

Letters to the Editor

ISO 14042 Restricts Use and Development of Impact Assessment

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The International Standards Organization (ISO) is currently developing a series of standards for Life Cycle Assessment.¹ We feel compelled to comment on a committee draft for an international standard for Life Cycle Impact Assessment (LCIA) ISO/CD14042.3, because it could impede further progress of the field. As research scientists we are currently developing impact assessment methods for toxic substances.² We have not previously sought an active role in the drafting of an LCIA standard, because we felt that it was too early to develop such a standard and that by developing a specific impact assessment method we could make a more valuable contribution. We are concerned, however, about the current committee draft (CD), which contains a number of provisions that would adversely affect the further development of assessment methods and unduly limit the use of impact assessment.

Our comments can be grouped in three parts:

1. One on the issue of comparative LCAs (clause 9 of the CD),
2. the second on the framework underlying the whole draft,
3. the third on the stringency of the provisions in the draft standard. Let us discuss these in turn.

1 The Current Language Inappropriately Restricts the Public Use of LCIA

The committee draft clause on "comparative assertions" (Clause 9) puts serious constraints and limitations on information released to the public and is in conflict with the spirit of open public discussion and information access that is part of the legal tradition of many democratic societies, especially the public Right-To-Know provisions in several U.S. environmental statutes. Clause 9 denies the public access to expert judgment and information that is based on imperfect but valuable understanding of the science in certain impact categories. Since our understanding of environmental processes is hardly ever perfect, Clause 9 is a severe limitation that will prevent the publication of comparative LCAs in all but a few trivial cases. We suggest that Clause 9 should be dropped from the standard. At a minimum, following provisions should be changed:

¹ ISO 14040 lays out on the principle and framework for LCA, and the draft international standard (DIS) 14041 defines the LCA steps of goal and scope definitions and inventory analysis. The standard for Life Cycle Impact Assessment is currently at the stage of the third committee draft and therefore refer to as ISO/CD14042.3.

² See [1,2] and <http://www.scoregard.org> for samples of our work.

"LCIAs shall not provide the sole basis of comparative assertions of overall environmental superiority or equivalence." Other tools have shortcomings similar to those of LCIA identified in Clause 8 of the draft, including that they are based on value choices, use simplifications, and are constrained by the limits of our scientific understanding of natural and industrial processes. Given these imperfections, we do not see any reason why the use of expensive and valuable information gained through an LCIA should be precluded if other analyses have not been conducted. This would, in fact, constitute an imprudent use of resources.

"As a minimum the category indicators shall natural science based, i.e. modeled on the basis of a known additive environmental mechanism and/or on empirical observation." This language is ambiguous and it is not clear to what degree simplification and value judgments are permitted. As the CD asserts earlier, simplifications and value judgments are a necessary part of impact assessment. Known mechanisms are hardly ever additive and often contain feedbacks and non-linearities (e.g. global warming). Depending on the interpretation, this sentence may rule out the use of any existing characterization method.

"Weighting across the impact categories shall not be used for comparative assertions ..." Valuation, or weighting, is conducted because it adds valuable information and judgement that are the result of educated deliberation. Psychometric research in decision analysis has shown that in absence of interpretative aids decision makers tend to assign equal weight to all reported criteria, which – for LCIA – would be category indicators ([3], p. 94f). This can lead to highly misleading conclusions and can constitute (intentional or accidental) misinformation of the public. This is especially of concern if a normalization is not conducted and the impact categories are not pre-defined.

We share the committee's concern about the misuse of LCIA to make misleading product claims. These concerns should be addressed by requiring the disclosure of LCIA information, including important assumptions, scientific methods, value judgments, and data used for impact assessment. The public will be prudent enough to interpret LCIA with caution, as it does with risk assessments or environmental impact statements.

We believe that ISO should not limit the public's access to information or expert judgment and that ISO should not preempt or discourage the further development of impact assessment, especially in the little-researched areas of normalization, weighting, and interpretation. An open discussion of LCA and its re-

sults is necessary for the social processes that would lead the public to accept certain judgments as reflecting its values. The provisions of clause 9 would impede the publication of LCAs and hence prevent such a debate.

