GHG Rulebook v1.5 consultation report

Executive Summary

Introduction and Methodology

The Global Battery Alliance's GHG Rulebook v2.0, published on 6 December 2023, includes enhancements reflecting insights from stakeholders worldwide. The Global Battery Alliance (GBA) presented an earlier draft for public consultation to invite feedback from industry experts, environmental organisations, governments, and concerned citizens, some of whom contributed their perspectives on how to reduce greenhouse gas emissions across the battery lifecycle.

The draft was made available in two languages: English, and Chinese, and the public consultation ran from the 20th June 2023 until the 30th September 2023. Participation in the consultation process was facilitated via email, an online portal, a launch webinar and workshops in Brussels, Beijing, and New York. A total of 17 organisations provided feedback.

The Global Battery Alliance Secretariat commissioned INOVEM Consult™, an online Consultation Software, to manage the consultation data from the online responses and the in-country workshops.

Key Elements of Implementation

1. **In-Depth Review and Analysis:** GBA's GHG Working Group reviewed and analysed the feedback received. Comments were categorized and studied to identify overarching themes and areas of the GHG Rulebook to strengthen.

2. **Collaborative Refinement:** The GBA is dedicated to maintaining an open and collaborative dialogue with stakeholders. Specialized working meetings, webinars, and forums were organized throughout 2023 to facilitate discussion and refinement of proposed changes following the GBA Consensus Way. Decisions taken this way are usually supported by all members. Though there may not always have been unanimity, all GBA members share the motivation to achieve broad public acceptance of the GHG Rulebook.

3. **Leveraging Expertise:** GBA's membership comprises diverse stakeholders across the battery value chain. Their collective networks and expertise were harnessed to ensure that revisions of the GHG Rulebook remained aligned with the latest technological advancements, industry best practices, and innovative emissions reduction strategies.

4. **Transparency and Accountability:** The GBA committed itself to a high degree of accountability and transparency throughout the consultation process. This report has therefore been prepared for members and the public. Operational and strategic guidance was provided by the GBA's Battery Passport Steering Committee.

5. **Monitoring and Evaluation:** Post-implementation, GBA aims to establish a reliable monitoring and evaluation framework to assess the effectiveness of the revised GHG Rulebook in reducing emissions. Periodic reviews should allow for adjustments and improvements as needed.

How did the GBA make its decisions? The GBA Consensus Way

The GBA Consensus Way makes use of Systemic Consensing to anticipate how it will make difficult decisions once the available time for less-structured consensus-building has expired. Systemic Consensing is a modern participatory decision-making method that uses resistance in a pragmatic way as a resource for innovation.

When contrary proposals arise, the GBA draws upon professional facilitation skills to help understand underlying interests, encourage independent fact-checking, scope where group polarisation is greatest, and raise awareness amongst members of potential synergies and trade-offs. Customised exercises (remote or in-person) are then provided to explore, prioritise and refine proposals, as well as clearly identify what happens if no decision is taken.

During discussion of stakeholder feedback, participants' objections and resistance to proposals were regularly measured and used as a creative means of incrementally improving the solutions proposed. Within the announced schedule, the GBA's GHG Work Group identified the solutions with the least resistance, that all members could live with to some extent, and agreed how to amend the GHG Rulebook. In this way, the GBA took a systematic, time-efficient approach to consensus-building, without lessening the quality of the result.

Submissions

In-country workshops and webinars

Introductory webinar

On June 20th 2023 (15:00-16:30 CEST), the GBA launched the public consultation phase for the GHG Rulebook v1.5. This was via a webinar designed to raise awareness of the GHG Rulebook and the web-based portal through which members of the public could provide feedback. The webinar was promoted via the GBA's website and LinkedIn page and through members' networks.

Public debate - Brussels

The GBA hosted a live public debate at the Steigenberger Wiltcher's Hotel in Brussels on June 27th, 2023 (13:30 – 18:00 CEST) entitled 'Product Carbon Footprints and Digital Product Passports. Can accurate carbon accounting in product passports help avoid greenwashing?'. Three panels, corresponding to three cross-cutting issues were held:

- Panel 1: Reflecting Greener Electricity Grids in Product Carbon Footprints
- Panel 2: Reflecting Higher-Quality Datasets in Product Carbon Footprints
- Panel 3: Reflecting Benefits of Recycling in Product Carbon Footprints

The public debate was promoted via the GBA's website and LinkedIn page and through members' networks.

Bilateral consultations with public and academic institution – Beijing

Between August 14-18 members of the GBA Secretariat visited local stakeholders and partners in Beijing and Ningde, China. During meetings with research institutes, the Chamber of Commerce, and other public bodies, the GBA presented the work on the battery passport specifically highlighting the work related to the GHG rulebook.

Public debate and bilateral meetings with policy makers – New York and Washington DC

On September 21 the GBA hosted an interactive knowledge exchange session for partners and interested stakeholders in Washington DC. The session provided stakeholders with the

opportunity to meet with the GBA Board of Directors and Secretariat and learn more about the GHG Rulebook public consultation.

Email responses

Very few responses to the consultation were made by email and all were responded to within 48 hours. These were limited to clarification of the GHG Rulebook text (See Annex B).

Targeted outreach to industry initiatives

The GBA prioritised outreach to a small number of globally influential business initiatives in a bid to facilitate broader consensus. These were the World Business Council on Sustainable Development PACT Partnership, the Catena-X project consortium & association, and the Together for Sustainability initiative of the chemicals industry.

Through a series of meetings between the respective secretariats, agreement was reached to harmonise guidance on the following aspects:

- Definitions of certain terms (with reference to the ISO 14067 standard)
- Definition of preferred units for reference flows of metal-containing battery materials
- A general exclusion of packaging from the scope of EV-battery PCFs
- Use of a common hierarchy of preferred sources for transport-related emission factors
- Allowance for cutting-off flows up to a maximum of 3% of the total PCF, 3% of total mass flows, and 3% of total energy flows

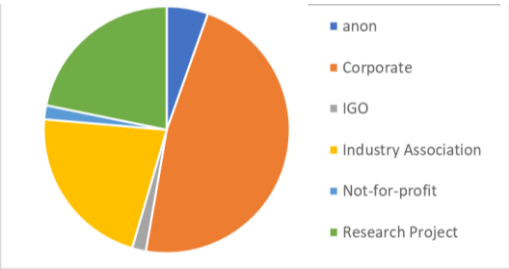
Portal responses

Number of responses received

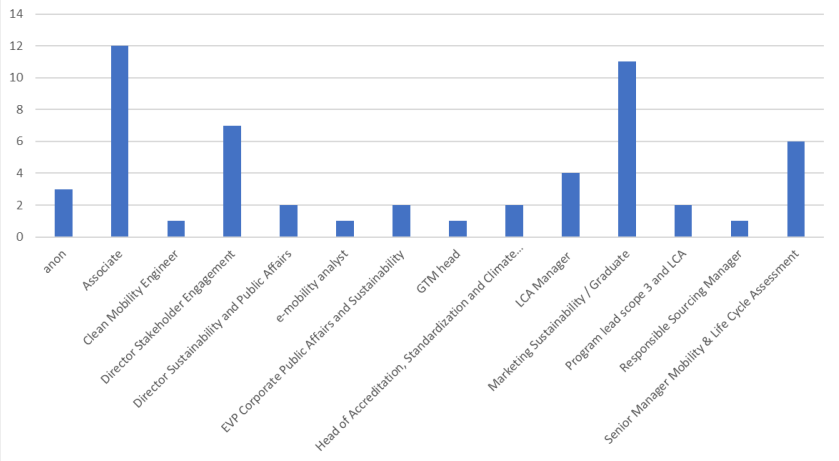
A total of 55 responses were received from between 14-16 individuals or organisations.

Breakdown

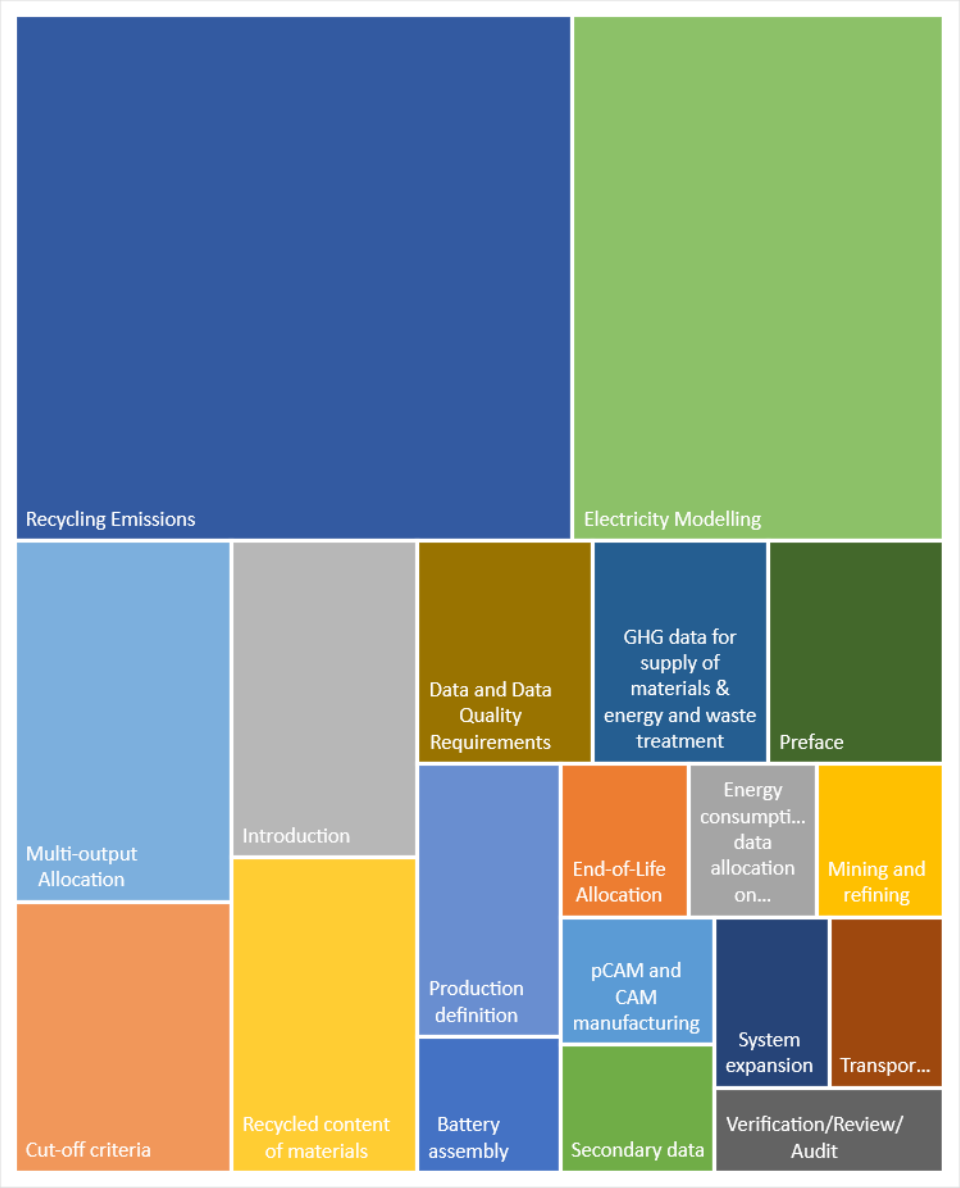
Number of Comments per Stakeholder Group



Number of Comments per Role of Respondent



Number of Comments per Rulebook Chapter



Views on the GHG Rulebook

The consultation questionnaire included several general questions, to which respondents submitted no replies. The questions were:

- Do you agree with the Rulebooks' content, or are the important gaps (please list them)?
- Were there any Chapters that were difficult to understand (please list them)?
- What would be a barrier to you using (or recommending) this Rulebook?
- Why would you use (or recommend) this Rulebook?
- How would you rate your overall satisfaction with and usability of the GHG Rulebook v1.5?

