

Reply to the editorial “Product environmental footprint—breakthrough or breakdown for policy implementation of life cycle assessment?” written by Prof. Finkbeiner (Int J Life Cycle Assess 19(2):266–271)

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We would like to contribute to the discussion on the environmental footprint (EF) of products started by Professor Finkbeiner with his editorial published in this journal in February 2014 (Finkbeiner 2014). We thank Professor Finkbeiner for sharing his concerns and suggestions, as he puts forward some relevant points and opens a discussion that can help the Commission to improve the EF methods. It also allows us to clarify our communication activities and avoid possible misunderstandings related to the work carried out by the European Commission on EF.

First of all, it might be useful to recall that the development of European methods for the calculation of the EF of products and organisations was mandated to the Commission by the EU Member States (through the Council of the European Union). This request stemmed from a growing concern among Member States and industries related to the rapid growth in the number of “similar-but-different” methods and approaches related to the calculation of various footprints. The request was not to harmonise the existing standards but to develop an approach that could be used in existing or new EU policies.

The proliferation of methods for, and approaches to, measuring environmental performance makes it unnecessarily complicated and expensive to make environmental claims regarding the environmental performance of products or organisations across borders in the EU Single Market. The EF methods were called for by the Council of the EU in order to provide a common basis for measuring and communicating

environmental performance, which would be recognised by market actors across Europe.

Consumers and other stakeholders require environmental performance information and show an interest in choosing environmentally friendly (green) products. However, they are confused by the proliferation of information available which is based on different measures, and the majority do not trust the “green” claims.¹ Accordingly, the EF methods were required to help define what can be considered a green product or organisation, which implies evaluating performance with respect to that of an average product or organisation (benchmarking). Moreover, the EF methods request the development of product- and sector-specific rules, which would set unique, consistent requirements leading to comparable results. The need for reliability requires that strict attention be paid to data quality and to review.²

Several factors must be considered in informing consumers and helping them to identify green products. These include their desire for indicators regarding the most important environmental impacts of a product, as well as a single indicator regarding the product’s overall environmental performance—this latter indicator, where appropriate and relevant, could be based on a weighting system.

An analysis³ of existing LCA standards revealed that none fully matched these policy needs. The flexibility inherent to

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¹ Flash Eurobarometer on *Attitudes of Europeans towards building the single market for green products* (http://ec.europa.eu/public_opinion/archives/flash_arch_374_361_en.htm#367)

² Information underlying this analysis can be found in the Impact Assessment accompanying the Commission Communication *Building the Single Market for Green Products*, Commission Staff Working Paper (2013) 111

³ European Commission - Joint Research Centre - Institute for Environment and Sustainability. Analysis of Existing Environmental Footprint Methodologies for Products and Organisations: Recommendations, Rationale, and Alignment. <http://ec.europa.eu/environment/eusss/pdf/Deliverable.pdf>

the existing standards leads to LCA results that are often neither reproducible nor comparable. While there may be good reasons for such flexibility, the results are not helpful from a decision support point of view. This situation gives rise to confusion, and contributes to a lack of confidence that weakens the potential role the LCA tool could have, especially in a policy context.

However, we also want to highlight that we consider the standardisation process to be a vital element of policy making. While ISO standards cannot totally provide the required level of technical detail and prescriptiveness that is needed to ensure a consistent application of provisions that lead to robust, reproducible and comparable results, they provide a much needed and indispensable framework. The urgency of the request and the need to include certain features (e.g. more specific data quality requirements, benchmarks, etc.) in the new EF methods obliged the Commission to carry out the work based on its own expertise and the inputs of experts gathered through consultations and pilot tests.

It may be helpful to recall some basic principles behind the use of standards in policy. Standards may be referred to by a policy as a means of fulfilling a policy objective. In order to implement certain policy targets, they often need to be “transformed” into measured requirements (e.g. thresholds), and the means for calculating such measurements must be standardised. Clearly, in these cases, the standard must deliver what the policy is designed to achieve. However, although the implementation of policies is closely linked to their respective standards, this does not necessarily preclude the development of new related standards or policies. It is possible to develop a new policy even when standards are not in place. If the policy changes or the standard obstructs, the achievement of the new policy objectives, then the specific standard needs to be revised or a new one needs to be developed. In case of standards supporting policy, standards must conform to policy needs, and not the other way around.

