



EUROPEAN BATTERY RECYCLING ASSOCIATION

JRC 4th workshop on RE / MRT (19 September 2023)

EBRA Comments (to be delivered no later than 10 October 2023)

EBRA welcomes the new version of the draft guidance document circulated by JRC prior to the workshop of 19 September and appreciates the efforts made by the JRC team to clarify some concepts and regarding the new sections on reporting and verification.

We think that on certain points, additional clarification or re-wording is necessary. We present hereby our comments and suggestions. Our goal is to make sure that the future guidance will create a worldwide level playing field so that European recyclers can compete in a truly free market.

Throughout this paper, when using the word 'guidance', we refer either to the technical report or the draft future guidance on the Methodology on the calculation, reporting and verification rules for RE and MRTs. The EBRA comments are based on the draft text circulated by JRC prior to the workshop and on the slide deck used during the workshop (webinar) of September 19th, 2023.

- a) The EBRA document is divided in 4 chapters:
- b) Generic comments
- c) Comments regarding Chapter II: Method for the calculation of RE
- d) Comments regarding Chapter III: Method for the calculation of MRTs
- e) Comments specific to Chapter V: Verifications
- f) Some final thoughts

1| Generic Comments

Preparation for recycling

The new version of figure 1 indicates now clearly that preparation for reuse and repurposing is part of the 'preparation for recycling' step.

EBRA welcomes this clarification.

However, we would appreciate having a more generic definition of the outputs of this step entering the recycling process (and therefore subject to the RE and MRTs targets). The outputs should not be limited to waste modules and cells. See for example the case of the electric cables here under.

The outputs of the 'Dismantling step' are not described in a limited way, so should the outputs from the preparation for reuse and for repurposing.

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The recycling chain, the first recycler and the obligation of sub-contractor to provide the necessary reporting data.

A recycling process can be made of several distinct steps, not taking place in the same site. Some intermediate fractions may be shipped to another recycler / processor for further treatment. All the steps are necessary to comply with the requirements of the Battery Regulation.

Typical example: production of Black Mass (BM) from alkaline batteries, from LIB, etc. for further processing (Waelz furnace, hydrometallurgy, refining...).

A definition of the 'First Recycler' is needed in the guidance (no such definition in the Battery Regulation). The reason is that the first recycler must be clearly identified (for reporting and verification purposes). The case of a first recycler not located in Europe shall also be considered.

Another point: all parties contributing to battery recycling (not only the first recyclers) shall contribute to the reporting on how they achieve their part of the recycling targets. If they mixed the battery fractions with other waste before processing, they should take all necessary measures beforehand allowing the correct reporting needed by the 1st recycler.

EBRA suggestion: the guidance shall illustrate the case of the recycling chain and shall highlight the need for all actors involved to correctly report the achieved level of the recycling targets.

First recycler in case of dismantling

The Battery Regulation does not define who is the first recycler in case of dismantling.

If the recycling targets are also applicable to those (modules or cells) waste, the recyclers will have to collect data from the dismantler. This is not only complicated but not defined in the guidance.

EBRA suggestion: Could the modules/cells coming from dismantling be considered as equivalent to manufacturing waste (to which only the MRTs are applicable, not the RE).

Specific types of batteries undergoing recycling

Among the specific types of batteries, we mean the following:

- Out of specification batteries, packs, modules, cells not yet placed on the market.
- Special series produced for testing purposes only.
- End of series that cannot be sold anymore (obsolete technology, etc.).

Those types of batteries enter the recycling process in the same way as any other EoL batteries.

EBRA suggestion: the guidance should mention that those specific types of batteries shall be subject to both the RE and MRT targets.

Our suggestion regarding manufacturing waste is indicated in chapter II.

The definitions of the mass of input fractions and output fractions shall also be adapted accordingly (not to refer exclusively to waste batteries):

- m_{output} shall be defined as the mass of output fractions derived from waste battery input fractions accounting in the waste battery recycling process per calendar year.
- m_{input} shall be defined as the mass of (battery-related) input fractions entering the waste battery recycling process per calendar year.

The definition of Black Mass shall also be extended to the BM originating from those specific types of batteries.

Work in Progress (WIP)

The last deliveries of EoL batteries (or part thereof or manufacturing waste) of the year might not be fully recycled during the same year. The recycling targets for example could only be achieved in the following year.

