed document back to:

Beata Virsumirska, FBE Policy Officer
b.virsumirska@flowbatterieseurope.eu.

These companies already confirm their commitment to the project:



Join us in securing flow battery industry credibility and competitiveness.



FLOW
BATTERIES
EUROPE

Strategic Decision Webinar: Engage and Interact: Open Discussion and Q&A



What to expect at the International Flow Battery Forum (IFBF)

IFBF: 25-27 June 2024, Glasgow and online

- The leading event for the flow battery community
- It promotes the most recent developments in the science, technology and commercialisation of flow batteries
- The conference will feature talks, panel sessions, open discussions, networking breaks, a poster session, conference dinner and a local site visit
- Business leaders, policy makers, developers and researchers will share information and forecasts around the world of energy storage and the important role of flow batteries



IFBF

What to expect at the International Flow Battery Forum (IFBF)

Special discount for the webinar attendees!

Please use this code: IFBFXFBWEWEBINAR

Deadline: June 16, Sunday

Applicable for: standard and academic tickets, including online tickets.

£100

The discount cannot be combined with the FBE members discount code or other discounts.



IFBF



Thank you