Rulebook Chapter: Preface

One respondent raised the necessity for any verification system to align with legal requirements in each jurisdiction.

Rulebook Chapter: Introduction

One respondent requested clarity on battery chemistries covered by the GHG Rulebook, while another emphasized incorporation of GHG emissions from the battery's use phase—either within the carbon footprint scope or by integrating minimum performance-in-use in the Functional Unit of the carbon footprint study.

Rulebook Chapter: Production definition

One respondent sought clarification of which battery chemistries could be addressed with the GHG Rulebook, and another called for more detailed presentation of process Clusters.

Rulebook Chapter: Cut-off criteria

Respondents expressed worries that the proposed cut-off criteria were not consistent with other LCAs and standards (e.g., Environmental Product Declarations), which could make the GBA's GHG Rulebook inconvenient for prospective users.

Rulebook Chapter: Multi-output Allocation

Concerns were voiced by several respondents regarding the establishment of auditable rules for accounting GHG emissions related to processes just outside the EV-battery product system. This concern stemmed from the recognition that activities beyond the product system could significantly contribute to an organization's broader corporate GHG emissions. Notable comments related to distinguishing by-products from waste, with recognition of the difficulty in verifying this distinction, especially using the economic indices proposed in the GHG Rulebook for that purpose (see comments on System expansion below).

Rulebook Chapter: System expansion

Questions arose about the implementation and auditability of rules for system expansion. Respondents stressed the difficulty in verifying distinctions between by-products and waste, particularly using the economic indices proposed in the GHG Rulebook for that purpose (see comments on Multi-output Allocation above).

Rulebook Chapter: Energy consumption data allocation on production lines

A specific recommendation was made for the GBA to mandate dedicated electrical metering as a proportionate cost of adherence to more credible carbon footprinting rules.

Rulebook Chapter: End-of-Life Allocation

The aluminium industry urged the GBA to reconsider allowing the substitution approach to end-of-life modelling and/or the EU's Circular Footprint Formula, especially in the context of potentially transitioning from cradle-to-gate to cradle-to-grave carbon footprints.

Rulebook Chapter: Recycled content of materials

Additional calls were made for clarification of the battery chemistries covered, highlighting unclear and inconsistent terminology in this chapter.

Rulebook Chapter: Data and Data Quality Requirements

One respondent again pled for clarification of which battery chemistries were addressed, and another raised concerns about the ease of obtaining best quality data – especially for transport-related emissions factors.

Rulebook Chapter: Secondary data

Discrepancies were noted between the GBA's cut-off criteria and those of other LCAs and standards (e.g., Environmental Product Declarations), potentially rendering some secondary datasets incompatible with the GBA's GHG Rulebook.

Rulebook Chapter: GHG data for supply of materials & energy and waste treatment

Some respondents emphasised that certain EF-compliant datasets from the EU would not align well with the GHG Rulebook due to their specific scope and their in-built implementation of the EU's Circular Footprint Formula. Similar feedback referred to Annex B of the Rulebook.

Rulebook Chapter: Rule Set 1: Harmonized Market Approach (HMA)

Respondents expressed contradicting views of this section of the GHG Rulebook. Some suggested deleting Rule Set 1, some suggested modifications to Rule Set 1, and some suggested retaining Rule Set 1 and deleting Rule Set 2.

Concerns about Rule Set 1 were both conceptual and practical. Rule Set 1 considers electricity consumed over a whole year without matching to actual consumption during any shorter interval. Stakeholders worried that this provided greenwashing opportunities by, e.g., allowing claims related to renewable energy generated at midday in Summer to cover electricity consumed during the evening in Winter. It was argued that such a scenario could even lead to increased use of fossil fuels. Respondents feared that Rule Set 1 would thereby fail to incentivise location of facilities nearby low carbon energy sources, or to bring additional renewables onto grids.

To some extent these responses confirmed the need to balance Rule Set 1 results with another perspective. One respondent tendered alternative introductory text to better express the goal of Rule Set 1 in the proposed dual reporting context.

From a more practical perspective, one respondent sought clarification as to how to access the necessary emission factors for implementation of Rule Set 1 and recommended applying current GHG Protocol scope 2 Guidance as a more workable alternative.

Rulebook Chapter: Rule Set 2: Physically Modelled Approach (PMA)

Respondents expressed contradicting views of this section of the GHG Rulebook. Some suggested deleting Rule Set 2, some suggested modifications to Rule Set 2, and some suggested retaining Rule Set 2 and deleting Rule Set 1.

Concerns about Rule Set 2 were both conceptual and practical. Rule Set 2 Case B requires evidence that contracted installations generating renewable electricity have come into operation no earlier than 36 months before the consuming installation (i.e., the generating asset must be additional). One respondent protested that it was not the carbon footprint's purpose to stimulate build-out of additional renewables generation, and that the additionality requirement would force use of renewable power to be declared under Case C. Respondents feared that Rule Set 2 would thereby fail to incentivise location of facilities nearby low carbon energy sources.

To some extent these responses confirmed the need to balance Rule Set 2 results with another perspective. A few respondents tendered alternative text to better express the goal of Rule Set 2 in the proposed dual reporting context.

From a more practical perspective, respondents gave contrasting views as to whether appropriate commercial, infrastructure and IT systems were sufficiently established to enable hourly time-stamping of environmental attributes contracted under Rule Set 2 Case B, with some requesting more time to phase it in.

Rulebook Chapter: Communication of the product carbon footprint calculation results

One respondent again questioned whether appropriate commercial, infrastructure and IT systems were sufficiently established to enable hourly time-stamping of environmental attributes contracted under Rule Set 2 Case B, and requested more time to phase it in

Rulebook Chapter: Transportation

One respondent pointed out that the three approaches provided in the GHG Rulebook were not necessarily equivalent and that fuel consumption during shipping may often have to be modelled rather than measured.

Rulebook Chapter: Mining and refining

One respondent sought clarifications of the primary data collection rules (cut-off thresholds, reporting frequencies and system boundaries) to help assess feasibility of implementation.

Rulebook Chapter: pCAM and CAM manufacturing

One respondent requested clarity on battery chemistries applicable to the GHG Rulebook.

Rulebook Chapter: Battery assembly

One respondent drew attention to detailed rules for the virtual housing approach, which had recently been published by the EU's Joint Research Centre.

Rulebook Chapter: Recycling (recycled content emissions)

One respondent detected inconsistencies in the language used to define rules for waste modelling. Another reported ambiguity in Figure 5-28, which caused confusion for the user. The Germany-funded Battery Pass project noted that in several places, the Chapter was no longer consistent with its most recent findings.

Rulebook Chapter: Verification/Review/Audit

One respondent fed back that this Chapter appeared like a placeholder and had not been sufficiently elaborated.

Cross-Cutting Issues

Accounting for Re-use & Recycling

An essential part of product foot-printing is clarifying how to account for the fact that raw-material inputs increasingly come with their own history from previously discarded products, just as more outputs of product systems go on to substitute for virgin raw materials. It must be decided how to accurately assign the real-world emissions associated with such materials to a succession of different product systems in a circular economy. Several respondents pointed to the difficulty of making distinctions between by-products and waste consistent and auditable.

Electricity Modelling

Currently, there is no agreed definition of a single set of circumstances under which specific electricity supply contracts (e.g., renewable energy certificates, International Renewable Energy Certificate Standard compliant certificates, Guarantees of Origin, or Power Purchase Agreements) can always be used to associate renewable electricity supply to specific products. The public consultation clearly illustrated the divergent views.

Inconsistencies in Secondary Datasets

As much as possible, Product Carbon Footprints should be based on original, primary sources of data, and be as accurate and representative as possible. Still, for completeness, there will

always be a need to refer to some representative averages for specific materials, supply chains, or geographies. The wide range of secondary data sources, each with its own limited scope, makes it difficult to ensure that the selected secondary datasets are sufficiently inter-operable. Discrepancies between the cut-off criteria and methodologies used to generate readily available datasets, and the potential for them to be incompatible with the GBA's GHG Rulebook were frequently noted.

Data Protection

All responses received were processed by INOVEM Consult™ on behalf of the Global Battery Alliance for the purpose of creating this report. The Global Battery Alliance Secretariat had access to all responses submitted via this survey questionnaire. Responses were not used for any other purpose or passed on to any third parties. All responses that have been published were done so with express written permission from each participant.

All data was stored securely by INOVEM Consult™, the Global Battery Alliance, or Drielsma Resources Europe who can be contacted via the addresses below.

INOVEM Consult™
via https://ico.org.uk/make-a-complaint/03031231113

Global Battery Alliance
via ghg-rulebook@globalbattery.org

Drielsma Resources Europe
via www.resources-europe.eu

APPENDICES

Appendix A: List of Participating Organisations

Alcoa
Anonymous 1-5
European Aluminium
European Federation for Transport and Environment AISBL
Freyr AS
London Metal Exchange
Nano One
Saft Groupe SAS
The Battery Pass consortium
TÜV-Verband e. V
Umicore N.V
UNECE

Appendix B: Emailed Comments to the Consultation & Responses

Sent: Monday, 19 June 2023 12:25
Subject: Questions for 20/06 GBA GHG Webinar

I have two questions the I would like to propose to the discussion.

1. Second Life on EV batteries: in the several file issued on the standard and the rules for the CFB, I can't seem to find any information on wether the possibility of a Second Life of the batterie is consiederd and how this should be modelled/considered. Is it something that could (or will) be added by GBA? I would like to have some clarifications on this, since it could be a major way to reduce the CO2eq/kWh value of the batteries and give some more time to Europe to be ready to recycle the huge amount of waste batteries that are about to arrive.

2. Not yet produced batteries: it seems to me that the GBA rules are very clear and focused on batteries that are already on the market (or being produced anyway), but I dont see indications related to batteries that are still in developement. I'll give an example: I am required to gather primary data on "Battery production" in order to produce the CFB needed for selling that battery and the data must reference the previous year.
How do I do this? How do I get the data needed to release the CFB before the battery in produced and sold?
Maybe there is a procedure to have a CFB made with secondary data for like the for 1-2 years (bare minimun time to collect and process these data) and then a new CFB with primary data must be issued? I would like to have some clarifications on this, cause either I missed it (absolutely possible) or there is an issue with the time limits of the CFB for batteries not yet produced.

Sent: Monday, 19 June 2023 14:16

Subject: RE: Questions for 20/06 GBA GHG Webinar

1. The focus of the Rulebook is on the GHG footprint of the manufacturing and end-of-life stages. The in-between use phases (e.g., first and/or second life) might be covered in a future version of the Rulebook. For the moment, second-life use of batteries is only considered to the extent that the EU's Circular Footprint Formula provides some credits for making end-of-life batteries available for second-life use (See Annex B).

