SCORELCA

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WHAT IS A SIMPLIFIED LCA? HOW TO SIMPLIFY LCA?

Executive 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 drafting of documents.

Introduction

Until 2008-2010, Life Cycle Assessment was a methodology only used by some pioneer companies which had invested in softwares or high skilled people within a specific strategy. The development in France and then in Europe of environmental labelling policies, has increased the demand of LCA studies and therefore companies have been expecting for a decrease of studies prices.

An answer to this change has been the **generalization of LCA tools**: a model is developed once, and can be used as many times as needed by changing the value of a few specific parameters. Therefore, data collection is simplified and LCA can be developed at big scale, for a huge number of products references. Meanwhile, some standards and sectoral guidance have been developed to harmonize LCA processes and simplify some of the steps.

Last of all, as LCA becomes a more spread tool, it becomes a decision and communication tools, which needs some simplifications in the way to present results.

The aim of our study was to identify the possible simplifications in LCA with the following goals:

- Identify if simplification is in line with reference texts (standards, sectoral guidance…)
- Balance the benefits and drawbacks
- Point out the risks to use such simplifications

The results are the followings:

1. Definition and goal of simplification

- Simplification is **inherent to LCA**, as ideally LCA should model all inputs and outputs as elementary flows, which is impossible.
- There is **no written nor standard definition** of simplification. However, some words suggest a kind of simplification: neglect, omit, delete, make some assumptions, use proxys, …
- **Simplification allow to spare some time and budget**. Depending of the type of simplifications, around 60 % to 80 % of the time of a study can be spared.
- **Simplification can also help to reproduce, in a harmonized way, some calculations**. This is crucial in the case of environmental labelling or internal tools that can be used every year within a company, by changing a few figures obtained through updated reportings.
- Simplification **depends on the goal of the study**

Simplifying is accepting to lose some precision (and therefore reduce the effort) in the results of a study, without changing the conclusions: the aim is to deliver an appropriate work (neither too much nor too little) compared to the goal of the study.

2. Typology of simplifications

Two main simplifications exist.

- Some are focused on the different steps of LCA.
  The most frequent ones are linked with the modelling and data collection steps. It is logical as the time spent on model and data collection is around 2/3 of a study.
- Some are focused on the way to conduct a LCA
  - With the help of a tool

- By assessing a streamline LCA (only one iteration and identification of hotspots)

2.1. Simplification in goal and scope definition:

Type of simplification	Description – Risks - Recommendations	
Simplify functional unit	Definition	Not consider all the services that the product/service fills, but only the main *(it is generally done by practitioners without being aware of it)*
	Risk	▪ neglect some impacting processes *(e.g. barriers layers in a new bottle that could not be recycled because of them)* ▪ make mistakes in comparison (*e.g. compare 2 cars for passenger transport without considering that the size of the boot will disadvantage big cars)*
Neglect the consequential approach	Definition	Not consider the impacts on the market in case of a constrained market (*e.g. consider that a recycled material market can absorb all the demand without constrains)* *(it is generally done by practitioners without being aware of it)*
	Risk	Only in case of changes of scales: lack of nuance
Neglect some steps	Definition	Simplify model and data collection *(e.g. infrastructures, ink, glue…)*
	Risk	Neglect high contribution steps, suppress some steps in a comparison by assuming they are the same for both studied systems *(e.g. transport distribution when comparing glass bottles with and without deposit: the packaging is not the same and therefore neither the logistics)*
	Reco	Use the cut off criteria and check
Select some impact categories	Definition	Choose a set of impact categories that will limit data collection and interpretation of results
	Risk	▪ In a comparison, omit a category that is important especially for one of the 2 compared systems *(e.g. deposit systems need to consider water consumption which is not really a point for non-deposit systems)* ▪ Make mistakes in conclusion
	Reco	Analyse the correlation between categories, normalize/ weight results, use expertise or existing guidance
Reduce the level of precision	Definition	Accept that some data remain with big uncertainty
	Risk	Not be able to conclude because the results of the difference of impacts between systems, in addition to uncertainty are higher than the expected difference between systems
	Reco	Define precisely a threshold difference between the systems
Adapt the data to the goal and scope of the study	Definition	Define a level of quality appropriate with the goal of the study
	Risk	/
	Reco	Define data quality requirements, use expertise

