

Global guidance principles for life cycle assessment databases: development of training material and other implementation activities on the publication

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Abstract

Purpose The paper introduces the publication on “Global Guidance Principles for Life Cycle Assessment Databases”; it focuses on the development of training material and other implementation activities on the publication.

Methods The document is the output of the “Shonan Guidance Principles” workshop. The publication provides guidance principles for life cycle assessment (LCA) databases; this includes how to collect raw data, how to develop datasets, and how to manage databases. The publication also addresses questions concerning data documentation and review, coordination among databases, capacity building, and future scenarios. As a next step, the publication is used to prepare training material and other implementation activities.

Results The publication was launched at the LCM 2011 Conference. Since then outreach activities have been organized in particular in emerging economies. Further developments with regard to the guidance principles are foreseen as

part of a flagship project within phase 3 of the Life Cycle Initiative. Training material is being developed that will include how to set up databases and develop datasets. The topic has been taken up by United Nations Environment Programme (UNEP) in its Rio+20 Voluntary Commitments: UNEP and Society of Environmental Toxicology and Chemistry (SETAC) through the UNEP/SETAC Life Cycle Initiative commit to facilitate improved access to good quality life cycle data and databases as well as expanded use of key environmental indicators that allows the measurement and monitoring of progress towards the environmental sustainability of selected product chains.

Conclusions The adoption of the “Global Guidance Principles” publication as a de facto global standard is expected to facilitate the work of database teams, especially, in developing countries, and the collaboration in regional networks. These efforts are supported by the development of training material and other implementation activities.

Keywords Capacity building · Databases · Datasets · Global guidance · Life cycle assessment · Rio+20 voluntary commitments

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1 Introduction—the process

The process behind the publication “Global Guidance Principles for Life Cycle Assessment (LCA) Databases”, as described in a previous corner published in the International Journal of Life Cycle Assessment (Sonnemann et al. 2011), started back in 2007 when the International Life Cycle Board agreed that the United Nations Environment Programme (UNEP)/Society of Environmental Toxicology and Chemistry (SETAC) Life Cycle Initiative should produce a manual on

developing a country's life cycle inventory data for energy systems as a starting point for a LCA database. However, the manual was never finalized due to the significant amount of diverging comments from LCA experts. Nevertheless, the need for guidance on LCA databases did not disappear as discussions at various forums highlighted the presence of a range of contentious issues concerning the development of LCA databases and datasets. These issues required clarification and in some instances agreement among varying practices before a guidance document could be created. In particular, emerging economies and developing countries need global guidance for their life cycle assessment database efforts to guarantee an efficient allocation of resources to ensure reliability and quality, to avoid duplication of efforts, and to ensure comparability and usability between regions.

It was decided that the best way to proceed was to organize a workshop, bringing together LCA experts to address the topics of concern, reaching agreements and conclusions to be included as guidance principles in a publication. A Steering Committee equally composed of representatives from governments, business and industry, and non-government organizations and academia was formed to run the process and lead the organization of the workshop and the publication. Moreover, the Steering Committee with members from developed and developing countries served to define the topics to be addressed during the workshop, to provide an initial draft structure for the document, and to guide the authors in shifting some of the topics between chapters.

2 Methods—the workshop

A 5-day Pellston workshop was held early February 2011 in Shonan, Kanagawa, Japan. A SETAC Pellston-type workshop brings together around 50 invited experts for an intensive, week-long workshop, where, through the use of working groups and plenary sessions, specific topics are addressed and the discussions and decisions incorporated in the final workshop publication. Pellston workshops have a long, successful track record, especially in the area of LCA and this format was therefore deemed ideally suited for the process.

The workshop aimed to achieve an agreement on common practice with regards to LCA databases, striving towards consensus on certain issues, and defining a way forward for addressing the remaining challenging matters later on as part of the process. The focus was on the development of guidance for Life Cycle Inventory (LCI) databases, without being sector-specific and not entailing the development of a common database format.

Forty-eight participants from 23 countries from around the world attended the workshop, drawn in a balanced way from governments, industry, academia, and consultancies.