The rationale behind the development of the Product Environmental Footprint (PEF) and Organisation Environmental Footprint (OEF) methods is similar. PEF and OEF built on existing standards and approaches in order to establish an agreed basis as a starting point, and deviated from those only when necessary in order to match policy needs, i.e. in all cases where requirements were in conflict or did not exist, e.g. regarding the quantification of data quality.

The PEF and OEF methods are measurement tools, not standards. These tools might be linked in the future to European policies, depending mainly on the results of the 3-year EF pilot phase that got underway in November 2013.⁴ Thus, although it is useful to draw attention to potential

improvements that could strengthen the robustness of these methods, it is too early to draw overall conclusions.

The interest in this Commission-led initiative is overwhelming. Ninety pilot proposals were received in the first call for pilots, of which 17 were selected. More than 100 companies from all over the world are now actively developing environmental footprint rules for specific products categories and sectors covering a very high percentage of the European market for those product groups and sectors. These rules will provide further sector-specific guidance on how the PEF and OEF shall be implemented.

In addition to the default approach provided in the PEF and OEF, participants in the 3-year pilot phase are encouraged to test other approaches or methods that are seen to be more suitable for the issue to hand. The areas in which additional approaches are explicitly foreseen for testing cover a range of points made by Prof. Finkbeiner, such as impact assessment methods, end-of-life recycling formulae and different approaches to weighting. Additional approaches must be justified, their results must be discussed, and they will be included in the evaluation of the pilot phase.

The Commission's decision to launch an environmental footprint pilot phase indicates an awareness of the fact that the implications of several key issues need to be better understood before integrating the methods into policies can be considered. A revision of sections of the PEF and OEF methods is likely to be necessary at the end of the pilot phase. The Commission has set up a very open, transparent and inclusive process for including feedback from stakeholders around the world in the final pilot outcomes, as appropriate.

Some of the issues mentioned by Professor Finkbeiner in his editorial are already being reviewed, including the use of terminology that differs from that used in ISO 14040–44. The original intention was to use terminology that could make the application of the methods easier for non-LCA experts. Based on the feedback from stakeholders, it seems that this initiative found limited support.

However, we do not agree with other considerations expressed by Professor Finkbeiner. One example we would like to mention in this letter is the issue of weighting in the context of comparative assertions. We are well aware of how this issue is dealt with in ISO standards, but we are also aware of how weighting is actually implemented in practice. While weighting is part of many, if not all, the decision-making processes and the majority of current environmental policies, it is often hidden. For example, in the case of developing a carbon footprint standard, 100 % of weighting is implicitly and automatically assigned to climate issues. The same goes for all other single-issue footprint methods. Weighting is also used in ISO type I labels (e.g. the Blue Angel, the Nordic Swan, the EU Ecolabel, etc.) when deciding the most relevant criteria for the label. There are numerous examples of situations where weighting is already used by policy makers and

⁴ For more information on the European Environmental Footprint pilot phase, please visit the website: <http://ec.europa.eu/environment/eussd/smgp/index.htm>

LCA practitioners in the context of comparative assertions. A public, open and transparent discussion on this issue should be held. It was therefore considered appropriate to push for a systematic, but transparent, use of normalisation and weighting in the development of the category/sector rules within the pilot phase.

With regard to the objective of cost reduction, pre-defined choices will reduce the overall cost of achieving more reliable and robust assessments compared to the very heterogeneous situation that exists today. One objective of the category and sector rules is to ensure that each subsequent EF assessment can be carried out focusing on the things that really matter in terms of life-cycle stages, processes and impact categories. However, thorough and comprehensive assessments must be conducted during the pilot phase to ensure that any simplifications remain scientifically sound, are clearly quality assured and lead to robust and (insofar as possible) reproducible and comparable results. Based on confidential studies and preliminary reports from companies that have implemented the PEF and OEF methods (including elements of specific category rules), we expect a 30–50 % reduction in assessment costs compared to the current situation.