The methodology shall clearly indicate how to deal with the WIP from a reporting point of view. Indeed, recyclers must provide a yearly reporting to their competent authorities. How should the WIP be reported ?

Our suggestion (assuming first in, first out):

In the reporting template, an elaborate section shall be devoted to the mass balance with in particular:

- ***Q1: Quantity of batteries (or battery-related material) arriving at the recycling plant (collected batteries, not necessarily ready yet to enter the recycling process)***
- ***Q2: Quantity of batteries (or battery-related material) in inventory at the beginning of the year that are ready to enter the recycling process.***
- ***Q3: Quantity of batteries (or battery-related material) received during the year (till 31 December)***
- ***Q4: Quantity of batteries (or battery-related material) in inventory at the end of the year (not yet processed)***
- ***Q5: Quantity of battery (or battery-related material) in inventory at the of the year partially processed, bur for which the recycling targets cannot be calculated and reported yet.***

The reporting of the recycling targets (RE, MRT) shall be devoted to the Q2+Q3 only. Storage of batteries (or fraction thereof) is not a recycling activity and shall not be accounted for in the reporting of the RE and MRTs targets.

EoL batteries imported into EU for recycling.

European recyclers are importing and recycling batteries (or part thereof, or manufacturing waste) from outside the EU (UK, Switzerland, other non-EU-27 countries, etc.).

The Battery Regulation stipulates requirements for EoL batteries to be exported for recycling, not for imports into the EU.

Once imported in Europe, the EoL batteries (or part thereof, or manufacturing waste) shall be subject to the same recycling targets than the one(s) generated within Europe (they will

probably be recycled together with the EU-ones, even if the RE/MRT targets are not compulsory outside the EU).

Moreover, the reporting obligation by recyclers shall be adapted accordingly, clearly identifying the quantities imported for recycling, from which country. This is necessary for the correct verification step, avoiding double counting or to prevent inflating figures with undeclared non-EU batteries and generating clean reporting statistics.

EBRA suggestion: the future guidance should have some wording about how to consider the imported waste batteries and waste battery material from a requirement, reporting and verification points of view.

Definition of intermediates

If a definition for 'intermediate' in the recycling process for batteries is most welcomed, the concept of intermediates should however not refer to the definition of intermediates under the REACH Regulation.

Indeed, and unlikely to the REACH regulation (Regulation (EC) N° 1907/2006), an intermediate fraction is not necessarily transformed into another chemical substance. An intermediate in a battery recycling process can be further refined to become a recycled outputs without responding to the criteria defines under RACH for intermediates.

EBRA suggestion: to indicate clearly in the guidance that the concept of intermediate does not refer to the definition of intermediate under the REACH regulation.

Electric cables

The electric cabling of a battery, chiefly EV or industrial types, can be subdivided into 2 categories:

- Electric cabling within the battery itself. You need to open the 'box' to see them. I case of refurbishing, repair, repurposing, there could be a need to replace part of them. Should they be part of the recycling targets (RE, MRT)?
- External electric cabling to connect the battery with e rest of the application (car, industrial machine, etc.). They might not be considered as part of the battery and therefore not subject to the recycling targets (RE, MRT).

The guidance should clarify the fate of both categories.

More generally, the guidance shall list the most frequent example of external parts that should not count towards the recycling targets. This will contribute to a better level playing field across the recycling space.

Battery Management System (BMS)

EBRA would appreciate a wording in the guidance indicating:

- ***The need to recycle the EoL BMS***
- ***The BMS fraction should not be considered towards the recycling targets (RE and MRTs)***

2 | Chapter II: Method for the calculation of RE

RE calculated/reported per stream

Chapter II indicates that the RE of a recycling process is calculated separately for each input stream. One of the input streams is 'Lithium-based batteries'.

There are different LIB technologies (NMC, LFP, Li-polymers, ...). In the past, all LIB technologies were recycled together as:

- Only the RE-target is existing under the battery directive, not the MRT targets.
- The non-MNC technologies were representing a minority share of the recycled quantities.

In the future, the situation will change for the recyclers:

- We see the market share of LFP increasing over time.
- Recycling them together with the NMC may penalise the targets (mainly the MRT-targets)

Therefore, a segregation of the recycling processes is most likely to happen. Some NMC-recyclers could take the decision not to accept LFP batteries (or part thereof) as input materials anymore. Other recyclers could decide to recycle both but in separate batches (with a segregated calculation of the targets (RE, Li) knowing that Co, Ni are not present in LFP-batteries.