2 If LCA is Used as a Tool to Support Decisions About how to Protect the Environment, it Should be Based on a Framework that Integrates Scientific and Normative Elements

The committee draft for ISO 14042 is based on a framework that treats LCA as a scientific measurement instrument. The inevitable presence of a normative element is viewed as undesirable and there is a subsequent lack of strategy about how to address normative questions in LCA. This is reflected in formulations about the undesirability of value judgments and in the view that natural science is the only appropriate basis for impact assessment. This tendency is apparent throughout the draft, especially in the discussion of the limitations of LCIA, in the call to minimize value choices in categorization, and in the heavy emphasis on natural science to the exclusion of other sciences.

In our own work, we have found this framework to be inappropriate, because it does not reflect the purpose of LCA. LCA is done for a purpose. The value-based objective of protecting the environment needs to be included as central part of the analysis and drive the data collection effort both in inventory and impact assessment. Value judgments are not necessary evils that "should be minimised" (p. 8) but the cause and motivation for the analysis; values must be properly included if LCA is to serve its purpose. Value judgments are present at all phases of LCA, not only the impact assessment. We agree with the draft standard that value judgments should be appropriately identified, discussed, and published.

We view LCA as a tool that collects, organizes, and evaluates scientific information useful for decision making. LCA is more an information management tool used in the management sciences or policy analysis than a tool of the natural sciences. A decision-analytic framework needs to be developed which systematically integrates scientific analysis and value judgments [5].

The language used by the committee draft reflects the natural science bias and is inappropriate for the decision support tool. For example, instead of characterization, the draft uses the term "modelling of category indicators" (p. 10). In the environmental sciences, a model is a (mathematical) representation of an actual natural process. As OWENS et al. [4] have noted, characterization invariably combines value judgments and science. Therefore it should be viewed as an assessment or evaluation, not as modeling.³

³ The draft standard also uses this term "category indicator" instead of the older "equivalence." Indicator is a very general term that is used for quantitative (leading economic indicators) and non-quantitative (indicator species, indicator lamp) measures. Equivalence is a better term for the characterization methods that have been developed to date, because it refers to a cardinal measure needed to scale mass releases and it makes clear that some sort of conversion is involved that does not justify to assume perfect equality. (Energy carriers are often aggregated in terms of tons of oil or coal equivalents. One oil equivalent of different energy carriers has the same energy content, but it does not imply that energy carriers are equal in usefulness, economic value, or the content of toxic trace elements.)

Values are not arbitrary or outside the scope of scientific analysis. The committee has chosen to ignore insights from academic disciplines that address value questions, ranging from decision analysis and environmental economics through psychology to ethics. The LCA community needs to find a better way to integrate the (natural-scientific) analysis of the data and processes of environmental degradation with a value-based judgment process in order to evaluate different environmental impacts. In the end, LCIA should help us to decide whether and how much we should be concerned about certain emissions or resource uses connected with a product, and this decision cannot be made by science alone.

The necessity of value judgments in LCA should therefore not be viewed as a liability or a factor limiting the usefulness of LCA but as the natural characteristics of a decision support tool that addresses such complex problems as environmental degradation. The presence of value judgments, however, makes it necessary to involve stakeholders in the development of assessment methods and to open assessments to public scrutiny.

3 The Current Draft Closes too Many Doors

Impact assessment is a recent area of research that is at an early stage of development, as we know from our experience in developing LCIA methods for our own purposes and jointly with large U.S. corporations. At this stage, it is important to open doors, to try out different approaches and methods. ISO/CD 14042.3 contains a number of strong provisions that limit this experimentation and burden the analyst with documentation requirements that are not part of current LCA practice. We encourage the committee to postpone the use of such strong language to a later stage when LCIA has become better developed and established.

We have submitted our comments to the committee in charge of drafting standard. One of us (HERTWICH) attended the negotiations for the next draft of the standard and is sorry to report that there has been no significant improvement in the directions suggested here. We welcome support by other researchers and LCA practitioners in our effort to change the provisions of the standard so it will become more conducive to the further development and increased use of impact assessment.

4 References

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