

Title:

Sustainable Management of materials products and services –
An Approach to Strategic LCA

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Main text

Background

There is no such thing as a “sustainable” or “harmless” substance, material, product or service. From a sustainability perspective, the characteristics of practices must be evaluated in relation to the full social, ecological and economic impacts throughout the whole life cycle. Sustainable *management* of materials, products and services follows from the full context of sustainability. This is not captured by a traditional Life Cycle Assessment (LCA), neither is the strategic business perspective (see figure 1).

INSERT FIGURE 1 HERE

Another drawback of traditional LCA is that it is reactive, focusing on some known environmental impacts at a relatively detailed level. Potential future not yet described environmental problems are not addressed. This gives us a challenge to find some general underlying causes to the many diverse environmental problems that emerge now and in the future.

Goal and Scope

This paper outlines the need for a more structured and simplified Life Cycle Assessment approach – called Strategic LCA. It builds on a previously published and peer-reviewed methodology using backcasting from basic principles of socio-ecological sustainability. The idea is to simplify, not by excluding parts of the traditionally covered dimensions in this field, but by a new way of setting system boundaries.

An Approach to Strategic LCA

It is suggested to start sustainability analyses of materials, products and services from a full sustainability perspective large enough in time and space to cover all possible impacts on the global level, now or in the future. Rather than applying boundaries related to geographic regions, or fields of expertise, or particular impacts, all issues found to be relevant as regards achieving sustainability are taken into account. To that end, we use four previously published generic principles of socio-ecological sustainability for the scrutinizing of materials, products and services. After this initial bird’s eye assessment has been completed, ‘hot-spots’ are selected that may need further investigations and quantitative assessments before a relevant conclusion can be drawn (see figure 2). Consequently this new approach does not replace more detailed quantitative analyses such as traditional LCA, but provides context to an efficient use of such.

INSERT FIGURE 2 HERE

Since the definition of sustainability is done on the basic principle level, there are no constraints in time and space. All options are reviewed according to their abilities to act as stepping-stones towards a situation that is sustainable on all geographic levels regardless of how far into the future this situation may be achieved.

Conclusions

The new approach for Strategic LCA is expected to facilitate strategic planning for sustainability in several ways:

- First of all, starting with a qualitative overview increases the chances of including all systems relevant for sustainability into the analysis, while the socio-ecological principles for sustainability will “filter” out the major issues, keeping the complexity at a minimum.
- Furthermore, by mapping the large picture at start the risk of sub-optimisations are reduced. The sustainability analyses can thus be focused in those areas that are most urgent, giving organisations the most of their research efforts.
- Strategic LCA is expected to facilitate for sustainability analysis teams to make the most of their combined competence, by giving them a shared mental model for the working process and the sustainability goals.
- The a well structured overview and shared mental model is also a way of bridging the gap between experts and strategic decision makers, improving the chances of the methodology to have a real impact on business practices.

Upcoming research

The paper represents the beginning of an international research program where this new combined LCA tool will be developed into support systems for strategic evaluation of materials, products and services. These support systems should apply both a Life Cycle perspective and knowledge within the domains of system dynamics and industrial ecology.

Related work

Ny H., Broman G., MacDonald JP., Yamamoto R., Robèrt K.-H., Sustainability constraints as system boundaries: an approach to making life-cycle management strategic. *Journal of Industrial Ecology*, 2006, vol 10, issue 1.