EBRA suggestion: in the reporting, allow the possibility to differentiate between NMC-batteries and other ones.

This suggestion is also valid for Chap III.

The RE: calculated on the compounds, not the metal equivalent.

The input as well as the output materials of a recycling process are usually not metals but oxides, salts, etc. For example, NMC cathode are made of a mixed oxide, NiCd batteries do contain hydroxides.

EBRA suggestion: A clear statement I the guidance shall mention that:

- ***RE is calculated on the chemical compound, not the metal equivalent.***
- ***MRTs are calculated on the metal equivalent.***

The fate of Carbon

The last text proposal foresees the possibility of counting carbon used as a reducing agent in the RE. This is most appreciated, chiefly for the primary batteries like the ZnC and alkaline batteries. The RE of 50% can be achieved in some cases without counting the carbon. However, if one of the other recycled outputs fails to materialize, the recyclers will need to count (at least part of) the carbon used as a reducer to meet the RE target.

Because the market for alkaline/ZnC batteries is not growing like the LIB market, recyclers will not proceed with new important investment for finding new recycled fractions meeting

the targets.

It should be noted that counting carbon in the RE calculation shall be subject to certain rules not mentioned in the draft text:

- ***Only the quantity of carbon used as reducer in the recycling process can be accounted for, not any excess.***
- ***The use of C as reducer outside the battery recycling process (as a whole, included sub-steps) cannot be accounted for***
- ***The carbon from plastic fractions recycled/recovered separately cannot be accounted for as reducing agent (no double counting allowed).***

Because the methodology is general, this rule is also applicable to other type of batteries (like LIB).

The fate of solvent

The recycling targets are calculated on a dry basis (input/output). Solvent is not water. Should it be excluded from the input / output fractions?

EBRA suggestion: the fate of solvent shall be clearly mentioned in the guidance.

Manufacturing waste and RE

It is our understanding that manufacturing waste are subject to the MRT targets (Whereas 33 of the Battery Regulation).

Nothing explicit is said about the RE. Moreover, manufacturing waste can be made of a mix of different fractions, making the RE calculation difficult.

EBRA suggestion: clearly state in the guidance whether the manufacturing waste are subject to the RE target (for a correct interpretation of Figure 1)

RE for waste modules or cells from repurposing

When undergoing a repurposing, repair, etc., some modules or cells from the original battery may be disregarded (as waste) and sent for recycling. They are considered as battery waste.

However, calculating the RE on such modules or cells is not always easy and feasible if the 'packs' (containing modules and cells) are not considered into the calculation. To include 'packs' into the calculation, the choice of who is the first recycler is pivotal to collect and track the data. Sometime the dismantler (or the first recycler) is unknown or can come from various sources. Sometime recyclers receive a mix of them and individual traceability is not possible. One can think of imposing requirements regarding the data for calculating the RE in the collection/recycling contract, but this will create 'orphan' battery waste streams. The Battery Regulation imposes the recycling of all collected batteries (or fractions of), and this requirement is independent from the availability or not of the data to calculate the RE.

In other words, as such the modules and cells alone can't reach the RE-target (whatever the fate of C or O is). Should they be considered in the same way as manufacturing waste and having only material recovery target? By combining the obligation to recycle and the MRT-

targets is sufficient for the batteries to be recycled without placing a legal burden on recycler when all data are not available to calculate the RE.

EBRA suggestion: clearly state in the guidance whether the waste modules or cells coming from a repurposing step are subject to the RE target (for a correct interpretation of Figure 1)

3 | Chapter III: Method for the calculation of MRTs

When a fraction achieves the ‘end point of recycling’ ?

EBRA welcomes the concept of ‘end point of recycling’ but the definition shall more clearly indicate when and at which conditions an output fraction is considered as achieving the end point of recycling. Is it the fraction before refining or after ? What if an output fraction can either be part of a supply chain (with an industrial use) or could be further refined. The decision is often more guided by business conditions than technology. Where is the pivotal point ?

The definition shall not be impacted by yields (or losses of material in industrial processes), rather by criteria on circularity and re-use.

EBRA suggestion: the guidance shall better define the pivotal point or at least provide several examples to help creating a better harmonised implementation of the recycling requirements.

