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LCA news
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For your Diary

Over the past years we have developed a schedule of two major LCA meetings annually. The first meeting is part of the Annual Meeting and focuses on methodology development. This year, the meeting will be in Copenhagen on 25-28 June. The platform sessions will cover:

- working group activities
- impact assessment - general
- impact assessment - energy
- LCA and ecolabelling.

In case you have not yet registered for the Copenhagen meeting, contact DIS Congress Service Copenhagen at fax +45-4492-5050.

Focus in the second meeting is on case studies. The Third Case Studies Symposium will take place in the Sheraton Airport Hotel, Brussels, 28 November 1995. Organisers are L. Grisel and C. Pesso. Further information, including a call for abstracts, will be published in the next issue of this newsletter. The meeting will have a new format that will include -for each contribution - a 2-3 page summary, a 5-minute presentation of results, a poster and a discussion session. This format has been tested in other meetings and was found to be more informative and to provide more room for discussion. Contributors will be asked to submit the summary ahead of the meeting; each delegate will receive a copy of the set of summaries.

Please note already now the date and look out for the next issue of this newsletter.

LCA Back on Track But is it one track or two?

Recently letters to LCA News first suggested that LCA is "losing its way" (R. Perriman, January 1995) and later that LCA is "back in its track" (H. Brunn, March 1995). This debate relates to the methods that are in development for impact assessment within LCA. In this paper, we suggest that this debate results from a dichotomy in what different practitioners expect from LCA. In addition we describe the current confusion over the name "impact assessment" and suggest improved terminology.

Perriman argued that whilst it might make sense to add up all lifecycle emissions that contribute to global-scale environmental effects (e.g. ozone depletors) and then convert them using an equivalency factor, there is no justification for doing this for local and transient impacts. Local impacts depend on local concentrations and local conditions. Emissions will have an environmental effect only if the concentrations are above the NOEC (No-Observable-Effect-Concentration). Adding up all lifecycle emissions that contribute to local scale effects gives no information as to whether thresholds will be passed in individual locations, and therefore whether any actual effects will occur.

This argument is, in itself, valid. That the debate continues none-the-less (H. Brunn, March 1995), we submit, is due to the different aims and objectives of LCA Impact Assessment (LCIA).

The Twin Tracks of Lifecycle Impact Assessment.

We can distinguish at least two different approaches which attempt to assess impacts within LCA.

"Less is better"

This reflects the current LCIA methodology development, as described in the SETAC Code of Practice (Consoli et al. 1993). Each resource use and substance emission is summed up across the whole lifecycle. These are then aggregated with other resource uses and emissions contributing to the same environmental burden category, using substance- and category-specific weighting factors. The approach is represented in Fig. 1.

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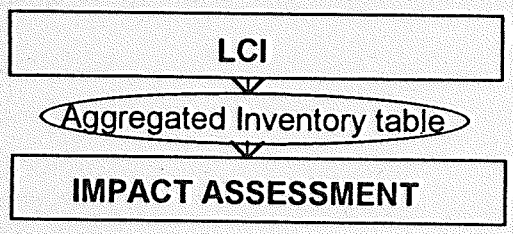

Fig. 1. "Less-is-better" approach

This approach assumes that all emissions are relevant on the basis of their intrinsic hazard characteristics, whether above or below the NOEC threshold ("less is better"). It does not give a realistic prediction of the actual environmental effects that can, or will, occur. It is a comparative approach which looks at the difference in resource use and emissions between options, rather than any evaluation of likelihood of actual effect or environmental harm. It employs a simplified interpretation of the inventory results, based on a global analysis.

"Only above threshold"

Alternatively, one can seek to discern whether actual environmental impacts occur from the system. An LCI can be used to locate the operations which produce the most emissions. However, other tools and information must be used to estimate exposures, to predict surpassing of thresholds and to monitor for effects. Only if thresholds are surpassed are the emissions taken into account. The structure of this approach is shown in Figure 2. Whilst this approach may use LCI, it relies upon the use of other tools, particularly risk assessment (RA), but also environmental impact assessment (EIA) and environmental monitoring (EM) (White et al.).

Versus the "less-is-better", the "only-above-threshold" approach has the distinct advantage to be able to identify whether there are likely to be any real environmental effects occurring related to the processes which are part of the product system.

There is a trade-off between the two approaches in accuracy and practicability.

