特集「Scope 3と組織のLCA」

解説(Commentary and Discussion)

Position paper (17th January 2014), by Technische Universität Berlin

- Department of Environmental Technology - Chair of Sustainable Engineering, on behalf of The German Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety and The German Federal Environment Agency, on EU Product and Organisation Environmental Footprint proposal as part of the Communication Building the Single Market for Green Products (COM/2013/0196 final)

Matthias FINKBEINER¹

Synopsis: The Product Environmental Footprint (PEF) methodology, published in 2013 by the European Commission, is a life cycle based multi-criteria measure of the environmental performance of products and services and aims at harmonizing existing methods, while decreasing the flexibility provided by ISO standards regarding methodological choices. Within the pilot phase the method is applied and tested for 25 product categories. The idea of a harmonized, life cycle based method enabling comparisons of products/organizations within the same product category/sector is principally good. However, it is accompanied by various risks and challenges and is controversially discussed by organizations, associations, science etc. The Chair of Sustainable Engineering at Technische Universität Berlin (TUB) was commissioned by the German Federal Ministry of Environment and the German Federal Environmental Agency to follow and assess the PEF process in order to establish the German position to it. This included for example a thorough analysis comparing ISO 14044 and PEF/OEF methodology. Some results of this analysis were published in the International Journal of LCA²⁾. Another result of this project is a first position paper on the general PEF methodology which was prepared by TUB and submitted to the European Commission and all member states. This position paper is attached here.

Keywords: Comparative assertion; European commission; LCA; product environment footprint; organizational environmental footprint

Background

The EU Commission published the Product (PEF) and Organisation (OEF) Environmental Footprint methods as part of the Communication “Building the Single Market for Green Products” (COM/2013/0196 final). We clearly support the approach to address all relevant impact categories and the full life cycle of products and services.

According to the documents released, the PEF and OEF methodologies build on existing LCA based methods and aim at harmonizing them. They aim at increasing comparability between products by predefining requirements for certain methodological aspects, thus decreasing the flexibility provided by ISO 14044. We support the proposal of further guidance for a harmonized method for quantifying and communicating environmental performance from cradle-to-grave, which however also

bears risks and poses challenges. It is still unclear to us whether the proposed approach actually supports these targets in a substantial way or may even have adverse effects on the policy targets it tries to achieve.

As Germany announced at the first meeting of the Stakeholder Committee of the PEF/OEF pilot phase, this position paper presents some general key findings of a comprehensive analysis of the PEF/OEF methodology with regard to consistency with international state-of-the-art LCA standardization and science. Regarding the currently started PEF/OEF pilot phase we recommend to take our findings into account when generating and evaluating the pilot results.

Analysis

As a starting point and one of the main targets, the proposed PEF methodology is supposed to harmonize

¹ Department of Environmental Technology, Technische Universität Berlin / Office Z1 - Strasse des 17. Juni 135 - D-10623 Berlin, Germany

* 連絡先 (Corresponding author), a-inaba@cc.kogakuin.ac.jp

several existing standards and methods, e.g. ISO 14044, ISO/TS 14067; ISO 14025, ISO 14020, BPX 30-323- 0 (ADEME); and also Greenhouse Gas Protocol and PAS 2050, which have a rather limited scope.

ISO 14040 and ISO 14044 are the leading basis for all the previous quantification standards; they represent the constitution of LCA. Many of the other standards contain significant amounts of ISO 14040/44 content. With exception of the limited focus of the carbon footprint standards on climate change, all of them reference ISO 14044 as their basis and basically comply with it. On the contrary, the proposed PEF/OEF methodology is in conflict with several core requirements of ISO 14044 and ISO 14025. The proposed PEF/OEF methodology seems not to support harmonization, because it is not based on ISO 14044 as a solid internationally agreed reference and because the proposed method is more different than any other existing standard. Harmonization is necessary based on the solid foundation of the existing international standards, but

PEF/OEF do not even conform to the existing harmonization level. As they stand now, PEF/OEF do not contribute to harmonization, but to proliferation. The following examples show some deviations from globally, basically unanimously agreed harmonized standards:

- A completely new set of terminology is introduced (e.g. unit of analysis instead of functional unit, resource use and emissions profile instead of life cycle inventory and so on). Renaming these common terms has no added value and rather leads to confusion and proliferation.
- Comparative assertions based on weighting of impacts are an optional step for PEF studies. If weighting is applied, the methods and results shall be reported under “additional environmental information”. It has been a long established global consensus (formulated in ISO 14044), that subjective weighting is not to be used for comparative assertions to be disclosed to the public. However, PEF leaves this harmonized solution and allows weighting and comparative assertions. The proposal to report it under “additional environmental information” is in full and obvious conflict with ISO 14025, because this is explicitly excluded there.
- With regard to OEF, the current draft of ISO TS

14072 on LCA for Organizations clearly states, that LCA studies for organizations shall not be used for comparative assertions disclosed to the public. Again, the OEF allows - in obvious conflict with the global standards - such an application.