2. In the case the product for which the carbon footprint is calculated is produced for less than 12 months or not the full year, primary data shall be collected for the time period in which the product is first manufactured or from the beginning of the most recent available 12-month period until the stop of production. In the case of cell-manufacture, a start-up period for a new facility (new location, extension of capacity or exchange of entire production line) of maximum six months may be used to exclude non-representative energy consumption due to low utilization rates (e.g., load-independent energy consumers directly connected to the studied product, like dry room climatization), but no exclusion of

a data period shall be done in case a new product is produced on an existing line. In the case of recycling processes, a start-up period for a new recycling facility (new location, extension of capacity or exchange of entire production line) of maximum six months may be used to classify stored materials as by-products (e.g., material for which discard is not intended, but for which commercial arrangements are not yet in place). In cases where not even the above primary data can be generated, Chapter 4.2 of the GBA GHG Rulebook includes guidance as to which secondary or proxy data to use for such “gap-filling”.

Sent: Tuesday, June 20, 2023 5:24 PM
Subject: RE: Questions for 20/06 GBA GHG Webinar

There’s a follow-up question: I still have some doubts about the second question.

What I mean is: if my plant for battery assembly is not finished yet and when I finish it I start producing batteries, what data do I use? Because I'll require the CFB with primary data of something that is just starting.

The case I'm referring to is the one of a battery production plant that is constructed after the publishing of the standard in EU.

I hope it is clear and if it is not I apologize for poor wording.

I remain available if it's not clear.

Sent: Tuesday, June 20, 2023 6:03 PM

Subject: RE: Questions for 20/06 GBA GHG Webinar

For GBA compliance, they would need to start collecting primary data within the first six-months of production and, either:

- Wait until they have at least 6 months of primary data before applying the GBA Battery Passport; or

- Use secondary data sources as recommended in Chapter 4.2 to apply the GBA Battery Passport until they have at least 6 months of primary data

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Appendix C: Consolidated GBA Responses to Submissions

repID	part__name	Comment	Proposed Change	GBA Response
16	Preface		The LME wanted to take this opportunity to commend you on formulating this guidance and promoting the need to standardise GHG methodologies throughout the battery value chain. We recognise the need for reliable, trusted and accessible data to achieve greater transparency and believe this rulebook is well positioned to forward this goal. We will follow updates and hope the uptake is successful.	Thank you.
34	Preface	It is recommendable to determine requirements for the marketing of rechargeable batteries on a global level, by considering different parts such as the placing on the market or putting into service, re-use, repurposing, due diligence policies and the digital battery passport. The GHG Rulebook is providing a methodology for the calculation of the carbon footprint, so it is to be considered as a guideline, with only some kind of requirements. The GBA foresees on his webpage the allocation of labels or seals. In general, such markings or labels include a concrete statement for the public. So, within the single market manufacturers declare with the CE marking, that all relevant and applicable legislative requirements are fulfilled. Therefore, we strongly recommend to set up a regulatory structure, which can serve as a basis for different markets, and so with different regulatory requirements.		We have modified Chapter 8 on Verification/Review to give some more general information about the GBA's current thinking and would welcome further suggestions in subsequent public consultations.
7	Introduction	Should this be to all batteries irrespective of battery chemistry ?	LIB can be changed to all battery chemistries	The focus of this version of the GHG Rulebook is lithium-ion batteries (LIB) for electric vehicles (EVs). Additional cathode chemistries e.g., solid state, and use-cases may be covered in subsequent versions.

8	Introduction	Excluding use phase might be problematic for GHG emissions, especially with respect to durability; I think you should baterry manufacturers to comply with UN GTR No. 22 (adopted by EU, US, China, Japan,...), that provides technical requirements and minimum performance requirements for batteries fitted in electrified vehicles; that would prevent the introduction on the market of batteries that are good on the production and end-of life phases, but then only last for a limited time, requiring more frequent replacement; this would have a bad impact on overall GHG. I would be ok to exclude teh GHG from use phase, but would require all batteries to comply with UN GTR No. 22 (for batteries to be fitted in light duty vehicles). there is another UN GTR under development for batteries in heavy duty vehicles. not sure I get the meaning of the sentence ";As the use cases for LIBs can be even different for the same battery product (location of use, mileage, lifetime, consumption of a vehicle, etc.), a comparison of GHG emissions from the manufacturing between batteries would be limited."; why ";manufacturing"; here ? please elaborate		We have modified the sentence in the Introduction to read as follows: "At this point in time, the use stage of LIBs is not considered in the Rulebook as the use cases for LIBs can be different even for the same battery product (location of use, mileage, lifetime, consumption of a vehicle, etc.). That said, the use phase might be covered in a future version of the Rulebook to provide a set of rules that allow for a consistent and homogenous comparison of LIB use in electric vehicles."
17	Introduction	Page 10 Terms and Definition - "Open-loop Allocation of Recycled Material" definition missing.	Page 10 Terms and Definition - Add definition for "Open-loop Allocation of Recycled Material"	As the term "Open-loop Allocation of Recycled Material" no longer appears in the Rulebook, it has been deleted.
9	Production definition	Metal sulfate (Nickel &; Cobalt): Nano One uses non-sulfated metals in its CAM production. Tracking should not be limited to Nickel/cobalt sulfates		This chapter refers to a "focus" on Nickel/Cobalt sulfates as predominant Hotspots, and was not intended to limit tracking to these. We have modified the bullet entry in the Production definition chapter to read as follows: "Metal compounds (Nickel & Cobalt)"
18	Production definition	Manufacturing processes – consider splitting mining and refining into two separate processes as these are not always integrated.	GBA to consider splitting mining and refining into two manufacturing processes.	At the beginning of the Rulebook project, the GBA considered splitting mining and refining into two manufacturing processes. As can be seen from the Figures in Chapter 6, for each material there are several production routes possible. Therefore, the GBA opted to group the descriptions of mining & refining by material for ease of understanding.

10	Cut-off criteria	As systematic exclusion, only packaging is excluded: Packaging at the moment is going to waste because considered contaminated, so not recycled. In a million ton CAM world, this means a significant amount of packaging, which has a GHG and broader environmental footprint. Recycling, reducing, eliminating packaging should be a goal	Include packaging in the tracking	Battery packaging may have a significant environmental footprint in total, or as a total output of a manufacturing company. However, previous studies have indicated that it is not a significant contributor to the carbon footprint of an individual battery pack. We have modified the Cut-off Criteria Chapter to include the following: "(The production of packaging materials shall be excluded from the battery supply chain, as the contribution to the overall impact has been estimated to be negligible according to the European Union's Product Environmental Footprint Category Rules for batteries)(Recharge, 2018)"
19	Cut-off criteria	The cut-off rule from the Commission Recommendation on the use of the Environmental Footprint (European Commission, 2021) has been adopted for the CF calculations. A maximum of 3% of greenhouse gas emissions may be excluded across the processes (cumulatively over all processes) for which primary data has to be collected referring to the overall CF of the product for which the CF is calculated. The exclusion shall also not exclude more than 3% of material or energy input or outputs cumulatively over the included processes. – Cut-off limits used heremay not be aligned to that of the limits used in other LCAs<>based on other standards	We would like to clarify the rationale for the cut-off limits with GBA as this discrepancy may result in adjustments made for the cut-off criteria of future LCAs.	The rationale for the cut-off limits in the GHG Rulebook, was to match as much as possible the latest thinking of the European Union for its Batteries Regulation whilst remaining practical. The World Business Council for Sustainable Development, Together for Sustainability (chemicals industry), the Catena-X project (automotive) and the GBA have now all agreed to recommend the cumulative 3% cut-off for material inputs/outputs, energy inputs/outputs and contribution to overall product carbon footprint.
30	Cut-off criteria	The 3% threshold value of greenhouse gas emissions that may be excluded across processes is high and this will cause issues particularly to match this code with the integration of LCAs or EPDs for materials done with a 5%. Therefore, this will potentially be a source of mismatch and an inconvenience for usability of this code.	A maximum of 5% of greenhouse gas emissions may be excluded across the processes (cumulatively over all processes) for which primary data has to be collected referring to the overall CF of the product for which the CF is calculated. The exclusion shall also not exclude more than 5% of material or energy input or outputs cumulatively over the included processes. (...) The possible cut-off in secondary data is not included in the 5% cut-off criteria for a process for which primary data is collected.	The rationale for the cut-off limits in the GHG Rulebook, was to match as much as possible the latest thinking of the European Union for its Batteries Regulation whilst remaining practical. The World Business Council for Sustainable Development, Together for Sustainability (chemicals industry), the Catena-X project (automotive) and the GBA have now all agreed to recommend the cumulative 3% cut-off for material inputs/outputs, energy inputs/outputs and contribution to overall product carbon footprint.

4	Multi-output Allocation	This formulation is still quite open and can allow misleading use. E.g. Producing Li-Hydroxide from Li-Carbonate will leave CalciumCarbonate, which usually would be reconverted to Quicklime in a Klin emitting CO2. Obviously I would need to include the CO2 in my calculations, but I could also stop at the Calcium Carbonate and sell this as a valuable co-product. The way I read this chapter is, that I can allocate some of my emissions to that Carbonate and even avoid including the CO2 in my balance. Obviously this is not the intention.		The GHG Rulebook sets rules for determining the carbon footprint of an individual battery product. Chapter 3.3 describes the boundaries of the individual battery product system. Accordingly, if Calcium Carbonate or Quicklime is a waste from the system, emissions due to any waste treatment must be included in the carbon footprint of the battery. If, however, Calcium Carbonate or Quicklime is a co-product of the system, emissions from any subsequent treatment are excluded (as being beyond the system boundary or "after the gate"). For clarity, we have modified the Sub-chapter on Primary Metallurgical Extraction from spodumene ore to include the following: “Following the general approach (see Chapter 4.1.1), any produced and sold calcium carbonate or quicklime shall be allocated by using system expansion according to Santero & Hendry (2016) and supported by 3rd-party verified evidence.”
11	Multi-output Allocation	In case the price is only paid for the transportation, or the price is zero,but the by-product is used as input to another product system, processes to treat that output may be excluded from the CF calculation, but no partitioning of GHG emissions to that output shall be performed: This may skirt the obligation to report significant GHG emissions. Treatment of the waste/byproduct may include and probably requires drying it for transport. Drying is likely only economical with natural gas, or heat generated from fossil fuel, or waste heat from the plant. It should be included in CF to incentivise waste heat use or more efficient dewatering techniques.Also, any partitioning of GHG would be weighted on the revenue of each product.	Maintain the CF for waste and by-product	Chapter 3.3 describes the boundaries of the individual battery product system. Accordingly, if waste is dried for transport, emissions from drying must be included in the carbon footprint of the battery. Similarly, if by-product has been dried for transport, emissions from drying must be included (as still within the system boundary or "before the gate"). If, however, the price paid for the by-product is zero, or covers transport only, no GHG credit can be claimed for its supply. For greater clarity, we have modified Chapter 8 on Verification/Review to give some more general information about the GBA's current thinking and would welcome further suggestions in subsequent public consultations.

