

The Life Cycle Initiative

LCIA Definition Study: Terms Of Reference

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1 Background, context and user needs

1.1 General aims of the Life Cycle Impact Assessment Programme

Within the Life Cycle Initiative, the LCIA programme will focus on the following tasks, which will be developed in order of increasing sophistication and with the option for generic application dependency:

- A consistent and encompassing flow diagram of environmental processes and Area of Protections (see Appendix 1 for definitions) enabling the choice of category indicators at different midpoint levels (like global warming potentials for climate change) and at endpoint level (like forecast indicators for impacts on human health in term of years of life lost).
- A default list of impact categories, possibly consisting of two sets; one at midpoint and one at endpoint (= physical damage) level
- Recommended practice regarding a set of category indicators
- Recommended practice regarding methodologies for the calculation of characterisation factors for the different impact categories
- Recommended characterisation factors for the different impact categories, to be included in a database on LCIA.

Recommended Practice: Practically, we are facing an interesting challenge: the need to bring together science and pragmatism, to obtain characterization factors and data sets that are scientifically defensible, relevant to the decision endpoints, and practical.

1.2 Existing and present efforts

The present programme will build on the ISO series of LCA standards, in particular ISO 14042 on Life Cycle Impact Assessment (LCIA) and the related Technical Specification 14047. Important predecessors of the present programme are the more than ten years of effort by SETAC in advancing LCA, in North America, Asia and in Europe. More specifically the working groups of SETAC-Europe on Life Cycle Impact Assessment have established a crucial basis for the identification of best available practice in this field. Also, the initiative builds on the ongoing national projects on LCIA, e.g in Japan, Denmark, US and on multinational initiative such as the OMNIITOX European project. The LCIA Programme will complement and strengthen these important international initiatives. It will be designed to avoid duplicating their goals and deliverables, addressing the remaining needs.

This programme starts here with the LCIA definition study, which is defined in the present document. First, the definition study objectives are defined. In a second step, we present a detailed description of how to achieve these aims, including a forum website. The expected results and deliverables together with the corresponding budget are finally presented.

1.3 User needs assessment

The field of life cycle assessment is facilitated and carried out by a wide array of different parties. The LCIA definition study will center on and start with user needs assessment. Specifically, the LCIA definition study will design the LCIA program by collaboratively involving representatives of, and inviting and reviewing widespread input from, each of these groups about their needs and concerns. "LCA stakeholders" include:

- Users of LCA results to make decisions within, and provide decision guidance and information to private sector, government (policy), NGOs and final demand purchasers (governments, companies, and consumers);
- Users of LCA data and software tools to conduct LCAs in private sector, government, NGOs and academia;
- Providers of LCA software tools, both for-profit and not-for-profit;
- LCA consultants;
- Academia (instructors, students, researchers)

Special emphasis will be given to specific needs for different impacts than the one typically applied in "OECD country LCAs", like e.g. erosion or biodiversity. Outreach to and involvement of stakeholders will be designed to ensure comprehensive representation geographically, economically, and organizationally. In addition, the entire process will be characterized by web-facilitated informational openness, both to and from all potentially interested parties worldwide.

2 Definition study objectives

The definition study aims:

- 1) To identify user needs for Life Cycle Impact Assessment
- 2) To provide a clear picture of the overall framework and of the impact categories (assessment endpoints) to address as high priority, including different impacts than the one typically applied in "OECD country LCAs", like e.g. erosion or biodiversity
- 3) To provide guidelines for the starting points, the decision-making framework (e.g. how to deal with time integration, spatial integration, population distribution, etc.) and guidelines for the identification of recommended practice.
- 4) To identify the main research needs and to produce a 2 years detailed plan, with a prospect of 4 years for the LCIA programme.
- 5) To identify worldwide experts from relevant fields, as potential candidates to ask for peer review, workgroups or task forces.
- 5) To identify case studies, and industrial partners, to test and improve the method feasibility.
- 6) To identify the links with the Life Cycle Inventory and Life Cycle Management programmes, including the relation of LCIA to sustainability indicators, which also include the economical and social dimensions of sustainability.