- Several reporting requirements based on ISO 14044 are not met, e.g. the requirement of a statement that an LCIA shall not provide the sole basis of comparative assertion intended to be disclosed to the public of overall environmental superiority or equivalence, as additional information will be necessary to overcome some of the inherent limitations in the LCIA.

It should also be noted, that some of these main differences and conflicts of PEF/OEF with existing standards are not properly reflected in the comparison of standards provided in Annex X of the PEF document.

The proposed PEF/OEF methodology is supposed to build on existing, extensively tested and used methods. This is a feasible strategy for harmonization and also for cost-effective implementation. In those parts of the PEF/OEF methodology, which are actually taken over from existing standards, the solid and tested ground of the method is achieved. However, in those parts of the methodology, which are newly required by PEF/OEF, the claim to use extensively tested and used methods is no longer true. Elements like the screening step, the ban of cut-off-criteria, the end-of-life-recycling formula, the reviewer qualification scheme and several of the proposed impact categories and indicators are neither extensively tested nor extensively used.

In 2011 the JRC published a set of recommended life cycle impact assessment methods (ILCD handbook: Recommendation for Life Cycle Impact Assessment in the European context) based on a comprehensive analysis. This set included 14 impact assessment methods on midpoint level and three methods on endpoint level, which are ranked from level I-III evaluating the maturity of the method. The recommended methods on midpoint level were incorporated into the PEF method without properly reflecting the maturity levels identified. Only two methods (IPCC method for climate change and WMO method for ozone depletion) are characterized with level I (“recommended and satisfactory”) and fulfill all the necessary requirements. According to the analysis from the JRC the methods for assessing water

consumption and land use should “only be applied with caution” due to shortcomings of the models and factors (level III). Seven methods are classified as level II (“recommended, some improvements needed”). Finally, all the three USEtox models (human toxicity for cancer and non-cancer effects and ecotoxicity) are ranked as level II-III. Even the developers of USEtox themselves acknowledge that the uncertainty of the characterization factors is up to three orders of magnitude¹). It is striking, that the PEF/OEF methodology requires the use of the even most uncertain methods. Some examples for the most obvious artifacts of the untested methods proposed:

- For assessing impacts of water use the ecological scarcity method²) is recommended. However, this method contains severe flaws. For instance, impacts resulting from water consumption in Germany (910 eco points/m³) are considered 40 times higher than in Australia (23 eco points/m³). More commonly used and better tested impact assessments for water do not show these artifacts.
- The proposed recycling allocation formula is not used in practice and therefore not tested. It can lead to unrealistic results since for example the land fill term is never zero even if 100% of the material is recycled. The quality term can be “adjusted” to almost any “desired” result. The environmentally very relevant aspect, how often a material can be recycled is not reflected in the formula at all. A material that is recycled barely once gets the same burden/credit than a material that is recycled 100 times.
- Acidification and eutrophication impacts are assessed in almost every LCA today, based on tested methods. The PEF proposes the accumulated exceedance method which was basically never used and tested. It is better in theory to assess impacts on regional level, but practically impossible as no regional inventory data are available in common LCA datasets. As a consequence, average characterization factors based on European data are provided by the JRC which include overall only five characterization factors for acidification and six for eutrophication. Hence, characterization factors for many inventory flows are missing and the method is less robust than well-established impact indicators.

In real world application of LCA, there are many

existing, extensively tested and used methods available. Why are they not used? The proposal of such unproven methodologies leads to lacking robustness of results and poses even a threat to the credibility of the LCA method as such.

Under the justification “comparability over flexibility” PEF/OEF predetermine a number of value choices. One feature supposed to support “comparability” is the requirement that each “unit of analysis” has to be linked to the CPA/NACE-codes. Product Environmental Footprint Category Rules (PEFCRs) are supposed to be developed on the two-digit-level of the classification. However, for many products the identification of a suitable code is not a straightforward task and many groups cluster products together with very different productions systems (e.g. manufacture of vegetable and animal oils and fats).

