Regional LCA in a global perspective

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REGIONAL LCA IN A GLOBAL PERSPECTIVE

Colophon

Regional LCA in a global perspective
A basis for spatially differentiated environmental life cycle assessment

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Preface

When I started writing this PhD thesis I had already been working on LCA for a number of years. I contributed to the development of LCA methodology as well as to a number of LCA case studies. During these years, I got well acquainted with this tool, both with respect to its strengths and with respect to what I considered its limitations.

The strengths of LCA, as I saw them, were in its 'looking behind the obvious' with respect to environmental impacts of products over their entire life cycles, in accounting for the a large spectrum of environmental impacts, in describing the connection between environmental interventions on the one hand and products on the other in an exact manner, in estimating the quantitative relationships between environmental interventions and their impacts, and in preventing dilution from being considered as a solution for pollution. The quantitative aspects of LCA intrigued me: how could we get it right? And what is 'right'?

The limitations that struck me were the points at which I felt we were not yet right in our quantification. These points mainly concerned LCA toxicity assessment: our lack of a measure for 'actual' toxic impacts (beside the potential ones), the fact that metal emissions heavily dominated the toxicity impact scores in LCA, while experts stated this corresponded in no way to their relative environmental harmfulness, and the fact that the assessment of environmental impacts did not account for regional differences, even though the range of processes of a single product life cycle might span the world. These were the three aspects that I felt I should work on to get them right, or at least more right. I was lucky to get the freedom to address all these issues – and one more – in a PhD-project on environmental fate modelling in the context of LCA toxicity assessment.

In 2006, I was involved in a project on LCA normalisation, a subject which I had only had superficial attention for, despite its quantitative character. While working on this project, I discovered an interesting methodological issue, and felt we should adapt our methodology and introduce a new principle, concerning the definition of the reference emissions. Again, I was lucky that there was support for my ideas to include this principle in our normalisation study, and to include the normalisation study in my PhD thesis. With this, I broadened the scope of my thesis from mere LCA toxicity characterisation to life cycle impact assessment as such, be it that the overall focus is still on toxicity assessment. The global character links the different aspects together.

LCA toxicity assessment cannot replace human and environmental risk assessment, not even in a spatially differentiated form. Risk assessment tools are designed for the assessment of ambient concentration dependent effects, which are not part of LCA. With this, risk assessment tools can help assess whether processes in the product life cycle meet environmental standards, and whether they can be considered as environmentally responsible. What LCA toxicity assessment can add is an answer to the question which product alternative is optimal with respect to overall environmental burdening. Spatial differentiation can help to model this as well as possible.