SCORELCA

STUDY N° 2013-003

AVAILABLE DATA FOR THE MODELLING OF THE WASTE TREATMENT AND RECOVERY SECTORS IN LCA: STATE OF THE ART AND AVAILABILITY

ENGLISH SUMMARY

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SCORE LCA is an association that has been created to financially support collaborative research on LCA and related topics. It aims to promote and organize cooperation between companies, institutional and scientists in order to support the evolution of LCA methods and its practical implementation at European and international level.

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- ✓ The views and recommendations expressed in this publication are those of the authors and do not necessarily reflect, unless otherwise stated, the views of all members of SCORE LCA.

- ✓ The information and conclusions presented in this document were established on the basis of scientific and technical data and regulatory and normative framework in force at the date of the publication of documents.

As part of its missions, SCORE**LCA** wishes to improve the diffusion of Life Cycle Assessment (LCA) in industrial activities. The challenges linked to the end-of-life are fundamental for the development of a sustainable industrial model, SCORE**LCA** seeks to extend and deepen the knowledge their members have by offering them help reviewing available and missing data on several waste streams (WEEE, ELV, solar modules, furniture waste, demolition waste, lubricants, gas bottles, batteries, textiles and household chemical waste), as well as the materials that compose them (plastics, metals, glass, cables, rubble, biomass, screens, WWTP sludge, mineral oils).

Faced with this issue, an exhaustive bibliographic research and an analysis of the main existing databases and LCA tools were carried. The main types of data sources studied are presented below:

- LCA reports
- LCA reviews
- Specific articles on industrial emissions
- Activity reports
- State of the art reports
- LCI databases
    - Ecoinvent
    - ELCD/ILCD
    - ESU data on demand
    - US LCI
    - DEAM/WISARD
    - CPM database
- LCA tools
    - GaBi
    - EIME
    - EASEWASTE/EASETECH
    - WRATE

As the main goal was to draw the global landscape of waste treatment LCI data, it was decided that the research process would look into every kind of intermediary and elementary flow for every step in the life cycle of the selected waste streams. Moreover, the research had to be as large as possible and it wasn't limited by the geographic or technological relevance of the modelled processes.

This study was accompanied by a **data quality assessment**, carried using a methodology based on the ones recommended by the ILCD and ecoinvent. The developed methodology allows the user to judge the overall quality of a datum with a scale going from 1 to 5:

- < 1,6 «Good quality data»
- > 1,6 « Average quality data»
- > 3,2 «Bad quality data»

All the identified data was then used to **create a life cycle inventory (LCI) database** with a simple structure. The goal of this tool is to allow the user to:

- Complete missing data from the data collection process for a product's LCA
- Confirm the validity of data when compared to the data available in the literature
- Model the end-of-life of a selected waste stream

The search engines integrated into the tool allow the user to choose the criteria (stream, materials and/or technology) that interest him. A table with only the corresponding data is then obtained. The user can then compare all the different data sources; using the documented metadata and the overall quality of the data the user can then select the model that represents his system the best.

This study not only improves the availability of consolidated and reliable data for the LCA practioner, it also renders possible the **identification of the issues surrounding end-of-life data collection and modelling**. A **statistical analysis of the data** was carried to identify the waste streams needing complementary work.

At the end of this study, it comes to light that several waste streams (mainly solar panels, household chemicals and gas bottles) are less represented in the literature and in existing databases. Figure 1 shows the distribution of the identified data sources according to the average quality and publication year for each waste stream.

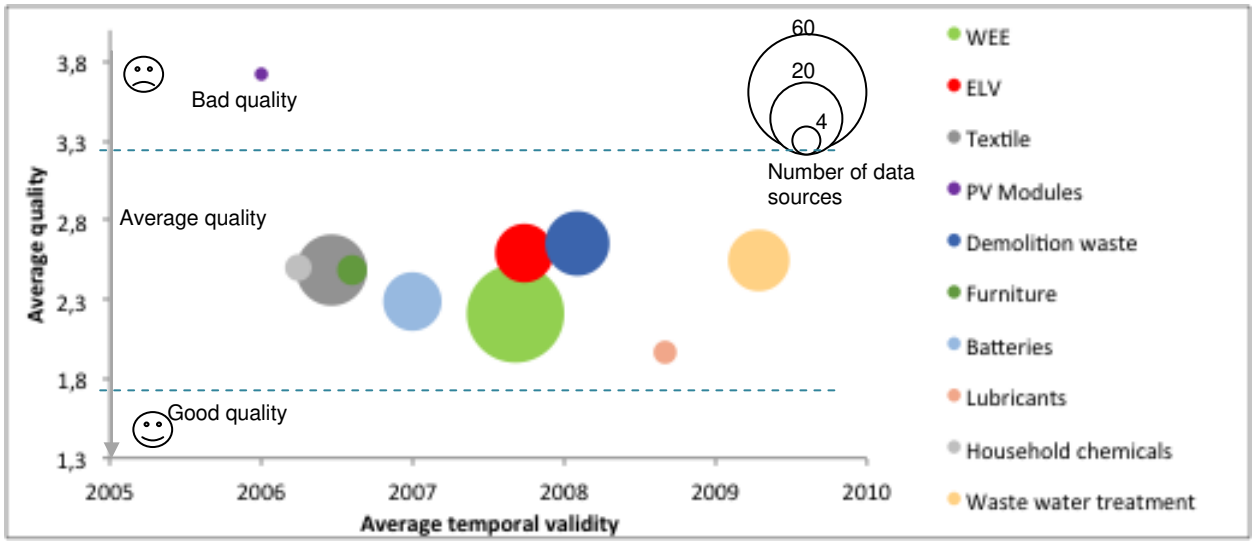

Figure 1. Distribution of the identified data sources according to the average quality, the waste stream and the temporal validity

This figure shows an important dispersion of the different waste streams according to the three studied parameters. However, the quality of obtained data is, in essence, the same for every waste stream (an average grade between 2.0 and 2.7 for most waste streams), with an average age that remains quite close. The main difference is the number of data sources dealing with the end-of-life of each stream. The reasons behind this difference are varied and depend, on one hand, on the players of the sector with data confidentiality issues and, on the other, on the complexity n the structure and the age of the sector.

On top of these issues, the difficulty to develop consistent models to evaluate the different end-of-life technologies must be taken into account. The same phenomenon can be observed for the reported flows, with certain types (mainly direct soil emissions) being absent from most inventories as a consequence of modelling difficulties. Moreover, the age of data

is in average over 6 years. The whole picture points to a level of data quality that is only mildly satisfying.

Considering the overall quality of existing data, complementary work is needed in order to improve the current knowledge level consistently. Taken into consideration the results of the study and the input from the contacted experts, several improvement measures were suggested. The proposed action plan goes trough a multiple-criteria decision analysis that will determine the prioritization of the different waste streams. This step is key to determine the methodological rules that must be implemented and to identify the main players in the sector, the construction of partnerships being one of the building blocks for the creation of reliable data.