Comparability and flexibility: If there is variability in the real world and a certain modelling approach defines fixed values or a fixed approach for it, that does not increase comparability, it just increases reproducibility. If a certain end of life recycling approach is fixed, like in PEF/OEF, it increases reproducibility as everyone is forced to use the same formula. However, if this formula represents a best case solution for one material and a worst case solution for another material, it does not introduce comparability, but bias. For real reproducibility the PEF/OEF would need to fix even many more methodological choices, most prominently, the data sources and databases. As such, PEF/OEF introduce inflexibility (proper antonym to flexibility), fail to achieve full reproducibility and do not achieve comparability of relevant environmental information.

The PEF methodology also does not allow cut-off criteria. How this methodological requirement of PEF could practically be followed is completely unclear as it is theoretically impossible to achieve. To include all processes and all elementary flows for the 14 impact categories proposed leads to an exploding workload for identification of flows and related processes with a limited significance for the results (if the cut-off is done properly, the influence on the results is usually negligible).

Regarding data, the PEF methodology provides an evaluation scheme to assess the quality of the used data. Even though this scheme is formally easy to apply, it leaves a lot of room for adjusting the scoring and

interpretation. The data quality of the data quality assessment will be often worse than the data quality of the LCA study. It also has to be applied case by case as the evaluation depends on the context of the study. For product systems with easily 100 or more unit processes the extra unproductive workload is substantial even if only minutes are assumed for each data set. Despite the efforts generated, the required data quality assessment does not allow any quantitative assessment on the significance of the results.

If all these requirements for PEF/OEF are followed seriously, the resulting cost for the LCA will easily increase 100% or more – without any significant increase in LCA quality. As such, PEF/OEF are rather a cost driver for business and an obstacle for promoting LCA use with SMEs.

The Commissions Communication limits the use of PEF/OEF to the voluntary communication of life cycle environmental performance information to any private, public and civil society stakeholder. As there are several pieces of existing EU legislation – from automotive emissions, via biofuels, substance bans according to RoHS or ELV- which could be improved substantially, if a proper LCA based policy was introduced this could be discussed again at the end of the pilot phase. For EU legislation which is already based on LCA we see especially a need for harmonization in the methodology, e.g. the Ecoreport Tool applied for the preparatory studies of the Ecodesign Directive and the PEF.

Even though communication to consumers is the target, PEF/OEF so far offer very little on how the communication should actually look like. The PEF/OEF pilot phase should provide an answer or a discussion, how they relate to the established environmental labeling schemes like the EU-flower, the Blue Angel or existing type III declaration programmes.

Conclusions and recommendations

PEF and OEF are supposed to achieve an important goal, the implementation of LCA in European environmental policy. It can be questioned whether the proposed methods and solutions can achieve the objectives which they are supposed to serve. In their current form and due to the significant flaws addressed above, PEF and OEF might not support the idea of integrating LCA into environmental policy. Many of the

flaws could have been and still could be corrected easily - either before extensive cost and efforts are put into the pilot studies or at least at the end of the pilot phase.

The most urgent requirements and improvements for the PEF/OEF methods include:

- PEF/OEF need to commit to conformity with international standards, especially ISO 14040/44. Building harmonization on the solid foundation of ISO 14040/44 may work; harmonization against ISO 14040/44 will lead to proliferation, confusion and mistrust.
- PEF/OEF need to use internationally agreed terminology. There is no added value at all to invent new and artificial terminology.
- PEF/OEF need to use internationally agreed and tested impact categories, e.g. all impact categories with a score of I and II only in the ILCD study.
- PEF/OEF need to use scientifically valid and practically applicable impact category indicators for the selected impact categories, e.g. CML or ReCiPe instead of Seppälä for eutrophication and acidification.
- PEF/OEF need to refrain from the approach to fix a certain set of value choices as solution for achieving comparability. These “pseudo-solutions” (e.g. recycling allocation, weighting, product classification) do not even achieve full reproducibility. PEF/OEF may support comparisons, but cannot replace the responsibility of any user to make its own informed choice.
- PEF/OEF need to refrain from adding unrealistic requirements, burden and cost to LCA application for business and SMEs without adding value, e.g. by the data quality assessment scheme and the restriction of cut-offs.
- PEF/OEF communication to consumers must be put into proper context with existing type I and type III labelling schemes.

We think that addressing these issues would help to position PEF/OEF as a useful instrument which can facilitate the use of LCA and provide the basis for sound political decisions.

(平成26年12月14日受付)

Reference list

- 1) Rosenbaum, Ralph K., et al. (2008): The International Journal of Life Cycle Assessment, 13(7), 532-546

- 2) Frischknecht R., Steiner R., Jungbluth N. (2008): The Ecological Scarcity Method – Eco-Factors 2006. A method for impact assessment in LCA. Environmental studies No. 0906. Federal Office for the Environment (FOEN), Bern, Switzerland, 188 pp.