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# Review statement on European database for corrugated board life cycle studies, 2021

Dataset owners: CEPI Containerboard & FEFCO corrugated packaging

Dataset developer: Michael Sturges, RISE - Research Institutes of Sweden

Reviewer: Frank Wellenreuther, ifeu - Institut for Energy and Environmental  
Research

Heidelberg, May 2022

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# 1 Background and Goal

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CEPI ContainerBoard (CCB) and the European Federation of Corrugated Board Manufacturers (FEFCO) collected data from the industry to document the environmental impact of corrugated board.

The result is a European database for life cycle studies that includes data for the production of:

- Corrugated base papers from primary fibres: Kraftliner, White Top Kraftliner and Semicheical Fluting (data from CCB)
- Corrugated base papers from recovered papers: Testliner, White Top Testliner and Wellenstoff (data from CCB)
- Corrugated board products (data from FEFCO).

The data is the tenth edition of the database and represents averages of the inputs and outputs from the production sites per tonne paper and per tonne of corrugated board product for the year 2020.

The database report has been prepared bei RISE Bioeconomy.

The updated database was presented to ifeu gGmbH for critical review.

The goal of the review presented here is to ensure that:

- the methods used to compile the database are scientifically and technically valid,
- the methods are used consistently within the FEFCO LCA database,
- the data used are appropriate and reasonable in relation to the goal of the LCA Database
- the LCA database report is transparent and consistent

## 2 Review procedure

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This review has been commissioned by FEFCO on the 04<sup>th</sup> of December 2020. The review work has been conducted in two steps. For the first step, on the 11<sup>th</sup> of December 2020, the dataset developer provided the data collection questionnaires for review before sending them out to the data providers. In the second step the final draft database report including an annex with gate-to-gate inventory data for corrugated base papers and corrugated converting processes was provided for review on the 25<sup>th</sup> of April 2022.

This review statement has been sent to the commissioner and the dataset developer on the 04<sup>th</sup> of May 2022. It refers to the latest version of the database report received on the 25<sup>th</sup> of April 2022.

### 2.1 Documents provided and reviewed

The dataset developer provided the reviewer with several documents relevant for a clear understanding of the data compilation process. Those documents were as follows:

#### Data collection questionnaires

- Papermills questionnaire – draft final 10-12-2020.xlsx
- Draft questionnaire – corrugated sheets and boxes.xlsx

The draft data collection questionnaires were made accessible to the reviewer on the 11<sup>th</sup> of December 2020.

After receiving and considering comments from the critical reviewer the final revised versions of these data questionnaires as used for the actual data collection were then also shared on the 05<sup>th</sup> of January 2021:

- Papermills questionnaire – final 05-01-2021.xlsx
- corrugated sheets and boxes questionnaire – final 05-01-2021.xlsx

- The questionnaires follow a top-down approach to data collection consistently.
- Information about all annual inputs and outputs was requested.
- As no allocation was made for by-products the inputs and outputs include the production of these by-products
- The participation of mills and converting facilities have increased compared to earlier versions of this dataset, therefore the representativeness has been further improved.

⇒ The questionnaires are considered to be well-suited to their purpose to collect all relevant gate-to-gate data.

## Database report

- FEFCO environmental database – draft final report 25-04-2022-marked-up.docx

This final draft of the database report has been sent to the reviewer on the 25<sup>th</sup> of April 2022.

- The report contains a single European average inventory dataset covering corrugated board production including the production of the four main paper grades used.
- In an annex to the report the separate gate-to-gate inventory datasets for the four paper grades and the converting process are also included.
- It contains a very detailed section describing the production processes.
- The dataset for the corrugated board is calculated by multiplying the average paper grade composition data from the paper mills with 1.12 (as on average 1.12 tonne of paper is used for 1 tonne corrugated board) and adding the corrugated board data from converting facilities.
  - ⇒ The detailed section describing production processes is well written and very much appreciated as it will help non-professionals to understand and therefore use this dataset correctly.
  - ⇒ This calculation approach is transparently presented in the report and considered suitable for the generating of one average dataset.
- The underlying datasets differ in their representativeness. The data for Semi-chemical Fluting and Kraftliner represent more than 84% of the total annual production of corrugated base papers from primary fibres in Europe. The data for the production of Testliners and Wellenstoff represent about 71% of the total annual production of corrugated base papers from recovered paper in Europe. The data on corrugated board production represents 73% the total annual production of corrugated board in Europe.
  - ⇒ The resulting dataset is considered to be representative of the European production of corrugated board and the reference year 2020. The overall representativity could be improved compared to the previous version (#9) of this database.
- Allocation of inputs and outputs was not necessary in all cases of data collection. At some sites only one grade of product is produced, at some the mills were able to assign inputs of raw materials to the different products. In remaining cases allocation between co-products has been done by data providers according to causality.
- Inputs and outputs allocated to other products (not by-products) and sold energy have been excluded from the inventory data.
- No allocation was made to by-products, so the reported inventory includes the production of these by-products.
  - ⇒ The allocation procedure is considered suitable to deliver the most valid results possible.

- The previous version of the database report (#9 for 2018) included descriptions of material and energy inputs and emissions including emission factors. Some of the information of this section can now be found in the data questionnaires.
  - ⇒ The inclusion of these sections on inputs and outputs is not mandatory, but would be useful for a better understanding for readers who do not have access to the questionnaires.

## Inventory data

Unlike the previous version of this database report, the inventory data is not presented in a separated excel file but directly included into the report. An annex also presents the separate gate-to-gate datasets for the production of the main paper grades and the converting process.

- The inventory tables include the inputs and outputs per ton net saleable product.
- The list of material inputs does not include packaging material.
- The list of material outputs includes residues.
- Total sums for some material or energy inputs are additionally presented.
- Apart from material and energy flows also transport parameters for wood, recovered paper and also paper to corrugating plants are listed.
- An additional table listing internal fuels, which are not added to the inventory data as their emissions are already accounted for, is presented.

- ⇒ Biogenic and fossil based CO<sub>2</sub> is reported transparently
- ⇒ The reviewer appreciates the consideration of peat as fossil fuel regarding the quality of CO<sub>2</sub> emissions.
- ⇒ Packaging materials are not included although they have been collected via the data questionnaires and were included in the 2018 version of this database.
- ⇒ Water balances have been checked by the reviewer and are found to be sufficiently closed (the difference is also reported in the inventory)
- ⇒ The inclusion of internal fuels for information purposes only is appreciated



# 3 Conclusion

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The presented documentation of the dataset is considered transparent and correct, clearly describing how the dataset has been built up and what it represents in terms of production, technology, geography and time. This is considered appropriate for the intended application: gate-to-gate LCI dataset for production of corrugated board for use in LCI/LCA studies.

- ⇒ the methods used to compile the database are scientifically and technically valid,
- ⇒ and consistently used within the FEFCO LCA database,
- ⇒ the data used are appropriate and reasonable in relation to the goal of the LCA database
- ⇒ the LCA database report is transparent and consistent

Nevertheless it is less comprehensive than the previous version of this database report from 2018. It misses its detailed description of inputs and outputs, a glossary, emission factors and information on data gaps and packaging materials.

The input and output flows have been cross-checked by the reviewer with other paper sector datasets and have been found to have a high level of completeness including all relevant flows of inputs of raw materials and energy.

## Limitations

The data set refers to European industry average. This review does not apply to any individual datasets collected at single mills or corrugated board plants.

Heidelberg, 04.05.2022



Frank Wellenreuther, ifeu gGmbH