A few of the points in Professor Finkbeiner's editorial may be based on miscommunication or misunderstanding. For example, when it comes to cutoff criteria, the PEF guide requires that all known consumptions (e.g. energy, raw materials, land use) and emissions be reported. This is what we refer to as “no cutoff”, and aims to avoid situations in which available information and data are neglected. If a cutoff is applied, usually a limit is set to avoid that in total more than a certain percentage (often 5 or 10 % related to mass or energy) is cut off. In the EF, the information used to determine that cutoffs do not amount to more than the limit should be taken into account. However, and this is where the misunderstanding may have arisen, as the data quality requirements for this data are low (“take the best you have”), no significant additional efforts should be spent to improve the data quality in that area. Such efforts would be indeed both impractical and pointless, as those areas can be assumed to play an insignificant role in the overall picture.

We do not fully understand the criticism of the screening step in the environmental footprint methods, as this screening step entirely reflects the iterative process of carrying out an LCA, as occurs in common practice and is well founded in ISO 14044.

Some of the other “technical” concerns raised in Professor Finkbeiner's editorial are addressed in the following.

On the discussion of flexibility versus comparability, it should be recalled that in developing the PEF and OEF methods, the Product Environmental Footprint Category Rules (PEFCRs) and the Organisation Environmental Footprint Sectoral Rules (OEFSRs), the Commission has followed the ISO 14044 requirements in Section 4.2.3.7:

“Comparisons between systems”. This requires that a range of choices be made in an equivalent way in order to compare systems: “Systems shall be compared using the same functional unit and equivalent methodological considerations, such as performance, system boundary, data quality, allocation procedures, decision rules on evaluating inputs, and outputs and impact assessment.” Of course, how to best make those choices is open for discussion, and we welcome any constructive suggestions on how to improve on the choices made in the PEF and OEF methods and in the related PEFCRs and OEFSRs.

It is acknowledged that the choices made in the PEF and OEF methods do not allow for full reproducibility or comparability. The 3-year pilot phase aims to develop product-category and sector-specific rules which improve comparability within a given product category or sector. Unless a range of value choices that are inevitable in any life-cycle-based assessment are fixed, comparability cannot be achieved. However, the role and responsibility of decision makers is not changed by the PEF and OEF methods, which are merely measurement tools supporting the decision-making process.

The aim of End of Life (EoL) formula is to reach a compromise between different approaches and formulae taken from other methods. While this specific formula has been developed based on the need to account for the benefits of using recycled materials and recycling at the EoL, cross-comparisons with the provisions in ISO TS 14067, in BPX 30-323-0 (ADEME 2011) and in PAS 2050 (2011) were carried out during its development.

It is acknowledged that the choice of a “50/50” approach is a compromise. However, in the testing of different approaches, neither a “100/0” nor the “0/100” approach yielded satisfactory results, and both were seen as being less likely to meet the set objectives. The approach taken in the BPX 30-323-0 was seen as being the most promising. However, with three different formulas for different situations and a very detailed assessment of the energy recovery, it was seen as being too complex to be directly used in the broad application of the EF methods. Therefore, it was taken as basis and simplified by applying the “50/50” formula to all situations and simplifying the energy recovery part of this formula.

Of course, the provision of a formula to calculate the potential loss of quality when recycling material (“down cycling”) cannot prevent its misuse. While some guidance is provided on how to calculate the quality factor, further specifications and requirements should be developed in the product-category and sector-specific pilot tests.

Regarding the selection of impact assessment methods, it must be recalled that the objective of the PEF and OEF is to enable the assessment of a comprehensive set of environmental information for decision support purposes. Therefore, the PEF and OEF use a broad set of impact categories, including all midpoint methods according to the ILCD Handbook that

are recommended with levels I, II and III (EC 2011). The ILCD Handbook has five categories: the three levels of recommendation (I, II, III), Interim (not recommended) and not even mentioned (not recommended). So, while recommendation level III is the worst of the recommendations and is to be used with caution, it remains a recommendation by the Commission that should be used to ensure a comprehensive picture and to avoid the unintended shifting of burdens.