20	Multi-output Allocation	1. 'A by-product under the GHG Rulebook is defined as an output with an economic value above zero, for which demand at the specific production site is available, and evidence can be given that the by-product is used as intended.'– This requires further clarity for products without an index price. 2. 'In all cases, a third party shall verify the economic value of the by-product with specific properties (e.g., purity/grade, net calorific value, water content, etc.) at the facility gate, as well as the share of the by-product for which the price is paid. If no economic value of the by-product can be proven, the output shall be considered a waste.'– More clarification required for this paragraph.	1. We would like to clarify the approach that GBA requires to verify third party commercial information. This is in consideration of products that do not have index pricing and would rely on achieved contract price, which is commercially sensitive information. 2. We would like to further clarify the requirement that 'A third party shall verify the economic value of the by-product with specific properties (e.g., purity/grade, net calorific value, water content, etc.) at the facility gate, as well as the share of the by-product for which the price is paid. If no economic value of the by-product can be proven, the output shall be considered a waste.' Is the intent to place a requirement on the auditor of LCA to obtain this evidence?	A by-product under the GHG Rulebook is defined as an output with an economic value above zero, for which demand at the specific production site is available, and evidence can be given that the by-product is used as intended. If no economic value of the by-product can be proven, the output shall be considered a waste. The verifier of the battery carbon footprint would be expected to check any proofs or evidence associated with a high risk of error. For greater clarity, we have expanded Chapter 8 on Verification/Review.
31	Multi-output Allocation	There are many types of allocation and mass allocation is very representative for metals. Therefore, in order to increase clarity in this section we recommend specifying this indicating that the partitioning of GHG emissions between product and co-product(s) shall be done by mass allocation for graphite and metals and by system expansion for other materials.	Add the word "mass" allocation resulting as: "the partitioning of GHG emissions between product and co-product(s) shall be done by mass allocation for graphite and metals and by system expansion for other materials".	The GBA GHG Rulebook specifies: - system expansion for sulfuric acid, ammonium sulfate, sodium sulfate, chlorine by-products etc. - mass allocation for metal products in the absence of precious metals and for co-products from brine - economic allocation for metal products in the presence of precious and for graphite products See Chapter 4.1.1. Therefore, we have not added the word "mass" where suggested.
21	System expansion	1. 'For metals, 10-year average global market prices, e.g., as published by the World Bank (The World Bank, 2022) shall be applied' Is there an expectation to consider rolling 10-year average for the economic value calculation? 2.System expansion – 'The system expansion is done in a way that the by-product, which is used in other processes and therefore replacing another material, is credited with the carbon footprint of the replaced material. This can be, for instance, if sulphuric acid is produced as a by-product from sulphidic ore processing. This would replace sulphuric acid from the petroleum industry' - This is where system expansion can be questionable: It's not always clear what it replaces.	1. We would like to clarify GBA's definition of '10-year average global market prices'. Is there an expectation to consider rolling 10-year average for the economic value calculation? If not, how often should this be updated? Also, how does GBA expect this to be applied where there isn't a global market price for example in the case of illiquid products? 2. We would require clarification on what the economic allocation between co-products entails, where the boundaries are set and what the logic is behind it.	1. The primary data collection shall be done on an annual basis (either the most recent available calendar year or the most recent available financial year). The 10-year average global market price should be the most recently available annual update of 10-year average global market prices. 2. The GHG Rulebbok is provided to complement existing standards and methodologies on economic allocation between co-products. See Chapter 2 for reference to existing standards and methodologies. Because it is not always clear what a by-product replaces, the GHG Rulebook specifies that a well-characterised representative process must be present to allow implementation of system expansion.

3	Energy consumption data allocation on production lines	Considering the overall capital intensity of this value chain, I dont think it would be too much to ask for installation of dedicated meters. This costs only a couple of hundred Euros and would avoid judgement calls that can be misused to lower the allocation. This is bread and butter business of the plant engineers and or the fitters.		We have modified Chapter 4.1.2 on Energy consumption data allocation on production lines as follows: "If there is a primary data collection for energy consumption taking place within the value chain where more than the considered product is produced in a plant and only one energy meter (e.g., for electricity) for several production lines is available, it is important to install a metering point per production line. If not enough individual meters are installed, partitioning of energy consumption between products becomes necessary. Considering the overall capital intensity of the Li-ion battery value chain, the most accurate way to determine the energy consumption per production line is a detailed metering system. Therefore, if not already available, a metering point per production line shall be installed by 31 Dec 2024."

38	End-of-Life Allocation	For cradle-to-grave assessment, we recommend the use of the end-of-life recycling approach, also called substitution approach in this Rulebook. As an alternative we support the use of the Circular Footprint Formula as defined in the Recommendation EC 2021/9332 The definition used for the classification of scrap are misleading	For cradle-to-grave assessment, we recommend the use of the end-of-life recycling approach, also called substitution approach in this Rulebook. As an alternative we support the use of the Circular Footprint Formula as defined in the Recommendation EC 2021/9332. When it comes to the classification of scrap, we would suggest revising the proposed classification by adopting the more common terms of post-consumer scrap, pre-consumer scrap and scrap of unknown origin. For pre-consumer scrap and post-consumer scrap you may refer to the definition included in ISO 14021. The use of the term “process scrap” may be misleading and should be better clarified. The rule “Process scrap within the same plant shall not be considered in calculating the recycled content rather only scrap or waste originating from outside the plant” is not aligned with the methodology used by European Aluminium, as it focuses on the fact that scrap are produced within or outside a specific plant, while European Aluminium approach will consider the point of the process in which the scrap are generated. According to the methodology used by European Aluminium, process scrap can be modelled as pre-consumer scrap provided that they are generated after the calculation point, i.e. process scrap issued from processes located beyond the system boundary / the gate. Process scrap generated before the calculation point, i.e. process scrap generated within the system boundary/the gate, are modelled as run-around scrap. If a different approach to differentiate between pre-consumer scrap and run-around scrap is used, the approach shall be clearly described in the LCA report.	In the GHG Rulebook, only the carbon footprint for cradle-to-gate plus end-of-life is described (i.e., not cradle-to-grave). The Battery Pass project has found that it is technically infeasible to apply the end-of-life recycling approach and simultaneously align with the recycled-content rules of the European Union's Batteries Regulation. Taking into account stakeholder feedback overall (including during a public debate of 27/Jun’23), GBA members consider the Circular Footprint Formula a barrier to generating accurate, and differentiating battery carbon footprints, and one that potentially obscures from view the efforts required to ensure sustainable recycling of used batteries. To surmount this barrier, the GBA requires use of the cut-off approach to EoL modelling, and provides Annex B to the GHG Rulebook with the Battery Pass project to enable optional use of the CFF in Europe.

12	Recycled content of materials	The calculation of the recycled content in the GBA GHG Rulebook is limited to the metals: cobalt, lithium and nickel in the active material, as required by the proposed EU regulatory framework for batteries (European Commission, 2020): Criteria should not be based on a specific national or supra-national body, such as the EU, if the Battery Passport aims to be universal. Even though LFP batteries represent a marginal percentage of batteries produced in Europe and the US in 2023, projections show this will increase significantly in upcoming years. Iron and phosphate will need to be recycled, as well as LFP batteries as a whole. This GHG footprint needs to be accounted for.	-Not align on one regulatory body -Make sure LFP is accounted for	We have modified Chapter 4.2 on Recycled content of materials to include the following: "The calculation of the recycled content in the GBA GHG Rulebook is limited to the following components: housing, cables, printed circuit boards, anodes, cathodes and electrolytes. It is essential that over the entire supply chain, the information about the recycled content within a raw material (e.g., metal sulfate), the pCAM or CAM and the cell are handed over to the next process step / manufacturer with regard to the final battery product, e.g., the CAM manufacturer needs to know the share of recycled cobalt, nickel, manganese or iron and phosphate and lithium carbonate / hydroxide used in the CAM production and submit this information to the cell manufacturer. Then, a transparent recycled content of the active materials can be calculated. The user of the Rulebook shall therefore calculate the recycled content of the six components: housing, cables, printed circuit boards, anodes, cathodes and electrolytes in relation to the relevant reference unit and submit this information together with the GHG impact. The user should calculate an additional recycled content value that includes all recycled materials within its product."
32	Recycled content of materials	The following statement in bold characters “Process scrap in a production facility shall not be included in the calculation of the recycled content. “ is inconsistent with the above explanation in the same section in which pre-consumer scrap is accounted within the recycled content ;Process scrap and end-of-life waste are accounted for in the calculation of the recycled content and expressed in percentage of the product weight.;. Please, clarify it or remove it in order to avoid miss-understandings.	Remove: ;Process scrap in a production facility shall not be included in the calculation of the recycled content; to be consistent with the first sentence of this section.	We have modified the GHG Rulebook to avoid using the confusing term "scrap". We have modified Chapter 4.2 on Recycled content of materials to include the following: "Pre-consumer waste in a production facility shall not be included in the calculation of the recycled content. To calculate the recycled content for a LIB, it is important to consider that only the secondary materials that end up in the final product are relevant."

39	Recycled content of materials	The text states that “process scrap and end-of-life waste are accounted for in the calculation of the recycled content”.	The text states that “process scrap and end-of-life waste are accounted for in the calculation of the recycled content”. We would suggest including in the recycled content process scrap (preferably renamed pre-consumer scrap), end-of-life waste (preferably renamed post-consumer scrap) and waste from unknown origin (preferably renamed as scrap of unknown origin). For the inclusion of process scrap in the calculation of the recycled content, please refer to the comment to section 3.4.3. The calculation of the recycled content may be allowed also for other metals in addition to cobalt, lithium and nickel.	We have modified the GHG Rulebook to avoid using the confusing term "scrap". We have modified Chapter 4.2 on Recycled content of materials to include the following: "Recycled content may only be derived from pre-consumer waste and end-of-life waste and shall be expressed in percentage of the product weight."
13	Data and Data Quality Requirements	Nickel sulfate and cobalt sulfate: As per previous comment, we should not limit tracking to metal sulfates because Nano One does not use sulfated inputs.		This chapter refers to specific data being collected for at least Nickel/Cobalt sulfates as predominant Hotspots, and was not intended to limit tracking to these. We have modifed the bullet entry in the Data and Data Quality Requirements chapter to read as follows: "Nickel sulfate (or other) and cobalt sulfate (or other)"

22	Data and Data Quality Requirements	1. 'For purchased components and semi-finished materials not covered above, the GHG calculation ideally includes supplier-specific data for material, auxiliary, and energy consumption, including yields and / or scrappage, as well as waste and emission data. In case data from the supplier is not available, the user of the GHG Rulebook shall add to the material amounts in the components / semi-finished material generic processing steps used to produce the parts (e.g., aluminium die-cast, injection moulding of polymers, machining of steel or aluminium, etc.), covering, for example, energy and auxiliary consumption as well as yields. In case the CF is calculated for a product from the mining & refining or anode material manufacturing cluster, and the producing company is not responsible for the entire supply chain, e.g., is purchasing metal concentrates, supply-chain specific data shall be used for the supply of these major input materials' – There may be reluctance among suppliers to provide supplier-specific data currently (unless there was a commercial benefit to them). This may result in difficulties in obtaining supply-chain specific data as required for products from the mining & refining cluster. 2. 'Representativeness expresses the degree to which the data matches the geographical, temporal, and technological requirements. The aim is to use the most representative primary data for all processes and the most representative industry-average data as well as Defra data for transportation and IPCC emission factors or national emission factors under the UNFCCC GHG reporting for fuel combustion. Whenever such data are not available (e.g., no industry-average data available for a certain country), best-available proxy data need to be used and transparently reported (e.g., from a commercial database)' – Don't think DEFRA should be directly prescribed. E.g. Some maritime analytics system goes further than DEFRA and estimates emissions based on specific vessel characteristics (rather than tonne.km method used by DEFRA). For emission factors, EN series of standards can also be used.	1. Further clarification needed on the definition of 'supply-chain specific data'. Does it include scope 3 GHG emissions of suppliers, or only the scope 1 and 2 GHG emissions of suppliers to producing companies? This may present a significant challenge given the level of maturity of some suppliers (e.g. metal concentrates suppliers). While having full transparency across the supply chain is ideal, we recommend GBA to give further consideration to the value and need for this extent currently. This should be considered as a voluntary scope. We would also like more information on the extent to which GBA expects the Battery Passport to cover Scope 3 GHG emissions. 2. Recommend not to limit transportation emission factors only to DEFRA, but consider broader library of transportation emission factors E.g., BS EN 16258; BSI; British Standards Institution (BSI);2012;	1. The GHG Rulebook is provided to complement existing standards and methodologies on data collection. See Chapter 2 for reference to existing standards and methodologies, and see the definition of "primary data" for an explanation of "supply-chain specific data". See Chapter 3.3.2 on cut-off criteria for the extent to which GBA expects the Battery Passport to cover Scope 3 GHG emissions. 2. We have modified the Data and Data Quality Requirements chapter to include the following: "Representativeness expresses the degree to which the data matches the geographical, temporal, and technological requirements. The aim is to use the most representative primary data for all processes and the most representative industry-average data as well as GLEC data for transportation and IPCC emission factors or national emission factors under the UNFCCC GHG reporting for fuel combustion. Whenever such data are not available (e.g., no industry-average data available for a certain country), best-available proxy data need to be used and transparently reported (e.g., from a commercial database)." The GLEC Framework provides guidance on how to implement ISO14083 (which supersedes BS EN 16258) and incorporates use of relevant IPCC, DEFRA, GREET model data as well as internationally recognised emission factors for other regions (e.g., Australia).