By the way, in figure 2, the box ‘Manufacturing for equivalent purposes’ shall not only linked to the refining step. It is perfectly possible to fulfil this definition without a refining step.

The case of the MRT for Ni in steel

Both Ni and Cu are subject to the MRTs.

Nickel can be found in almost any battery chemistry (example: if they have a steel casing, as Ni is an alloying element in steel).

Imposing the calculation of the MRT for Ni in primary portable batteries for example (when the steel casing is recovered) will entails excessive analytical costs compared to its contribution to the recovery of Ni as a valuable resource to manufacture new batteries (the RC does not apply to primary batteries anyway).

The focus of the MRT should be on Nickel from cathode material.

EBRA suggestion: the guidance shall provide clear wording about the fate of Ni in steel casing.

The fate of impurities

Impurities included in an output fraction shall not be accounted for in the recycling targets (RE, MRT) even if they are in the form of Ni- or Cu-compounds.

However, the same impurities shall also be excluded from the weight of the input fraction. If not, this will lower the level achieved for the recycling targets.

The examples of close loop recycling shall be publicised to increase harmonisation across Europe.

Regarding impurities: we should keep the reporting on the hazardous substances listed in the Battery Regulation (now or in future adaptations). We should not confuse this list with the hazardous substances defines in REACH: the list is way too long, inappropriate for the purpose of the Battery Regulation, and chiefly will entail excessive analytical costs for the recyclers.

EBRA suggestion: the guidance shall clarify this point, also to make sure of a harmonised application of the rules across Europe (and so contributing to creating a level playing field).

External recycling of manufacturing scrap

There is a possibility that manufacturing scrap (as defined in whereas 30 and 30 of the Battery Regulation) can be shipped to another plant for recycling (belonging to the same manufacturer or to an external party).

EBRA suggestion: the guidance should specify whether the manufacturing scrap remains a 'scrap' or becomes a manufacturing waste in those circumstances and at which conditions (example: if there no direct close loop with the manufacturing process).

4| Chapter V: Verifications

Definition of the first recycler

Comments made earlier will certainly contribute to a better verification step by the MSCA. However, we think that the guidance shall provide examples of recycling chain with the role and duties of the MSCA at each step and which MSCA is responsible for from a verification standpoint.

More particularly in cases involving batteries collected outside the MS of the 1st recycler, when the 1st recycler is outside the EU, etc.

EBRA suggestion: include in the guidance some figures with different recycling chains clarifying and indicating who is doing what from a verification standpoint.

Level playing field is also important during the verification step

The Commission should be empowered to assess the quality of the reporting from Member States (art. 76). ***In that context, we recommend that the Commission should develop an assessment tool to ensure homogeneous assessments and evaluations by MSCA.***

5| Final thoughts

Placing on the market of batteries / recycling processes not fulfilling the recycling targets.

The battery world is a very innovative space. Changes in battery composition is inevitable and will have an impact on the recyclability of batteries and the achievement of the level of the various targets.

A recycling process not fulfilling the recycling requirements shall not be permitted or authorized.

In the same way, the placing of a battery on the EU market without the corresponding recycling process meeting the requirements of the Battery Regulation shall also be banned.

EBRA suggestion: The guidance shall indicate what happen in those 2 cases, how to allow the involved parties to remedy to the non-compliance within a reasonable timeframe, before implementing more drastic measures. This will greatly contribute to the creation of a level playing field across Europe in the battery space.

Incentive for better recycling results

The Battery Regulation defines recycling targets and their levels to be achieve. However, there is no mechanism ensuring an incentive or reward for recyclers exceeding the targets. The recycling of most battery chemistry is today (and for at least some time in the future) a net cost. Thanks to the EPR concept embedded in the Battery Regulation, the recycling costs are covered.

However, without incentive, the market will converge with the cheapest solution, most likely the one achieving the targets but not exceeding them.

Abbreviations used:

BMS	Battery Management System
EoL	End-of-Life
EU	European Union (27 Member states)
EV	Electric vehicle
LFP	Lithium Iron Phosphate
LIB	Lithium-Ion Batteries
MRT	Material Recovery Target
MS	Member State
MSCA	Member State Competent Authorities



EUROPEAN BATTERY RECYCLING ASSOCIATION

NMC	Ni-Mn-Co LIB
RC	Recycled Content
RE	Recycling Efficiency
WIP	Work In Progress

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