The evaluation procedure up to the recommended methods of the ILCD Handbook included a broad analysis of existing approaches (EC 2010a), setting requirements for LCIA methods (EC 2010b), and was based on input from experts and consultation processes. The process started in 2008 and considered only methods which were available up to early 2009. A total of around 150 characterisation models were identified belonging to 12 different LCIA methods (EC 2010a). Of these, around 90 models were shortlisted for further analysis (Hauschild et al. 2013). Obviously, it is a matter of opinion as to whether the right selection was made, and it can be acknowledged that some of the recommended methods (e.g. on water use) have meanwhile become outdated. The process of revisiting some of the methods, including water use, has started and will end when the 3-year pilot tests are completed.

The underlying principle of the eco-scarcity method for water use (Frischknecht et al. 2006) belongs to the family of the withdrawal-to-availability ratio midpoint methods. More recent methods such as Ridoutt and Pfister (2010), Pfister et al. (2009) and Milà i Canals et al. (2009) follow a similar approach and were mentioned as potential candidates. However, they could not be included in the original method comparison which formed the basis for the recommendation for timing reasons. While it is likely that better methods will be identified in the ongoing revision, as of today, no clear international consensus on a recommendation seems to be available, e.g. the related activities of the UNEP SETAC Life Cycle Initiative are likely to produce final results towards the end of 2015.

We agree that the toxicity impact categories have higher uncertainties than most of the others (e.g. Pant et al. 2004). This is reflected in the level II or III for some chemical groups. The uncertainties were seen as being too high for the seawater eco-toxicity calculation, so no method could be recommended. However, USEtox was seen as being sufficiently elaborated and robust to reach a level of recommendation to be used for decision support regarding human toxicity and freshwater eco-toxicity. Of course, decisions are a lot more straightforward if toxicity aspects are not included, e.g. when assessing the replacement of incandescent light bulbs with sources of light that are much more energy efficient but contain mercury, or when deciding whether common one-way batteries are preferable over rechargeable accumulators that contain heavy metals, or when evaluating the use of pesticides in agriculture

to increase yields per hectare. But does the a priori exclusion of toxicity aspects lead to less uncertainty regarding the assessment of environmental performance? Does it lead to better decision support? Even if toxicity aspects were taken out of the EF assessment (for example as kind of “additional environmental information” based on comparative environmental risk assessment), they would eventually need to be re-integrated and weighed against the results of an EF assessment in order to provide meaningful decision support. To our understanding, the rejected toxicity impact categories fulfil the requirements on the selection of impact categories as described in ISO 14044 Sections 4.4.2.2. and 4.4.5, e.g. they are supported by international organisations like UNEP and SETAC and have gone through a rather thorough scientific and stakeholder consultation process.

As always, the difficulty lies in finding the right balance, but according to the precautionary principle, scientific uncertainties should not prevent us from taking action to better protect the environment and health (Harremoës et al. 2001).

For freshwater and seawater eutrophication, the ILCD and EF methods are in fact the same as those preferred by Professor Finkbeiner and used in ReCiPe. However, ReCiPe does not cover terrestrial eutrophication. Only for terrestrial eutrophication, the method based on the accumulated exceedance is recommended. We doubt that the exclusion of aspects of terrestrial eutrophication would lead to better informed decisions.

For acidification, the CML method recommended by Professor Finkbeiner was not seen as being the most suitable even with its developer (CML) being one of the supporting contractors.

In general, we would like to reiterate that throughout the entire 3-year pilot phase, there will be several rounds of consultation and possibilities for expert input (as communicated in the Commission's website, the dedicated pilot project wikipages and in the Environmental Footprint Steering Committee⁵). A technical advisory board of experts has already been formed with the objective of investigating technical and methodological issues and of providing their opinion to the EF Steering Committee during the 3-year pilot phase. There will be plenty of room to discuss all the different elements of the methods and the pilot phase objectives.

Any necessary changes to the PEF and OEF methods will be implemented at the end of the 3-year pilot phase, based on the outcomes of the pilots themselves, the consultation process and a final evaluation from a policy perspective.

⁵ For details on how to register, see http://ec.europa.eu/environment/eussd/smgp/pdf/Wiki_reginstr.pdf

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