33	Secondary data	As per suggested modification in 3.3.2 a 5% instead of 3% will improve usability of this code with LCAs and EPDs done on a 5% threshold value.	Modify the 3% by 5% along this subsection.	The rationale for the cut-off limits in the GHG Rulebook, was to match as much as possible the latest thinking of the European Union for its Batteries Regulation whilst remaining practical. The World Business Council for Sustainable Development, Together for Sustainability (chemicals industry), the Catena-X project (automotive) and the GBA have now all agreed to recommend the cumulative 3% cut-off for material inputs/outputs, energy inputs/outputs and contribution to overall product carbon footprint.
23	GHG data for supply of materials & energy and waste treatment	In general, the use of secondary data from different sources can lead to different results in the carbon footprint calculation due to different methodology, system boundaries or coverage of GHG emissions between the different data sources. Therefore, the latest EF compliant data sets published under the EF node (European Commission, 2022) shall be used.' This data may not meet the requirements for representativeness in section 4.2	Suggest that the use of EF node data is recommended in instances when it is representative for the activit y . In instances where EF node data is not used, the rulebook could recommend or require entities to disclose the source of the factors used to facilitate comparability .	We have modified Chapter 5.2.1 on GHG data for supply of materials & energy and waste treatment to include the following: "If a certain input material is not adequately represented by an EF compliant data set under the EF Node (European Commission, 2022), the user may use commercial or other available datasets respecting the following hierarchy, and report in a transparent way: 1. Select the most representative EF-compliant dataset available from the EU's Life Cycle Data Network (LCDN). 2. Select the most representative EF-compliant dataset from any other source 3. Select the most representative dataset developed in agreement with the International Reference Life-cycle Data System (ILCD) Data Network - Compliance rules and entry-level requirements - either from the LCDN or from any other source."

40	GHG data for supply of materials & energy and waste treatment	Datasets are developed by using the Circular Footprint Formula	According to the text, the latest EF compliant data sets published under the EF node (https://eplca.jrc.ec.europa.eu/LCDN/contactListEF.xhtml), (European Commission, 2022) shall be used. Such datasets are however developed by using the Circular Footprint Formula, while the use of such CFF is not required by the GBA Rulebook. An assessment of the potential inconsistency should be performed. To solve the inconsistency we would suggest to consider using the Circular footprint formula for the modelling of the end of life and recycled content.	We have modified Chapter 5.2.1 on GHG data for supply of materials & energy and waste treatment to include the following: "In general, the use of secondary data from different sources can lead to different results in the carbon footprint calculation due to different methodology, system boundaries or coverage of GHG emissions between the different data sources. Therefore, the latest EF compliant data sets published under the EF node (https://eplca.jrc.ec.europa.eu/LCDN/contactListEF.xhtml), (European Commission, 2022) shall be used, transparently noting that these datasets contain underestimates due to their use of the EU's Circular Footprint Formula. The combined effect of such underestimates shall be limited by maximising provision of primary data. Older versions of EF compliant data sets under the EF Node may be used if the process (energy or material supply, waste treatment etc.) is not available in the latest version."

6	Rule Set 1: Harmonized Market Approach (HMA)	The Rule Set 1 (Harmonized Market Approach) is designed to allow the use of market-based mechanisms such as guarantees of origins (GoOs). In particular, the rule considers the quantity of electricity consumed by the site over a whole year without ensuring that the energy injected into the grid by the contracted asset is matching the actual consumption of the site at any given time. This rule opens the door to substantial greenwashing opportunities as battery makers can set up in regions with a high carbon intensive energy grid and then buy their way (via GoOs) to a low carbon footprint through cheap green certificates, instead of encouraging low carbon generation in the regional market. In addition, such a rule does nothing to reward those battery companies that made location near low carbon energy sources part of their business case to directly reduce carbon footprint of their operation. Evidence shows that the GoOs price/design is insufficient to bring any additional renewables on the grid to compensate for the additional demand from battery factories. For instance, a production site would be able to consume electricity generated from fossil fuels in Germany during the evening in winter while claiming to use renewable energy that was actually produced in Spain at midday in summer. In this example, the consumption of the site would lead to an increase in the grid electricity demand in winter and consequently lead to an increase in the electricity generation from dispatchable fossil fuels power plants. The Rule Set 2 (Physically Modelled Approach) effectively closes this loophole by ensuring that "only the fraction of energy injected into the grid by the contracted asset demonstrated to lie below the load curve of the energy using facility, as demonstrated on an hourly basis by the date/time stamp of each instrument, shall be taken into consideration". This rule also is a lot more effective in incentivising low carbon battery manufacturing, and is therefore aligned with the GBA's vision.	Our preferred option would be to exclude rule set 1 from the rulebook, and rule set 2 should be kept. In any case, keeping rule set 2 is our red line.	The GBA considered excluding Rule Set 1, excluding Rule Set 2, and keeping both Rule Sets. The most acceptable option for the group as a whole was to keep both Rule Sets. We have therefore maintained the dual reporting requirement in the GHG Rulebook.

14	Rule Set 1: Harmonized Market Approach (HMA)	It is important to make sure certificates of origin, or other calculation methods do not result in displacing the carbon footprint of the energy grid to other segments of the market like residential or other industries that are not accountable from a GHG perspective. Even in the case where new dedicated renewable power capacity is built by the State for battery production, it may not result in net GHG reduction if that investment does not reduce the global GHG of the national grid. We consider that in all cases, State GHG emissions should be included and reflected in the production of the battery.		The GBA considered excluding Rule Set 1, excluding Rule Set 2, and keeping both Rule Sets. The most acceptable option for the group as a whole was to keep both Rule Sets. We have therefore maintained the dual reporting requirement in the GHG Rulebook. To address the risk of displacement of carbon footprint to other segments of the market, an additionality criterion has been included in Rule Set 2 (See Chapter (5.2.2).

24	Rule Set 1: Harmonized Market Approach (HMA)	1. 'Rule Set 1, Case C - Internationally recognized data sources shall be preferred. Amongst such well recognized data sources is the International Energy Agency (IEA) grid emission factors yearly publication' – Unclear definition of what the 'internationally recognized data sources' includes and how these data sources would likely be available for calculating GHG emissions. 2. Rule Set 1, Case C -In the case of very large countries such as the USA, Canada, Russia and China, in which several electrical grids operate, the grid specific residual mix (if available) or the country-specific consumption Emission Factor (EmF) (if available) shall be used.' – Not yet available for Australia. 3. Rule Set 1, Case B 'Attribute tracking instruments taken into consideration for a given calendar year shall be restricted to instruments corresponding to energy produced within the prior 12 months' – This is stricter than the current requirement for market-based reporting in Australia (generation date less than 36 months prior to the end of reporting year). GHG Protocol Scope 2 Standard is silent on a specific time period, but states that it should be as close as possible to the date of generation. Rule Set 1, Case B 'and their quantity shall be limited by the quantity of electricity consumed by the site for that year minus the quantity of electricity acknowledged under case A for that same year[3][3] The GBA shall reconsider this 12-month time period no later than December 31, 2025.].' – This goes beyond what GHG Protocol Scope 2 Standard prescribes, and dependent on how case A is interpreted "Electricity is supplied from a production asset connected to the energy using plant by means of a direct and dedicated connection….Remote electricity production assets are usually not connected to an energy using plant by means of a direct and dedicated connection, but rather through the electrical grid, and therefore do not usually fall under this case." 4. 'Rule Set 2, Case A, figure 4-1 - In this chart, only "area 3" energy can be counted as used by the site, with the asset specific EmF. The energy present in "area 2" is either wasted or injected into the grid and cannot be associated with the site	1. We would recommend clearly defining what the internationally recognized data sources are - E.g. published emissions factors by national Governments. We consider that these EmFs should be recognized. We would also recommend a clear definition of the other indicators which can be used. 2. Neither a grid specific residual mix or country-specific consumption Emission Factor are currently available in some other large countries such as Australia. 3. We will require more clarity on Case A and how it works with Case B. In Case A renewable generating assets cannot be connected to a main electricity grid, is this the case? In regional Australia there are some privately held transmission assets which deliver power to multiple commercial users but are not considered part of the main electricity grid. They are not operated by the same market rules or entities as the other main electricity grids. Would renewable generating assets connected to this grid form part of Case A, even if they are not a direct connection to a single site? We recommend to have more flexibility to use certificates within a reasonable time horizon to their generation (e.g. within 24 months). Time-of-use matching to this extent goes beyond the current GHG Protocol scope 2 Guidance. We would support having a review clause on timing that is tied to the maturity of electricity markets (E.g. if 12 month becomes the norm in the Australian market in the future). Also, we suggest that the Rulebook remains aligned with the GHG Protocol Scope 2 standard in this respect. 4. We would recommend a transitional period for this aspect of the calculation to ensure appropriate infrastructure and IT systems are in place to do this. The Australian scheme for accounting for Renewable Electricity Certificates does not yet include reporting for time-of-use. Retailers are unable to provide time-of-use data to match production to site loads. Reporting electricity covered under a renewable PPA which could not meet the hourly time-of-use matching requirement under Rule Set 2 case C would significantly overstate emissions in many circumstances and	1. GBA members consider that the International Energy Agency (IEA) grid emission factors published yearly appear to be specific enough for this purpose. 2. EmFs published yearly by the IEA include data for Australia reported on a fiscal year basis. By convention, data for the fiscal year that starts on 1 July Y-1 and ends on 30 June Y are labelled as provisional EmFs for year Y. 3. If electricity is not supplied via a direct and *dedicated* connection between a production asset and the energy using plant, privately held transmission assets which deliver power to multiple commercial users should be considered a "grid" as described under Cases B and C. GBA ambition is to remain aligned with, but less ambiguous than existing GHG Protocols in order to achieve higher comparability of results. EmFs published yearly by the IEA include data for Australia reported on a fiscal year basis. 4. We modified Chapter 5.2.2 on Electricity: Two sets of calculation rules to include the following transition period: "Case B of Rule Set 2 will not apply until 1st January 2027 to provide companies with the opportunity to adjust their supply arrangements and establish the required information streams to demonstrate hourly matching through the recording of instrument date/time stamps. In the meantime, Rule Set 2 Cases A and C shall remain in effect."

	consumption' – Currently, these requirements are typically out of scope for what the LCAs are set out to do.	could be misleading. This also effectively penalises a company for something that is outside their immediate control. We recommend that this method of requirement be only required in markets that have already developed infrastructure and mechanisms to support this.	