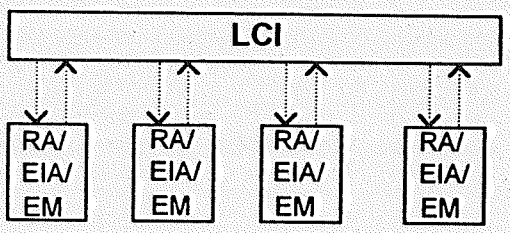

Fig. 2 "Only-above-threshold" approach

The advantage of the "only-above-threshold" approach is accuracy of prediction, since it only considers emissions that cause actual environmental effects. It is, however, limited by the complexity of applying it on a macro scale. For "only-above-threshold" it is necessary to obtain data from sites in relevant systems. While many of these data are available from regulatory compliance requirements and environmental monitoring, generally it will be necessary to gather additional data. More fundamentally however, the surpassing of thresholds, for a number of reasons, cannot be linked in a quantitative way to the functional unit of the LCI.

The "less-is-better" approach has an advantage in that it is simpler to use, and the calculated "environmental burdens" can be related in a quantitative way to the functional unit of the LCA. It has clear limitations, however. It provides a worst case scenario, since it implies that all emissions take place at sites which are sensitive to the substance concerned. It may therefore include irrelevant (or at least less relevant) emissions, which will not be distinguishable from relevant ones. This could misguide improvement measures or policy-making.

While "less is better" fits in the current LCA structure, there remains a need to demonstrate its added value over that of a Lifecycle Inventory alone. Such added value may occur in complex strategic comparisons. Examples include waste management options, overall energy strategies, but also product and service systems. What are needed are case studies demonstrating this added value and how the results can be used in sound decision-making.

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Terminology - let's say what we mean.

At least part of the current confusion is caused by the use of the word "impact", which means different things to different people. In RA and EIA an impact implies an actual environmental effect that is measurable. Since current "impact assessment" within LCA uses the "less-is-better" approach, it will include both emissions that do have actual effects, and those that do not (where thresholds are not exceeded). Therefore, using the term "impact assessment" here is a confusing misnomer. There has been an attempt to differentiate between the two by calling "less-is-better" results "potential impacts", but this has not been able to remove the confusion. We propose that the term "impact" be dropped altogether in this context. The term "lifecycle impact assessment" would then be replaced by "inventory interpretation". This would lead to the structure shown in Figure 3. One track follows the traditional route of impact (i.e. risk) assessment, but goes outside the current LCA boundary; the other track follows the current LCA approach but is not an impact assessment.

Since different LCA users have differing expectations, it is not surprising that they are going along different tracks. This dichotomy of approaches may account for the recent lack of progress in the development of agreed LCIA methodology.

We have tried to identify the branching point and the destinations to which both tracks are heading. A more complete publication on this subject is in preparation. We hope this will clarify where LCA has reached so far, and will help progress in the future.

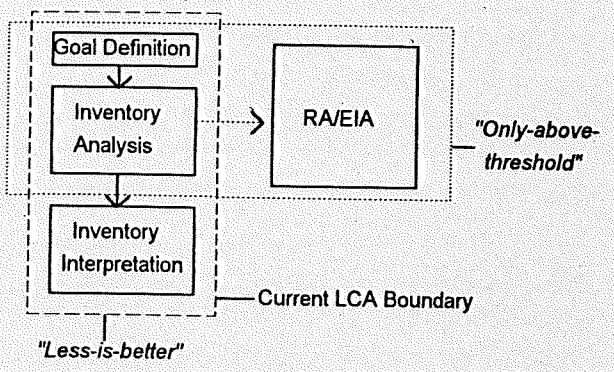

Figure 3. Relationship of different approaches to current LCA structure.

- Brunn H. *Putting LCA back in its track!* LCA-News, 5(2) 2-4 (1995).
- Consoli et al. *Guidelines for Lifecycle Assessment: A Code of Practice.* SETAC (1993).
- Perriman, R.J. (1995) *Is LCA losing its way?* LCA-News, 5(1) 4-5 (1995).
- White et al., (In Press) *Environmental management in an international consumer goods company.* Resources, Conservation and Recycling (1995).

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Experts need Experts' Judgement: Fate in LCA Impact Assessment

Emission quantity or emission flow in LCA impact assessment? A wrong question as soon as steady state is assumed !

In the impact assessment step of an LCA, much discussion has taken place about the need to consider emission fluxes instead of emission pulses or emission quantities. Assies (1) suggested defining emissions of the inventory table per unit of time, whereas Heijungs and Guinée (2,3) introduced the concept of a reference substance in order to suit emission pulses. This question is directly lined to the relationship between an emission and the corresponding increase in concentration.

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