Figures

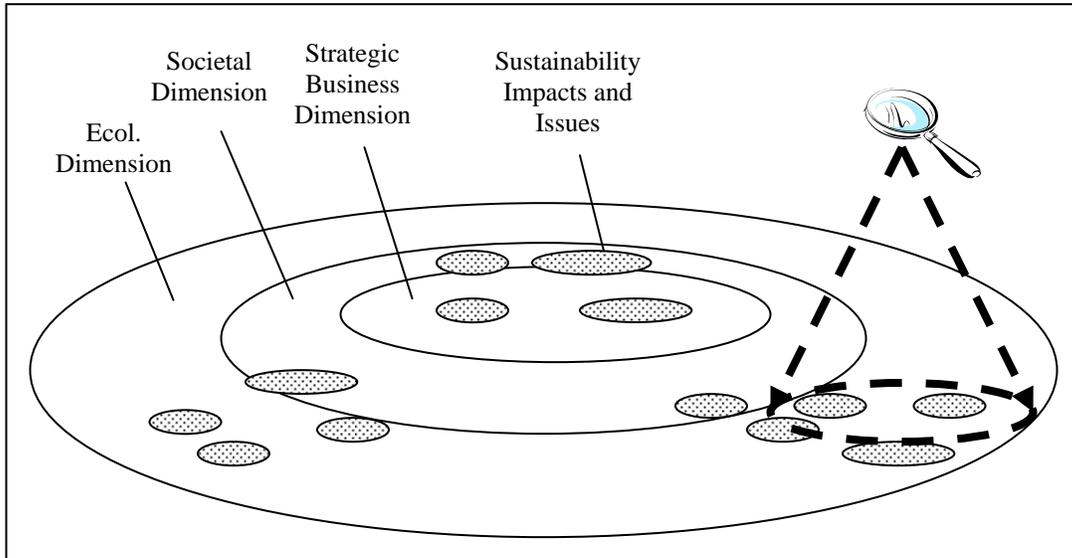


Figure 1. Traditional LCA – Known Issues as System Boundaries. The circle areas represent the essential business, societal and ecological dimensions, and the grey areas represent ‘hot-spots’ within those dimensions i.e. impacts and issues that are essential from a sustainability perspective. Traditional LCA focuses on some known environmental impacts and issues, of different sizes and magnitudes (e.g. waste issues and emissions of greenhouse gases). Sustainability problems related to the business and societal dimensions and yet unknown future environmental problems are therefore omitted.

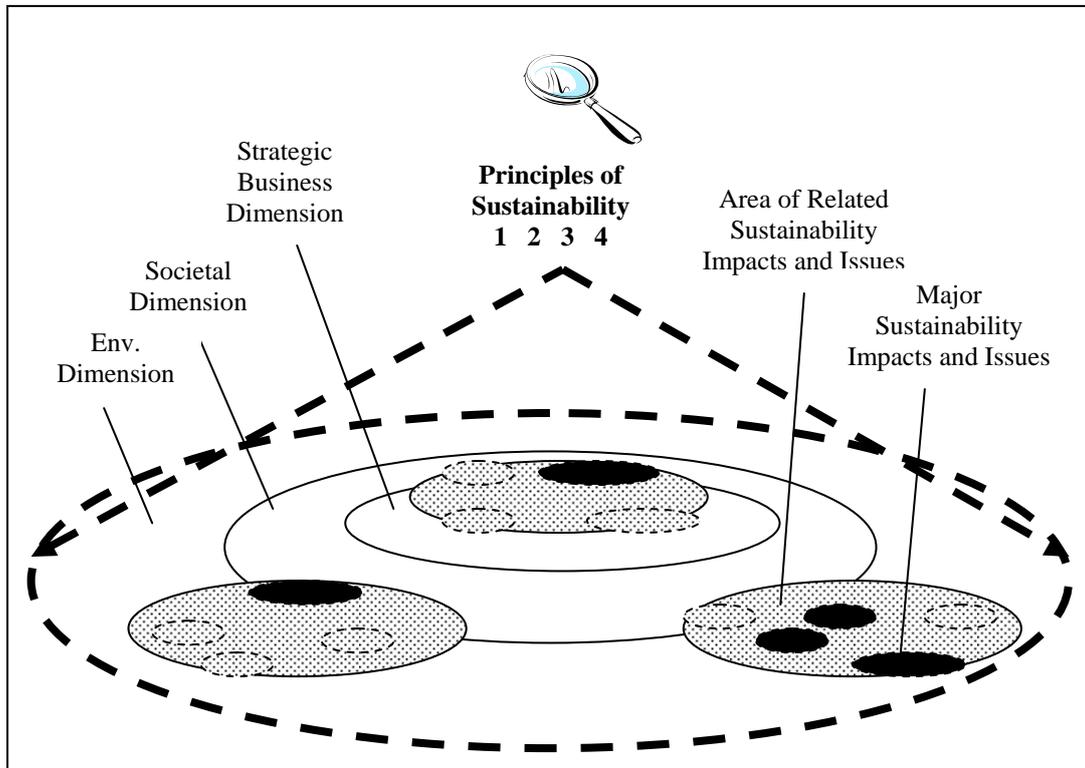


Figure 2. Strategic LCA – Principles of Sustainability as System Boundaries. This methodology starts with a qualitative overview of the whole system through the lens of the four Socio-ecological Basic Principles for Sustainability. The large grey areas denote areas of related ‘hotspots’ i.e. impacts and issues found to be in conflict with those principles and thereby essential for ‘winning’ in the system. Some of these impacts and issues may be sufficiently described from the overview, whereas others (the black areas) may need more detailed studies like quantitative LCAs. The dotted (and black) areas are the same that were shown in figure 1 but now they are put in context. Some ‘grey’ areas may not need a quantitative analysis, e.g. if the initial qualitative analysis reveals a strategic need to completely phase out a flow, regardless of its exact size.