28	Rule Set 1: Harmonized Market Approach (HMA)	The goal is to present the two methods as fairly as possible. Additionally the call for governements to develop residual gird mixes, which was agreed during the Baar meeting in September 2022, is now also made.	Rule Set 1: Harmonized Market Approach (HMA) The underlying philosophy of this approach is to guarantee as good as possible the uniqueness of claims.The market-based mechanisms allow electricity consumers that have entered into agreements, in which the ownership of bundled or unbundled electricity attributes) is transferred to these entities, to fully claim (under the criteria set below) the benefits of these attributes. Although the physical plausibility is weaker than in Rule Set 2(PMA), Rule Set 1(HMA) guarantees better the uniqueness of the claims. Where residual grid mixes are not available, the GBA calls for local governments to introduce this concept in order to guarantee everywhere the uniqueness of the claims.	We modified the text to read as follows: "Rule Set 1: Harmonized Market Approach (HMA) The underlying philosophy of this approach is to guarantee as well as possible the uniqueness of claims. The market-based mechanisms allow electricity consumers that have entered into agreements in which the ownership of bundled or unbundled electricity attributes is transferred to these entities, to fully claim (under the criteria set below) the benefits of these attributes. Although the physical plausibility is weaker than in Rule Set 2 (PMA), Rule Set 1 (HMA) guarantees better the uniqueness of the claims. Where residual grid mixes are not available, the GBA calls for local governments to introduce this concept in order to guarantee everywhere the uniqueness of the claims."
35	Rule Set 1: Harmonized Market Approach (HMA)	FREYR Battery is of the opinion that electricity modelling should Be done according to only one methodology (no dual reporting) to make clear comparison possible Documentation of the carbon footprint of the electricity used should be connected as much as possible to the actual electricity used/contracted. FREYR Battery therefor does not support GBA Rule Set 1.	Take out the whole chapter and only keep Rule Set 2 (with changes as comment below).	The GBA considered excluding Rule Set 1, excluding Rule Set 2, and keeping both Rule Sets. The most acceptable option for the group as a whole was to keep both Rule Sets. We have therefore maintained the dual reporting requirement in the GHG Rulebook.
29	Rule Set 2: Physically Modelled Approach (PMA)	The goal is to present the two methods as fairly as possible.	Rule Set 2: Physically Modelled Approach (PMA) The underlying philosophy of this approach is to reflect the physical plausibility as good as possible. Additionally, the efforts undertaken by electricity users to support the investment in low carbon production assets are still being acknowledged by allowing electricity users to claim the benefits generated by bundled electricity attributes meeting strict criteria. Although Rule Set 2 (PMA) includes a high risk of double counting of low carbon electricity claimed under other legally accepted accounting systems, the physical plausibility is higher compared to Rule Set 1 (HMA).	We modified the text to read as follows: "Rule Set 2: Physically Modelled Approach (PMA) The underlying philosophy of this approach is to reflect the physical plausibility as well as possible. Additionally, the efforts undertaken by electricity users to support the investment in low carbon production assets are still acknowledged by allowing electricity users to claim the benefits generated by bundled electricity attributes meeting strict criteria. Although Rule Set 2 (PMA) includes some risk of double counting of low carbon electricity claimed under other legally accepted accounting systems, the physical plausibility is higher compared to Rule Set 1 (HMA)."

36	Rule Set 2: Physically Modelled Approach (PMA)	For Rule Set 2 the following changes are recommended: Additionality as a requirement to the asset(s) in question should not apply. There is no difference to the carbon footprint of a electricity producing asset depending on its age. GBA's proposal would f ex rule out most of renewable hydropower in the Nordic countries. This is not acceptable. It is FREYR Battery's view that stimulus to building additional capacity of renewable energy will derive from the carbon accounting rules through the market drivers it will create and should not be part of accounting rules for carbon footprint. If GBA decides to insist on additionality for Rule Set 2 then it is FREYR Battery's opinion that it must also insert this requirement to Rule Set 1 as there is no reason for the differentiation between these two on this issue. For both Case A and B in Rule Set 2 the allowance to demonstrate that an energy storage asset attached to the relevant electricity production asset is providing a time-shifting service shall be included and account as relevant production from the asset. Furthermore, the hourly time restriction shall be phase in through a 5-year transition period as these contracts are today not available nor commercially feasible.	For Rule Set 2 the following changes are recommended: Additionality as a requirement to the asset(s) in question should not apply. There is no difference to the carbon footprint of a electricity producing asset depending on its age. GBA's proposal would f ex rule out most of renewable hydropower in the Nordic countries. This is not acceptable. It is FREYR Battery's view that stimulus to building additional capacity of renewable energy will derive from the carbon accounting rules through the market drivers it will create and should not be part of accounting rules for carbon footprint. If GBA decides to insist on additionality for Rule Set 2 then it is FREYR Battery's opinion that it must also insert this requirement to Rule Set 1 as there is no reason for the differentiation between these two on this issue. For both Case A and B in Rule Set 2 the allowance to demonstrate that an energy storage asset attached to the relevant electricity production asset is providing a time-shifting service shall be included and account as relevant production from the asset. Furthermore, the hourly time restriction shall be phase in through a 5-year transition period.	The GBA considered adding the same additionality criterion to Rule Set 1, removing the additionality requirement from both Rule Sets, and modifying Rule Set 2 to pertain to additional capacity (rather than assets). The most acceptable option for the group as a whole was to keep the additionality criterion unchanged. The purpose of each of the two Rule Sets is different and contrasting. The additionality criterion is intended to achieve a clean physical modelling, avoid displacement of carbon footprint to others, and minimise double counting within Rule Set 2. We have therefore kept unchanged the additionality criterion of Rule Set 2 in the GHG Rulebook.
56	Rule Set 2: Physically Modelled Approach (PMA)	Case B / bullet point 2 is too complex and hard to understand (not to be too critical). The reasonning behind this criteria is that the energy producer must be in a situation in which it is possible to consider that the energy that it injects into the grid effectively (and not accidentally) contributes to feeding the energy using facility. For this, both entities should ideally be located in the same binding area (this concept is in the existing text), but an extension should be granted to expand to the full country (to not place countries that have multiple bidding areas at a disadvantage) and to the neighboring country (to not place small countries at a disadvantage), provided the two countries do have a physical interconnection between their grids (to exclude neighboring contries which are not interconnected). The sale 1,000,000 km2 threshold could be inserted for case C	Case B: The contracted asset and the energy using facility shall be located in the same country or within an adjascent country with which there is a physical interconnection. For very large countries (e.g.; 1,000,000 km2, ie Russia, Canada, China, Brazil and others) that have several bidding areas (or similar supply/demand matching areas), the contracted asset and the energy using facility shall be located in the same bidding area or within an adjascent bidding area with which there is a physical interconnection.	We modified the text to read as follows: "The contracted asset and the energy using facility shall be located in the same country. If the contracted asset and the energy using facility are located in two different countries, they need to be located in adjacent bidding areas with a physical synchronous interconnection. For very large countries (e.g., 1,000,000 km2, i.e., Russia, Canada, China, Brazil and others) that have several bidding areas (or similar supply/demand matching areas), the contracted asset and the energy using facility shall be located in the same bidding area or within an adjacent bidding area with which there is a physical synchronous interconnection."

57	Rule Set 2: Physically Modelled Approach (PMA)	We would like to express support to the continued use of Rule set #2 (PMA). Contrary to what has been argued by several stakeholders, the issue at stake is NOT full avoidance of double counting of low CO2 attributes energy (although rule set 2 tends to undercount attribute tracking instruments rather than double-count them), but rather proper tracking of the actual GHG generation linked to the manufacture of a product. Essentially, the issue at stake is to be ";approximatly right rather than precisely wrong";. In the context of increased pressure to strengthen the credibility of the GHG protocol, several scientific studies have been published that estimate the actual CO2 reduction that can be attributed to the act of contracting a PPA with a low carbon electricity producer (meeting additionality criteria) for the full electricity consumption of a site (see McKinsey 2023). Moreover, several initiatives have taken shape and have collaborated to generate a full set of standards to properly ensure synchronicity between supply and consumption (see the granular certificate scheme standard by Energy Tag). Lastly, the RED III directive, as per the compromise reached in April, will be requiring that a GoO makes reference to the imbalance settlement period during which it was generated (which is a series of short time increments which cannot exceed 30 minutes), hence laying the groundwork for future synchronicity requirements.	Keep scope 2 modelling approach unchanged.	In response to other comments received, we did amend Rule Set 2 in the following places: - Introductory paragraph explaining its underlying philosophy (see above) - Case B / bullet point 2 setting geographical criteria for claims of environmental attributes - Case B / bullet point 4 setting temporal criteria for claims of environmental attributes - New text introducing a 3yr transition period to application of Case B
25	Communication of the product carbon footprint calculation results	1. 'Product Footprint calculation results shall consist of the dual, synchronous communication of both Rule Set 1 and Rule Set 2 results with the relevant methodological identifiers (HMA and PMA).' – This may not be feasible due to technical limitations of current market design (E.g. Renewable Energy Certificates lacking a timestamp for hourly generation and supply matching). 2. 'Members of the GBA shall actively refrain from accepting from vendors of their supply chain, and communicating to their downstream prospects or customers, a product carbon footprint calculation based on only one set of the two mandatory Rule Sets.' – This requires further clarification on GBA's plans of an approved list of vendors or service providers.	1. For Rule Set 2, we recommend GBA perform further market studies to assess the feasibility and maturity of market participants to meet this requirement. Particularly, given GHG Protocol Scope 2 Guidance is currently under review, inclusion of this requirement should be pushed back. We recommend retaining only Rule Set 1 for now and aligning it with the current requirements of the GHG Protocol Scope 2 Guidance. 2. We would like to clarify GBA's plans to recommend or create a list of approved vendors who may have already implemented and/or automated the requirement to calculate their carbon footprint based on two mandatory Rule Sets.	The GBA considered excluding Rule Set 1, excluding Rule Set 2, and keeping both Rule Sets. The most acceptable option for the group as a whole was to keep both Rule Sets. We have therefore maintained the dual reporting requirement in the GHG Rulebook.