2.2. Simplification for data collection

Type of simplification	Description – Risks - Recommendations	
Use available generic data	Definition	Reduce time in primary data collection
	Risk	Select inappropriate data, especially for most influent data
	Reco	Use expertise and identify hotspots before
Select generic data, specific data and semi-specific data (default values with possibility of specific data)	Definition	Limit the research of specific data to the most influent/accessible and use some generic /default data for others
	Risk	Select generic data on the only criteria of accessibility and not on influence on environmental balance
	Reco	Identify the hotspots before
Use conservative data	Definition	Use data with higher environmental impact for some data
	Risk	Use conservative data on influent data and therefore get a too high environmental balance or favour one of the systems in comparison
	Reco	Identify hotspots Apply conservative data when data are not influent
Use proxys	Definition	Use approaching data instead of real data (reduce time of generation of data) by calculation, means, adaptation of existing data…
	Risk	Less representativeness *(e.g. adapt only electrical mixes of a LCI without considering the possible difference of technology)*
	Reco	Identify the hotspots before Use expertise to choose the correct proxys
Use aggregated processes	Definition	Use data from databases
	Risk	Less representativeness and double accounting of some steps *(e.g. yarn at filature can include both the yarn production and the cotton production at field; then the model must not consider the cotton production at field)*
	Reco	Pay attention to the data quality and building before selection

2.3. Simplification for other steps of LCA

Remove the weighting and normalization step	Definition	Non-mandatory step for ISO
	Remark	This step can help to select impact categories. It can lighten the results presentation
Remove sensitivity analysis	Definition	Limit time of interpretation, report writing and communication
	Risk	Unconformity with ISO Lack of robustness, nuance
	Reco	Keep at least some sensitivity analysis about the variations of situations (more than on uncertainty) Produce a selection of graphs
Keep only one iteration	Definition	Avoid the long and iterative process Limit time of report writing (graph exports)
	Risk	Unconformity with ISO if published study Lack of nuance and accuracy
Remove critical review	Definition	Limit time, delay and potential remodelling
	Risk	Unconformity with ISO (for comparative LCA with communication)

Conclusion

The following picture shows the easiness to practise simplification in LCA depending on the goal of the study (in green: easy, orange: possible with specific warning, grey: not considered, red: not recommended).

The more the study is internal, mono-product, and order of magnitude- focused, the easier it is to simplify. The more the study is comparative, with communication purpose, and product-specific, the riskier it is. For studies with PCR, simplifications are defined by the guidance document. No other ones are allowed. For studies that develop LCI in databases, of course, simplification is not recommended as the LCI can be used for a big range of impact categories and purposes.

Recommendations

Simplification in LCA is tricky, and may conduct to some risks:

- **Errors in modelling:**
  - Removal of some non-relevant steps (e.g. too influent on the results)
  - Use of generic data without enough consideration to the quality, representativeness and appropriateness to the goal and scope
- **Misinterpretation;**
  - Bad selection of impact categories that leads to conclude that a system is always (instead of only for the selected impacts categories) better than another one from an environmental point of view
  - Lack of analysis on hotspots that leads to use data that will artificially lower or increase the environmental impacts
  - Favour the most environmentally friendly system which lead to an inequitable comparison
  - Lack of quality in data that increases uncertainty
- **Impossibility to conclude**
  - Lack of accuracy that leads to see no difference between two systems
- **Non-conformity with ISO**

Therefore, it is important to:

- **Be transparent and justify the simplifications**
- **Check the relevance** of the simplification by having **a critical vision**
- **Use the following tools**:
  - ***Guidance documents***: they will help for selection of impact categories; of generic data, methodological choice
  - ***Screening LCA***: will help to identify hotspots
  - ***Sectoral and LCA expertise*** (the higher it is, the sharper the critical vision will be)
    - Sectoral expertise: it will help to choose appropriate proxys, generic data, to challenge the data quality and to know more on accessibility
    - LCA expertise: it will help to challenge data quality, identify hotspots, select right impact categories.

The global reports includes also :

- 13 detailed forms for each simplification, presenting some examples, balancing the benefits and risks, reminding the reference texts quotes and providing some practical recommendations and tools
- A practical study case based on a public study and its results and wondering about the possible and already done simplifications and their influence on final results; it also estimates the time that could take the simplifications.
- The results of an Internet consultation on the practise of simplification in LCA