The participants were organized into various work groups (WGs), each addressing specific aspects of the topic and responsible for the related chapter in the final workshop publication. An overarching “Integration and Cross-Fertilisation” WG was also established to ensure efficient communication and exchange of knowledge between the various WGs.

3 Results

3.1 Key recommendations of the publication

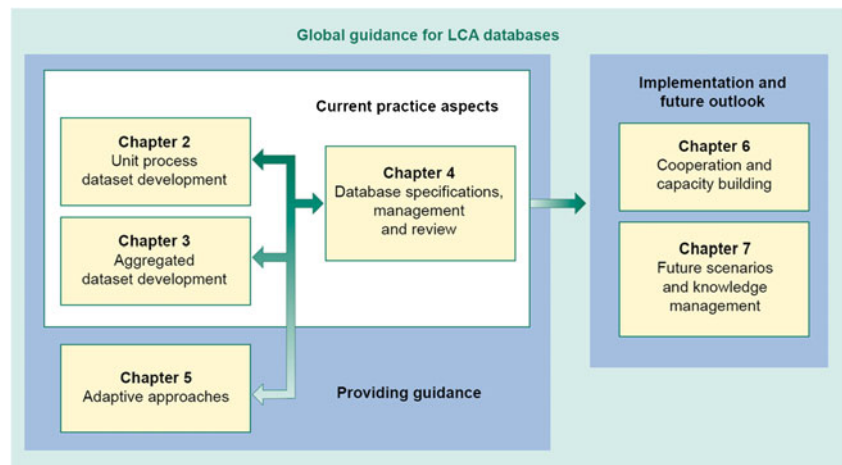
The publication “Global Guidance Principles for LCA Databases: A Basis for Green Processes and Products” (Sonnemann and Vigon 2011) is an account of the discussions, agreements reached, and future roadmap decided upon during the workshop. Other than editorial changes, the authors were not allowed, according to Pellston workshop regulations, to add or change any text after the workshop. The publication did undergo a comprehensive peer review process by SETAC and the UNEP/SETAC Life Cycle Initiative.

The publication was launched at the LCM 2011 Conference in Berlin in August 2011 and consists of eight chapters and four annexes (see Fig. 1). The complete table of contents contains the following chapters: (1) The context for global guidance principles for life cycle inventories; (2) Development of unit process datasets; (3) Aggregated data development; (4) Data documentation, review and management; (5) Adaptive approaches; (6) Cooperation and capacity building; (7) Outlook: future scenarios for knowledge management; (8) Integration and synthesis; Annex 1, Glossary; Annex 2, Peer review report; Annex 3, List of background literature; and Annex 4, List of public stakeholder consultation events. Some of the key results and recommendations presented in the publication include:

Current practice aspects:

- Data sourcing and data collection are critical elements in producing datasets that are consistent and exchangeable, collection of raw data and the creation of a dataset or datasets from those raw data requires a systematic and comprehensive process and expert know how.
- There is a need to maximize transparency whenever possible and to provide supplemental information and a review process when the aggregation of data/datasets cannot be avoided.
- A central position in creating and managing datasets is recommended for data documentation and review elements.
- There is strong support for the view that only complete and verifiable documentation makes a dataset. Detailed guidance is provided for quality metadata and other dataset documentation elements.

Fig. 1 Organizational overview and roadmap of the publication “Global Guidance Principles for LCA Databases: A Basis for Green Processes and Products”, nicknamed Shonan Guidance Principles



Database management:

- The Guidance Principles include a clear and meaningful differentiation of what does or does not constitute an “LCI database”.
- The primary target audience of the publication is database managers, who manage the data flow and the actors in the data supply chain.

Adaptive approaches:

- Various adaptive approaches, including environmentally extended input–output, hybrid, time-dynamic, and spatially-explicit approaches, were assessed according to their data-related implications, capabilities and constraints to answer questions about their usefulness, limitations, and connection to traditional or process-based data.
- Some consideration was also given to social and economic assessments, and associated data/database aspects, as complimentary to environmental LCA.
- The recommendations aspire to expand, and support with identified relevant data, the range of (emerging) questions accessible by LCA using adaptive approaches.