26	Transportation	1. “The approach requires the amount of consumed fuel, e.g., the diesel consumption of a company owned truck fleet in a mine. To calculate the GHG emissions, the diesel consumption is multiplied with the CF for the supply of the fuel (see chapter 4.2.1) and is multiplied with emission factors from e.g., the 2006 IPCC Guidelines for mobile combustion (IPCC, 2006).” – In many instances, for calculations under the first approach the amount of consumed fuel may have to be estimated based on modelling (E.g., ship specifications and assumptions regarding conditions at sea).	1. Is the expectation that transport emissions are reported as well-to-wake? As the first, second and third approaches are currently written you may end up with inconsistency in the quantified emissions. Our understanding is that the IPCC and DEFRA factors would account for the combustion emissions from using fuel in the vessel only, and not also the upstream extraction, refining etc. of the fuel (i.e. not the well-to-wake emissions). The factors in Annex II of the EU regulation on the use of renewable and low-carbon fuels in maritime transport (https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0562) could be an alternative if you want to cover well-to-wake emissions. In the near term (2-3 years), we expect IMO to release well-to-wake emission factors for the maritime industry which would become the governing factors for maritime's accounting of emissions. Suggest adding an allowance for a hybrid approach, given in many instances for calculations made under the first approach, the amount of consumed fuel may have to be estimated based on modelling (E.g. ship specifications and assumptions regarding conditions at sea on specific route).	The World Business Council for Sustainable Development, Together for Sustainability (chemicals industry), the Catena-X project (automotive) and the GBA have now all agreed to recommend use of the emission factors published by the GLEC Framework. The GLEC Framework provides guidance on how to implement ISO14083 (which supersedes BS EN 16258) and incorporates use of relevant IPCC, DEFRA, GREET model data as well as internationally recognised emission factors for other regions (e.g., Australia). The GLEC Framework v3, in line with ISO 14083, covers well-to-tank emissions plus tank-to-wake emissions. See Chapter 5.2.4
27	Mining and refining	1. ‘It is recommended to collect 100% of the production process relevant data.’ – Collecting 100% of the production process relevant data may not be feasible. 2. ‘It is very important that for the main reference flows, the specific assay data on Nickel and other elements included are reported with the reference flows to allow a proper mass balance check’ – Obtaining specific assays for each component of the reference flow process may not be feasible and could make it difficult to comply. 3. ‘It is also important to calculate the transport between the different processes up to the final product’ – Does this mean the boundary should be drawn once the final finished $NiSO_4$ $6H_2O$ is produced (i.e. excluding the downstream transport of products to customers?)	1. We would recommend referencing this to the 3% threshold used elsewhere in the Rulebook, and to apply this to the other cluster specific rules where relevant. 2. Please define the expectation of the frequency that the assay data must be refreshed. 3. Please confirm boundary for downstream transport here and in the other cluster specific rules, or alternatively in the transport section of the Rulebook.	1. We modified Chapter 6.1 on Mining and refining to include the following: "The cut-off rules are specified in the generic part of the rule book and shall be considered within this specific mining and refining cluster as well as all other clusters. It is recommended to collect as much of the production process relevant data as possible. So regular maintenance of equipment shall be included and is typically included in Life Cycle Assessment according to ISO 14040 / 44 (e.g., lubricants, grease, etc.)." 2. The period for data collection is annual. This can be either the most recent available calendar year or the most recent available financial year. 3. Each of the Tables in Chapter 6 calls for collection of data for transport of inputs from the gate of the supplier and transport of outputs to the gate of the customer.

15	pCAM and CAM manufacturing	so far, only NMC has been analysed in detail: Considering the growing importance of LFP, the same level of detail as NMC should be provided Nickel sulfateCobalt sulfate: As per previous comments, we recommend not to limit to sulfated metals		We modified Chapter 6.2 on pCAM and CAM manufacturing to include the following: "The following pCAM and CAM manufacturing-specific chapter covers the production of precursor cathode active material (pCAM) and the final production of the cathode active material (CAM). Rules for production of pCAM and CAM from recycling are included in Chapter 6.5. This cluster covers all kinds of cathode chemistries used for LIB in the electric vehicle sector (e.g., NMC, LFP, NCA). Cluster-specific rules are defined below in addition to the generic rules defined in chapters 4 & 5. As outlined in Chapter 5.3, the used CF for the supply of the following materials shall be supplier-specific: • Nickel sulfate or other • Cobalt sulfate or other • Lithium hydroxide • Lithium carbonate"
41	Battery assembly	In case of integrated housing fulfilling additional functions for the vehicle, the virtual housing approach shall be used. For a description of the virtual housing approach please check the final report published by JRC in June 2023 detailing the rules for the calculation of the carbon footprint of EV batteries. Such approach is also included in the latest version of the PEFCR for Batteries under development in the Technical Secretariat. This is fundamental in case the results are used for comparison or benchmarking of different batteries.	In case of integrated housing fulfilling additional functions for the vehicle, the virtual housing approach shall be used. For a description of the virtual housing approach please check the final report published by JRC in June 2023 detailing the rules for the calculation of the carbon footprint of EV batteries. Such approach is also included in the latest version of the PEFCR for Batteries under development in the Technical Secretariat. This is fundamental in case the results are used for comparison or benchmarking of different batteries.	We modified Chapter 6.4 on Batter Assembly to include the description of the virtual housing approach published by the EU Joint Research Centre in June 2023.
42	End of life and recycling allocation via the cut-off approach	The classification of scrap is confusing	The classification of scrap in this section is not consistent with the classification provided in previous section of the rulebook. Please, use the same classification throughout the document.	We have modified the GHG Rulebook to avoid using the confusing term "scrap". We have modified Chapter 6.5.1. on End of life and recycling allocation via the cut-off approach to include the following: "The share of recycled materials shall be reported on the input side of a process or product to enable the producer to calculate the recycled content of the battery. Per Chapter 4.1.3, the amount of secondary material shall be reported in two categories as follows: – Pre-consumer waste (manufacturing waste, excluding process revert) – Post-consumer waste (end of life waste batteries)"

44	Recycling Data collection requirements	In the Battery Pass version 1.1, we added a new section on pre-consumer waste allocation - potentially, this is something you can integrate in the generic section of the rulebook? If not relevant, please ignore :)	The allocation of pre-consumer manufacturing waste shall follow a consistent application of these rules when collecting the activity data and attributing related carbon emissions. In general, waste shall be modelled by allocating the waste burdens (e.g. from incineration or landfilling) to the process output products for which the carbon emissions are collected and calculated. The emissions from treating manufacturing scrap, which is material that is recovered in further operations (e.g. recycling), shall also be attributed with the burdens in the current life cycle. Figure X shows the modelling approach for pre-consumer / manufacturing waste. First, the collected activity data has to be classified in terms of whether the process output is waste or a co-product. In addition to the definition of co-product provided in this Rulebook (net economic value above zero, the distinction between waste and co-products shall be in alignment with prevailing legislation. Second, if the classification yields that the output is waste, the treatment process shall be identified. Third, as a general rule, process emissions shall be allocated to the process output products in the current lifecycle. Fourth, emissions data for the identified process shall be multiplied with the collected activity data. <img src="/gf2.ti/ah/1523682/791277_scale.jpg/jpeg/-/clfb%2Ejpg">	We have modified Chapter 4.1.1. on Multi-output Allocation to include the following: "In general, waste shall be modelled by attributing the waste burdens (e.g., from incineration or landfilling) to the process output products for which the carbon emissions are collected and calculated. The emissions from treating manufacturing waste, shall also be included with the burdens in the current life cycle. First, the collected activity data shall be classified in terms of whether the process output is waste or a co-product. In addition to the definition of co-product provided in this Rulebook, the distinction between waste and co-products shall be in alignment with prevailing legislation. Second, if the classification yields that the output is waste, the treatment process shall be identified. Third, as a general rule, process emissions shall be allocated to the process output products in the current lifecycle. Fourth, emissions data for the identified process shall be multiplied with the collected activity data."
5	End of life collection	A little confusing compared to figure 5-28. Is the collection to be included in the GHG calculation of the recycled material or added to the footprint of the first life of the battery?		We have modified Figure 5-28 to remove the reference to waste collection.
45	Discharge and dismantling Allocation	We added further specification of the allocation application	(...) as presented in Chapter 3.4 may be required (See Chapter 3.4.1). The user of the rulebook shall assess the applicability of economic allocation. Thereby, the price of the components shall be taken as the basis. Only if these are not available, the value of the embedded materials may be used.	We have modified the text to include the following: "The user of this Rulebook shall assess the applicability of economic allocation taking the price of the components as the basis. Only if these are not available, the value of the embedded materials may be used."

46	Thermal pre-treatment - pyrolysis Data collection requirements	Added graphite (changes in bold)	Where electrolytes and graphite evaporate in the thermal pre-treatment, direct emissions shall be included.	We have modified the text accordingly.
47	Thermal pre-treatment - pyrolysis Allocation	Added graphite and electrolyte in the specification in the table under Direct GHG emissions	Graphite and electrolyte, if thermally lost	We have modified the text accordingly.
49	Thermal pre-treatment - pyrolysis Allocation	We changed the allocation chapter as follows in the revision to Battery Pass version 1.1	Mechanical pre-treatment separates battery materials into black mass and several other co-products. Typically, metal fractions are produced as co-products. As a first step, it shall be assessed whether process subdivision can be applied at the points of separation for the respective co-products, in line with Chapter 3.4.1. As a second step, it shall be evaluated whether system expansion applies for eliminating co-products from the system boundary. Since there is likely no well-characterised and representative alternative for metals, metal fraction co-products shall be allocated either economically or via mass, depending on the price differential. For other materials such as polymer flakes, graphite or electrolytes, these co-products may be given system expansion credits if the conditions of the allocation rules apply (particularly well-characterised and representative alternative routes, verification of economic value). If these alternative routes cannot be identified, economic or mass allocation applies. When the price ratio between all process output products exceeds four, economic allocation shall be applied. This is likely the case but depends on the composition of the treated battery, which is why the user of the rulebook shall assess the applicability of economic allocation in line with the allocation requirements (See Chapter 3.4.1). For modelling electricity, please refer to the Chapter 4.2.2.	We have modified the text to include the following: "Mechanical pre-treatment separates battery materials into black mass and several other co-products. Typically, metal fractions are produced as co-products. As a first step, it shall be assessed whether process subdivision can be applied at the points of separation for the respective co-products, in line with Chapter 4.1.1. As a second step, it shall be evaluated whether system expansion applies for eliminating co-products from the system boundary. Since there is likely no well-characterized and representative alternative for metals, metal fraction co-products shall be allocated either economically or via mass, depending on the price differential. For other materials such as polymer flakes, graphite or electrolytes, these co-products shall be given system expansion credits if the conditions of the allocation rules in Chapter 4.1 are met (particularly alternative well-characterized and representative routes, verification of economic value). If these alternative routes cannot be identified, economic or mass allocation applies (See Chapter 4.1.1). When the price ratio between all process output products exceeds four, economic allocation shall be applied. This is likely the case but depends on the composition of the treated battery, which is why the user of this Rulebook shall assess the applicability of economic allocation in line with the allocation requirements (See Chapter 4.1.1)."

48	Mechanical pre-treatment / shredding Process description	In the revision to v 1.1, we changed this section slightly - see bold changes - to incorporate graphite evaporation	Mechanical treatment includes mechanically crushing/shredding (potentially with gas treatment under inert atmosphere) dismantled battery modules or cells (comminution), followed by air classification, sieving and magnetic separation. This yields black mass and, through some segregation processes, other co-products such as polymer flakes from separators, aluminium and copper fractions from foils or ferrous/non-ferrous metal fractions from the casing. Additionally, one possible route for graphite treatment might be separation before the black mass is produced (see the example of graphite treatment in the box below which shall serve as the basis for deciding on treating co-products). Drying can be a part of the mechanical treatment, yielding electrolyte as a co-product. The electrolyte treatment processes (especially if thermally treated) could lead to direct carbon dioxide emissions that need to be included in the CF calculation. The off-gas emerging from this process step is cleaned via condensing and an activated carbon filter which needs to be replaced and reprocessed periodically (Mohr, et al., 2020). The degree of mechanical processing varies and thus determines the amount of recovered materials as the amount and quality of recovered materials increases with more complex mechanical treatment. Subsequently, the black mass is pyrometallurgically processed before it goes into a final hydrometallurgical step or directly introduced into hydrometallurgical treatment. Potentially, entire battery packs are mechanically processed. This yields additional co-products such the fractions from the battery/cell casing and wiring. Example graphite treatment: The example of graphite highlights that battery recycling process outputs can vary strongly depending on the technical design. It shall serve as basis for classifying and accounting for typical co-products/waste from the respective recycling process steps (such as electrolyte). The recovery of graphite can follow four routes: (1) Separated in mechanical pre-treatment Graphite might be separated before the black mass is produced in the mechanical pre-treatment. Depending on the economic value (potentially as energy carrier	We have modified the text accordingly.

		substitute) and local waste legislation, the user of these rules shall determine whether graphite is to be treated as a co-product or waste. (1.1) Sold as co-product If the net economic value of graphite removed in the mechanical pre-treatment is above zero and local legislation does not classify it as waste, the allocation hierarchy in section 5.1.5 applies. (1 b) Incinerated (as waste) If the classification yields that the removed graphite is waste, the waste modelling approach in section 5.1.6 applies and burdens of further treatment shall be allocated to the output products of the mechanical pre-treatment step. (2) Thermally lost in pyrometallurgical or thermal pre-treatment The according carbon emissions from thermal treatment shall be accounted as direct process emissions with the carbon content of the graphite. (3) Recovered in hydrometallurgical treatment If black mass still contains graphite, it can be recovered through leaching in hydrometallurgical treatment. The rules in section 5.3.5 apply to recovered graphite as a co-product in the hydrometallurgical treatment. For all described routes, the quality of outgoing graphite shall be documented in the data collection as it is important for accounting associated emissions.

