SCORELCA

STUDY N° 2012-04

COMPREHEND AN ORDER OF MAGNITUDE OF THE RESULTS OF ENVIRONMENTAL IMPACTS – BENEFITS AND LIMITS OF NORMALISATION

Summary

October 2013

Scientific Manager :

Alexis Gerard, Isabelle Descos

RDC Environment - 57, avenue Gustave Demey - 1160 Brussels

In Life Cycle Assessment (LCA), normalisation consists in the division of impact or damage category indicators by reference values. Regarding the LCA reference documents, ISO 14 044 and ILCD handbook, normalisation is an **optional step** in the whole Life Cycle Assessment process. However, normalisation **is recommended** by the Product Environmental Footprint (PEF) guide.

According to LCA standards, guidelines and interviews of LCA experts, normalization can be used for 5 objectives:

- **Identifying incoherence during the iterative way of LCA**. This means pointing out some aberrations in the LCA or LCI by comparing them to other references (order of magnitude).

- **Helping to select impact category indicators**. The normalisation highlights the impact category indicators for which the studied product contributes the most compared with reference values.

- **Studying relative contribution of impact category indicators to a referent system** :By reporting to a reference scenario (e.g. historical or sectorial reference), normalisation can help for decision making or communication of performance results. Caution : this kind of use is near from a comparative LCA.

- **Facilitating communication of LCA results:**
  - by giving order of magnitude
  - by comparing with a product reference to help comparison,

- **A calculation step toward weighting**.

Three steps are crucial when using normalisation:

1) ***The selection or calculation of references values***

The issue is extremely **connected to the objectives** (cf. above) **and scope** of the LCA.
The present guideline helps the LCA practitioners to select it (cf. table below)

(+++ = recommendation)	Total Inputs and outputs of a geographical area	Total Inputs and outputs of a geographical area related to inhabitants (inhabitant equivalent)	A reference scenario		
			As an alternative product (eg: competing product)	Historical or sectorial reference	Usual activities
identifying incoherence during the iterative way of LCA		+	++	**+++**	++
helping to select impact category indicators	++	**+++**		+	
studying relative contribution of impact category indicators to a referent system	+++*		**+++**	**+++**	++
facilitating communication of LCA results by giving order of magnitude	+	**+++***	++	+	**+++**
facilitating communication of LCA results by comparing with a product reference to help comparison by giving order of magnitude			**+++**	++	
a calculation step toward weighting.	**+++**				

For all these reference values, the issues of the scope, the geographical and time representativeness, completeness and uncertainty have to be checked.

Characterisation methodologies have published reference values (ReCiPe 2008, CML 2002, Impact 200 +, EDIP 2004,). These are the most available and accessible data in 2013 but they also have strong weakness. For example they all are over dated and no incertitude evaluation is proposed.

The following guidelines help LCA practitioners to understand the weakness of these data and help him to select more accurate data accordingly to the objectives of the LCA study.

2) ***The presentation of normalised results*** :

The main principles to follow are: transparency, availability of impact category indicators before normalisation and clear formulation helping to understand the purpose of normalization and the conclusion that can be made according to this purpose.

3) The interpretation of results :

The main risk to avoid is to consider the normalised results as weighted results and therefore to conclude on the severity of impacts.
Moreover impact categories indicators normalised have not same robustness, then caution have to be made during interpretation.
In some cases, normalisation looks like comparative assessment. Then practitioners shall be careful when defining objectives and interpreting results relatively to these objectives.
The ISO 14 044 recommendations are clear for comparative assessment.
This guide provides recommendations and caution elements all along the process of normalisation.

Finally, these guidelines propose some potential R&D issues to improve the use of the normalisation in LCA.