Scenarios—outlook for the future

- Active anticipation of trends in information management are essential to shape users’ expectations regarding data, software functionality and interoperability in ways that will alter the scope of what can be done with LCA data.
 - Three scenarios are described in the publication, differing in their characteristics, for example degree of central data management, mechanisms of information sourcing, approach of the review, extent of linking, etc.

- The authors’ intent was not to predict the future, but rather to allow the LCA community to be pro-active in developing systems and networks to maximize access to high quality data.

3.2 Outreach activities on the publication

Following the launch of the publication, presentations were held and forums were provided to present and discuss the process, workshop, and document. Outreach activities have been organized in particular in emerging economies. Initial events have been run in Chile at the national level and in Tunisia for the Southern Mediterranean region in December 2011. A launch of the Shonan guidance principles in Japan for the Asia-Pacific region were organized in January 2012. These activities were followed in June 2012 by two events back to back to the ISO TC 207 Plenary meeting in Thailand, one for the participants of the meeting coming from all around the world and one for the interested Thai audience. As a next step, outreach workshops were provided in India (August 2012), Brazil (September 2012), and China (November 2012). They were seen as a crucial basis for developing datasets and setting up databases in the quickly industrializing parts of the world. In all of these countries, there was a huge interest in learning about the Shonan Guidance Principles. In addition, a special training event on life cycle approaches for developing countries was organized in Paris in November 2012, which included a special session on databases. These different activities have facilitated to create a global awareness of the Global Guidance Principles for LCA Databases. The activities are to be continued in 2013. Up to now events have been planned in Africa, Eastern Europe and Middle East. UNEP, with the support from the European Commission is implementing a 3-year project “Integrating resource efficiency in international supply chains—enabling companies and consumers to benefit from information on life cycle environmental performance of products choices” which aims at developing capacities and promoting coordination on

LCA databases among other life cycle-based approaches based on the Global Guidance Principles for LCA Databases. For this project, the following countries have been prioritized: Brazil, China, India, Indonesia, Malaysia, Mexico, Russia, Thailand, Turkey, Chile, Egypt, Morocco, Peru, the Philippines, and South Africa.

3.3 Development of training material and capacity building activities

Further development of the guidance principles is needed so that they can be used in a practical way for training and other applications. To achieve this is one of the targets and actions identified for a flagship project within phase 3 of the Life Cycle Initiative. The training material content will include the topic of how to set up databases and develop datasets, in particular in the developing world. The topic has been taken up by UNEP in its Rio+20 Voluntary Commitments: The UNEP and the SETAC through the UNEP/SETAC Life Cycle Initiative commit to facilitate improved access to good quality life cycle data and databases as well as expanded use of key environmental indicators that allows the measurement and monitoring of progress towards the environmental sustainability of selected product chains (UNCSD 2012). Overall, this flagship project foresees the systematic implementation of the Shonan Guidance Principles to ensure that practice follows the guidance.

Regional- and country-based LCA networks are seen as important elements of this implementation strategy. They have already demonstrated their value for the organization of awareness-raising events on the Shonan Guidance Principles. Database managers are identified as central actors in the Shonan Guidance Principles. Therefore, establishing multistakeholder and multiregion collaboration worldwide among database managers that in general are part of a regional and country based LCA networks is seen as another key element of a global roadmap for capability development on the generation of consistent LCA data and the management of related databases.

4 Conclusions—next steps

As a result of the publication there are a range of anticipated benefits and future activities. Two priority components of the roadmaps moving forward include

the global coordination among LCI dataset developers and LCA database managers, together with data mining, and the use of the publication for capacity building activities worldwide. The adoption of the “Global Guidance Principles” publication as a de facto global standard is expected to support database teams, especially, in developing countries, and collaboration in regional networks, as well as assist with increasing consistency within the generation of consistent LCA data in developed regions. The publication might also facilitate an expanded marketplace for developing and managing life cycle inventory datasets and for the use of life cycle assessment databases for decision-making in the public and the private sector. Along with the further dissemination of the publication, training materials will be produced as well as courses conducted globally.

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The publication and the list of the Initiative’s partners can be obtained from the new UNEP/SETAC Life Cycle Initiative website at <http://www.lifecycleinitiative.org/>.