50	Pyrometallurgical treatment Allocation	Minor edits below in bold	If system expansion is not applicable, economic or mass allocation shall be applied depending on the price differential of the co-products (See Chapter 3.4.1). Table 5-63 Calculated based on reductants (stoichiometry), graphite carbon content.	We have modified Table 6-63 accordingly.
51	Hydrometallurgical treatment Process description	Refined route number (3) to remove the differentiation between main and co-products as we decided to call all outputs co-products:	(3) The third is a combination of (1) and (2) where battery grade materials (NiSO4 and CoSO4) are produced and non-battery grade intermediates (MnCO3 and Li2SO4). Table 5-64 can be applied with the specification that MnCO3 and Li2SO4 are to be classified as co-products in the data collection. If these co-products are further treated to battery grade materials, the refinement process shall be included in the carbon footprint calculation.	We have modified the text to include the following: "(3) The third is a combination of (1) and (2) where battery grade materials (NiSO4 and CoSO4) and non-battery grade intermediates (MnCO3 and Li2SO4) are produced as co- products. Table 6-64 can be applied with the specification that MnCO3 and Li2SO4 are to be classified as co-products in the data collection. If the co-products are further treated to battery grade materials, the refinement process shall be included in the carbon footprint calculation"
52	Hydrometallurgical treatment Data collection requirements	Changed ";need to"; to ";shall"; in the following sentence	All relevant process emissions shall be included, for example potential sodium sulfate crystallisation as well as wastewater treatment which shall be accounted for in the process activity footprint calculation (see input/output Table 5-64)..	We have modified the text accordingly.

53	Hydrometallurgical treatment Allocation	Battery Pass significantly changed the section to apply allocation hierarchy more clearly and improve the description. All differentiations between main / co products were deleted.	Recycling processes are multi-output processes, i.e. having several valuable and functional outputs. For multi-output processes, the GHG emissions associated with the process shall be partitioned between the co-product(s) in a consistent way as per the generally defined allocation rules. In battery recycling, the target process outputs generally conform to battery-grade metal compounds (metal salts). Hydrometallurgical treatment yields a variety of co-products which varies depending on the complexity of the respective flowsheet. Generally, the target process output products are battery-grade nickel, cobalt, manganese and lithium compounds. Typically, sodium sulfate crystals, copper and graphite/carbon filter cake are produced as co-products. Following the multi-output allocation hierarchy (Chapter 3.4.1), it first has to be examined whether process sub-division applies. If sub-division can be applied, hydrometallurgical processes shall be further sub-divided into sub-process level under the conditions and guidance set out in Chapter 3.4.1. Where sub-division is not applicable, system expansion shall be investigated. If this is not applicable, allocation shall be applied. Even though nickel, cobalt, manganese and lithium compounds have alternative production routes, e.g., nickel sulfate and cobalt sulfate, these are not well-characterised and representative. There is no dominant route on the market producing these materials (see for instance GBA GHG Rulebook section 5.1.1. and 5.1.2.).[6] For co-products where the conditions of the allocation rules apply (e.g. sodium sulfate), system expansion substitution shall be applied. The credits for sodium sulfate – and other co-products – shall be calculated only after accounting for emissions from transport to the processing site and further treatment. For including transport emissions, the respective buyer-specific transport distances shall be applied. The user of these rules shall clearly classify for which co-products system expansion is applied and provide justification in the technical documentation. As there is likely no well-characterised and representative alternative	We have modified the text accordingly.

process for copper, this potential co-product shall be partitioned via allocation in line with the allocation method applied to the co-products. As the criterion for applying system expansion to other process output products is not met, allocation shall be applied. If the price differential between output products surpasses four – as is likely given the example presented by Battery Pass (2023) Figure 13 – economic allocation shall be applied. Only if the price differential is below four, mass allocation shall be applied for these outputs. The user of these rules shall determine the price differential based on the specific outputs of the process and apply the allocation classification. Allocation shall always be done at the point of separation If this is ruled out, the applicability of system expansion needs to be checked. For modelling electricity, please refer to the Chapter 4.2.2. [6] Note that the identification of well-characterised and representative alternative routes for the applicability of system expansion requires knowledge of production processes that yield materials of the same quality and composition as those of the recycled product. It is recommended to refer to the relevant sections for the upstream processes in this rulebook.

54	Hydrometallurgical treatment Allocation	We included electrolyte and graphite as co-products in Table 5-64	e.g., sodium sulfate (crystals), electrolyte, graphite	We have modified Table 6-64 accordingly.
55	Co-production of primary and secondary materials	Slightly changed wording in this paragraph - see below in bold	Additionally, co-production of primary and secondary materials is applied in industry. Pre-processed waste materials are refined together with primary materials. For calculating the carbon footprint of such processes, the steps from waste collection to the pre-processed waste material (i.e. black mass) shall be accounted for, including steps that clean or scrub the pre-processed materials.	We have modified the text accordingly.

37	Verification/Review/Audit	This section hasn't been sufficiently elaborated upon until now; it has mainly served as a placeholder. As a result, we're presenting our proposal here.	Proposal for the content of the GBA`s GHG Rulebook, Chapter 7: The focus of this conformity assessment procedure is on a verification of the LCA/PCF-study (ISO/IEC 14064-3, ISO 14065) and auditing of the quality assurance of the production process. The manufacturer must demonstrate that the requirements of Chapters 4, 5 and 6 are fulfilled. The manufacturer has to ensure that requirements are fulfilled on its own responsibilities. 1. Requirements towards the manufacturer 1.1 Quality system - Implementing certified quality system including processes to ensure the quality and traceability of information concerning PCFs 1.2 Supply Chain - Selects appropriate suppliers and conducts regular supplier audits - Providing evidence and information of the suppliers corresponding to the calculation study 1.3 Technical documentation - Prepare technical documentation and calculation study for LCA/PCF, if applicable: Product description Concept design, manufacturer drawings, BOM Marking List of standards that are have been used for the PCA/LCA-study Documents of the calculation study List of technical specification Test reports - Store technical documentation and corresponding information for at least 10 years 2 Requirements towards the conformity assessment body 2.1 Accreditation - Accreditation of an IAF-accreditation-body - Standards: ISO 17029, ISO 14065 as verification body, ISO 17021-1 as auditing body, ISO 17065 as certification body - An accredited conformity assessment body shall be independent and therefore shall not have any business relationship regarding consultancy or development with the manufacturer 2.2 Personnel Requirements - A conformity assessment body should have sufficient personal resources to perform the assessment procedure - The conformity assessment is taken by competent persons: Related academic degree or proven similar level of expertise gained in the field of LCA or PCF assessments At least 5 years professional experience in the respective fields of the assessment And related special expertise in the project role as “reviewer” or “verifier” according to	We have modified Chapter 8 on Verification/Review to give some more general information about the GBA's current thinking and would welcome further suggestions in subsequent public consultations.

	ISO/IEC 14066 and PEF Guidelines or ILCD Handbook proven by project references Proven knowledge and expertise about relevant international codes and standards 3. Project process 3.1 Pre-engagement, engagement and planning Both parties are Defining the project scope Identifying the concerned manufacturer locations Listing and exchanging the required information Estimating the project timeline Agreeing upon the applicable assessment procedure and the concerned resources Closing an NDA and a commercial project contract 3.2 Review of calculation study - Conformity assessment body is reviewing the received manufacturer information / technical documents, i.e. Primary data Selected GHG emission factors Corresponding procedures for documentation and monitoring the parameters - Checking overall data quality on validity, consistency, transparency - Checking and discussing manufacturers provided LCA model - Providing manufacturer with a report on findings, data inconsistencies and missing documentation 3.3 On-site audit Conformity assessment body is: - Analyzing primary data quality - Checking assumptions for product carbon footprint inventory and modelling, i.e. Raw material acquisition Recycled content calculation / documentation of recycled content from suppliers Manufacturing process Product use - Providing manufacturer with an audit report on findings 3.4 If necessary: Improving PCF study Manufacturer is implementing corrections and submit missing documentation Conformity assessment body is checking the implementations and the corrective actions for the findings 3.5 Statement is issued Conformity assessment body is: - in case of LCA, stating that the LCA is in conformance with ISO 14040 and ISO 14044 - in case of PCF, confirming that the information provided on the CO2 emission are reliable via the verification statement 4. Surveillance / Re-Statement Conformity assessment body is: - carrying out yearly audits to check actuality and reliability of data /methodology used to assess the LCA / PCF - providing manufacturer with a report

		on findings, data inconsistencies and missing documentation if applicable - checking the implementations and the corrective actions for the findings - adjusting LCA / PCF statement Manufacturer is - implementing corrections and submit missing documentation

43	Outlook	Reference to Table B1 of Annex B - I could not post the comment on the relevant page. sorry for this some content is not fully comprehensive when compared to the text of Recommendation 2021/9332	Reference to Table B1 – please refer to Part II of Annex C (excel file) of the Recommendation 2021/9332 that includes the default values to be included in the CFF. For the A value a reference to this excel file shall be included, rather than specifying the A value in such simplified way. Same comment applies for all other parameters. In Annex B the rule for the calculation of PEF for intermediate products shall be included. Such rules are detailed in the Recommendation 2021/9332, section 4.4.8.13 on "How to apply the formula to intermediate products (cradle-to-gate studies)". The rulebook shall require the delivery of two datasets for semi-finished and intermediate products to downstream actors, one calculated with the allocation factor equals to A,mat and one additional dataset calculated with A=1. The dataset with A,mat shall then be the one used for the calculation of the carbon footprint of the final battery. This double reporting would allow companies not only to calculate a compliant CF of their batteries, but also to implement sourcing strategies of the raw materials that would meaningfully drive towards the decarbonisation of the sector. We recommend the choice of E*v as a fixed that will depend on the region in which the recycling is expected to take place (fixed E*v, that in the case of this specific regulation should be representative of the European production of the materials or if not available the global production of the materials). To avoid the generation of negative results, we would then recommend to impose E*v=Ev when Ev is lower than the fixed E*v.	The text of the GHG Rulebook Annex B refers to Part II of Annex C (excel file) of the Recommendation 2021/9332. We have modified Table B-1 to explain it is an example only to be replaced with specifications of the EU's Batteries Regulation once adopted.