Starting with the transfer from different projects from different parts of the world (e.g. the Japanese National LCA project or EcoIndicators 99) and from results of the SETAC-Europe working group on Life Cycle Impact Assessment, the definition study will define to what extent existing approaches and databases can be adopted to meet the requirements of these deliverables and where there are gaps requiring further research. This procedure will be carried out in a very open process; involving worldwide stakeholders from private sector, academia, governments and NGOs.

3 Process: methods for collaboration, exchange, input & review

Work will be carried out according to the following complementary approaches:

- a) Workshops in conjunction with international LCA-related conferences which will be drawing a large audience (AIST workshop in Japan, Metals and LCA workshop, SETAC congresses, etc).
- b) Widely accessible Internet Forum periods, to enable worldwide participants to make proposals, suggestions and constructive criticism, especially enabling the participation of members of developing countries.
- c) A draft author team, which will collaborate via email and teleconferences to draft documents for wider review and comment, and which will synthesize feedback and input into final documents;
- d) A review panel, chaired by a chairman and a co-chair, which will review and comment on all draft documents and products of the DS. Panel membership will be designed to ensure breadth of representation and input. The review comments will be synthesized by the review chair and co-chair leading to change proposals. Peer Review is supervised by the scientific director to ensure independency from the LCIA Vice-director.

4 Work programme, actions and schedule

The work of the LCIA definition study will be carried out as follows:

The work will first concentrate on collecting user needs (deliverable 1, see section 6) and on elaborating the framework (deliverables 3). At the same time, additional information will be collected, on existing projects & experts and, in collaboration with the other programmes, on potential case studies/industrial partners. We will finally define the LCIA programme plan for 2002-2005 (deliverable 4).

After identifying user needs, an initial proposal for framework and for the programme plan is drafted by the author team. This proposal is submitted to ILCP members, to a worldwide Internet consultation and presented & discussed in workshops. It is then submitted to the review group. A final report is elaborated by the vice director staff and review team for presentation to the ILCP. The exact content and location of the different workshops will depend on the official starting date of the LCIA definition study

Action	Task, way of working	Starting points or documents	Deliverables	Timing
1a LCIA workshop I Demand side workshop (e.g)	Identification of user needs in an interactive workshop + questionnaire sent to partners Identification of people interested to contribute	Questionnaire, document on the demand side of the Life Cycle Initiative, OMNIITOX user workshops, contact with stakeholders from NGO and developing countries	List of potential members of draft author team, peer review group and working group members	Started
1b Kick-off of LCIA def. study			D1: (Deliverable 1): Report on user needs	Month 1
2 Creation of the interactive website	Central access through the main Initiative site;	Preliminary websites; For the interactive information exchange: webpage changes can be performed directly by scientific directors	D2: Operational forum	Months 1 and 2
3 Initial proposal on Area of Protection and overall framework	Survey of existing representation and impact categories → starting proposal on AoP. E-mail exchange + a short meeting linked to a conference or workshop	D1, the Japanese framework + AoP from SETAC-Europe. Start by determining the consequences of different representations of AoP on the list of impact categories and indicators (advantages and limitations of these representations).	Draft-D3: First proposal for AoP and Impact categories to be tested and discussed in workshop, including impacts relevant to non OECD country; first approach on the relation of LCIA to sustainability indicators	Months 2 and 3 *
4 1st worldwide Internet consultation	Obtain worldwide feedback and inputs ^[dw1]	D1 + Draft-D3	Change proposals, additional information on existing projects, actions of special interest	Months 3 to 5
5 Initial proposal on draft plan for LCIA programme	Workplan		Draft-D4: First list of research needs per impact category and draft 4-year plan for the LCIA programme	Month 4
6 LCIA workshop II	Selection & Prioritization of needs /time frame in different impact categories	Draft-D3	New Drafts D3-D4: Presentation and modification of workplan and agenda	Month 5
7 Peer review of Draft-D3&Draft-D4	Meeting of available peer review team at the end of LCIA workshop II	Draft-D3 and Draft-D4	D5: Synthesis report of review including change proposals	Month 5
8 Def. study report on framework & workplan	Elaboration of final report based on peer review comments	All other task deliverables	D6 = updated D1&D3&D4 presented to ILCP for amendments and ratification	Month 6

5 Partners

Interested contributors from private sector, academia, government and NGO are invited worldwide to apply as potential members of draft author team, review group or for further work within the future working group on Life Cycle Impact Assessment, providing their area of interest and domain of expertise. The final selection of contributors will be carried out by the ILCP on the basis of proposals from the Scientific Executive Committee.

5.1 Draft author team

Initial drafts of documents will be prepared by a team of authors from different geographic regions, organizational and economic perspectives. The draft author team (DAT) will work coordinated by the Vice Director and its staff and with support of the scientific director. It includes members drawn from four continents, from developed and emerging economies. Foreseen at maximum eight persons, it represents a manageably large authoring team. Different members will be involved in phase I and II

5.2 Review group

Initial drafts of documents will be reviewed by a panel of reviewers from a cross section of geographic regions, organizational and economic perspectives. The review group will be asked to nominate facilitators who will summarize input from subgroups which are based either on content or perspectives. Final comments from the review panel will be appended to the final reports.

6 Summary of expected results and deliverables

The following results will be delivered in the LCIA definition study:

- 1) D1: Report on user needs.
- 2) D2: Operational forum for internet consultation
- 3) D3: a) Proposal for a consistent framework, including a first prioritised list of areas of protection, related impact categories, desirable impact indicators at midpoint and endpoint levels, including impacts relevant to non OECD country. b) Relation of LCIA to sustainability indicators
- 4) D4: A 2 year plan for the LCIA programme, with a 4 year perspective; including the key milestones and the budget requirements; ensuring compatibility with the other LCI and LCM programmes. This includes a list of development needs in different impact categories, identifying readily achievable priorities and long-term research objectives. This also includes a proposal of 4 case studies, for example applications in private sectors that have a strong interest in the initiative, or applications of special interest in relation to the short-, mid-, and long-term objectives.
- 5) D5: Synthesis report of review including change proposals
- 6) D6: The final report of the LCIA definition study will consist of an updated compilation of the previous deliverables.

7 Appendix 1: Definitions

A first term to be defined is *impact category*: a class representing environmental issues of concern into which LCI results may be assigned (ISO term, see Figure 2). All physical processes and variables starting from extractions, emissions or other types of interaction between the product system and the environment, which are connected with a given impact category, are called the *environmental mechanism* of that impact category (ISO term). This replaces the term “cause-impact network” which was used by SETAC-Europe. Within and connected with this environmental mechanism one can distinguish:

- *environmental interventions*, such as in particular extractions from or emissions into the environment and other variables at the boundary of the product system and the environment, like different types of land use (SETAC-Europe term); note: the extractions and emissions are called together “elementary flows” by ISO; we propose to use the broader term “environmental interventions”
- *midpoints*, connecting the environmental interventions with the category endpoints (see below), like the concentration of toxic substances, the deposition of acidifying substances, the global temperature or the level of the sea (**SETAC-North America term; in SETAC-Europe until now called “intermediate variables”**)
- *category endpoints*, being the variables which are of direct societal concern, such as human life span or incidence of illnesses, natural resources, valuable ecosystems or species, fossil fuels and mineral ores, monuments and landscapes, man-made materials, etc. (ISO term); the level of the endpoints is also called the “damage level” (SETAC-Europe term)
- *areas of protection*, being classes of endpoints which have some well recognizable value for society (SETAC-Europe term; also called “safeguard subjects”); we distinguish four areas of protection: human health, natural resources, natural environment and man-made environment (the first three distinguished by ISO, the last added here).