



Absolute or relative LCA indicators? Arm wrestling between LCA normalization and weighting procedures

Chairs: Michele De Rosa, Fredy Dinkel, Massimo Pizzol

The LCA community is looking with increasing attention to the way LCA results are interpreted, and in particular at what role normalization and weighting procedures play in decision support. These are debated procedures as they involve value choices and intensive aggregation of information into indicators. Since formally correct LCA analyses may lead to very different or even opposite conclusion, the legitimacy of LCA to certify incremental environmental improvements of products is debated in the LCA community. While LCA studies may show the marginal environmental improvements of products for "sustainable development", i.e. on a relative scale, they are not addressing any ultimate goals of "sustainability" in absolute terms. Using absolute LCA indicators of environmental sustainability has been proposed to use estimates of carrying capacity or tipping points as a reference to measure the absolute sustainability of product systems relative to the earth's carrying capacity (i.e. how far are we from the limit or tipping point). The introduction of absolute indicators has however led to controversy. Quantifying ecosystem's carrying capacity also involves subjective political judgement (how much nature do we need? How much wellbeing are we willing to sacrifice to preserve it?) and may carry higher uncertainty than relative conclusions based on the marginal damage approach. Ecosystem carrying capacity may depend spatially on the sensitivity of the receiving environment, while assessing the carrying capacity of humans may be an even more subjective exercise. This session aims at discussing: LCA normalization and weighting procedures to assess the environmental sustainability of product systems, advantages and trade-offs of using conventional marginal damage versus absolute and distance-to-target impact indicators, combining LCA with other methods to interpret results (e.g. fuzzy set or multi-criteria decision analysis). Authors are invited to submit abstracts addressing questions such as: how is sustainability currently interpreted by LCA indicators and normalization and weighting procedures? Could and should LCA be used to assess the environmental performances of product systems in relation to an absolute target? How can other qualitative tools help interpreting LCA results? Does LCA risk to be used to legitimize a business as usual scenario rather than fostering solutions to achieve environmental sustainability?

Preliminary session type: Platform and Poster

Addressing data collection and computational challenges in LCI

Chairs: Tomas Rydberg, Sara Palander

In Life Cycle Assessment (LCA), consistency is a key principle affecting both data inventory and impact assessment indicators. Next to consistency in modelling, other quality criteria are still important topics in the LCA research. For instance, the discussion around certain accounting issues (notably the necessity to increase spatial and temporal resolution of datasets along with the need to pinpoint data documentation on sources and ranges of uncertainty) has been progressing in the LCA community, given also the importance played by these aspects when it comes to the interpretation of assessment results. Increasing data availability is also necessary to facilitate the use of LCA. Nowadays, several data sources have also emerged facilitating data availability through a wide array of public outlets or through other forms of data exchange on demand. This has been made possible thanks to smart metering in production processes and social media, among others. One of the advantages of this profusion of data sources is that such information can, in principle, be harvested to create new LCI datasets and for quality assurance of existing datasets. Additionally, modern approaches for data mining and management and for dealing with imperfect data sources offer new possibilities for working with non-LCA data sources. Last but not least, access to linked data is recently advocated in the LCA community as well.

Contributions on the advances in consistency and fine-tuning of LCA data modelling approaches are welcomed. How to better conciliate process-based LCA and economic input output tables is also in the scope of this session. The session aims at discussing theoretical aspects and case studies about data collection and computational challenges faced by the current increasing sophistication of LCI. Particularly welcomed are ideas and methods integrating and/or using computational tools that have been typically conceived outside of the LCA sphere, but that can enrich and bring forward the discussion towards the advancement of current spatial, temporal and uncertainty issues.

Preliminary session type: Platform and Poster

Advancements in life cycle impact assessment method development

Chairs: Tomas Rydberg

This session gives a platform for impact characterization frameworks and models showing latest developments in typical and new impact categories and impact assessment frameworks, both for mid-point or end-point approaches.

Progress in frameworks, models and case studies that allow for the integrated assessment of impacts on humans and/or ecosystems are welcome, especially if mutual learning, capitalisation of knowledge and interaction between the approaches taken in LCA and other field (e.g. RA) are presented.

The goal of this session is to present original papers which address impact assessment modelling, enhancing the methodology for assessing impacts at midpoint or endpoint and highlighting research needs towards increased robustness and comprehensiveness.

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Preliminary session type: Platform and Poster

Communication of single score (such as economic valuation) or end point results

Chairs: Thomas Kägi, Philipp Preiss

At the last SETAC Europe conference in 2015 there was a discussion about midpoint, endpoint or single score for decision support. The overall conclusion was that endpoint (e.g. YOLL (years of lifetime lost) or single score results such as "ecopoints" or "external costs" can be very helpful for decision support. However, the tricky task is to communicate the results in a way that transparency is given and that the results are actually understood by all stakeholders, including the decision makers.

In this session we therefore look for contributions that deal with:

- communicating endpoint or single score results in a understandable way
- transparency in communicating endpoint or single score results and the corresponding methods
- examples of the application of single score methods which can also show disaggregated results
- experiences and feed backs from stakeholders, such as the decision makers regarding endpoint or single score results.

Preliminary session type: Platform and Poster

Development, standardization and implementation of LCA and integration with economics for transportation infrastructure and operations

Chairs: Jullien Agnès, Arpad Horvath, Chantal Proust

The session considers climate change and other environmental impacts and includes international benchmarking results and case studies showing how the life cycle of transport is assessed.

- Methods for LCA and LCCA; tools
- Benchmarking approaches for LCA and databases
- Case studies of implementation and recommendations from analyses
- How to move recommendations to implementation at the international scale.

Life Cycle Assessment (LCA) is today a powerful systemic approach developed to provide decision support for questions regarding the environmental impact of industrial processes and products. Over the last 15 years it has been broadened to roads and railways. For that purpose LCA has then been applied to infrastructure materials and services in various countries namely around Europe and in the US. The scientific community working on road and railways sustainability working together with practitioners decided several years ago to share knowledge at the international level on methodologies, databases and results. Today improving LCA interest in the transport field means benchmarking as regards GHG assessment, climate change and others global and local impacts of transports, taking into account the energy mix, local materials and construction processes and water supply in each country, and extension of LCA from the project-level design questions to network-level management questions.

The application of LCA to road and railways management, vehicles and energy providers, and therefore more generally to transport modes design, construction, maintenance, operation, will be discussed in the session. The objective is to share information regarding: approaches for conducting LCA for transport, recommendations from LCA and LCCA for different regions and situations, and consensus regarding approaches for reducing impacts in each phase of life cycle, including use phase and assessment of multimodality services in rural and urban areas.

Preliminary session type: Platform and Poster

From Streamlining LCA to new concepts of Hotspots Analysis through global frameworks, principles and methodological challenges in integrating LCT for decision making purposes

Chairs: James Fava, Wouter De Soete, Mark Barthel, Serenella Sala

Aiming at mainstreaming life cycle thinking as leading concept for supporting decision making in policy and business context, to an increasing extent we face the challenge of grasping complexity of product systems, sectors and wider policy scales. Hence, LCA methodologies, ranging from hotspots analysis and streamlined LCA to full-blown LCAs, should be further developed and coupled with other approaches to preserve the ability of frameworks to deliver meaningful results with decision making power. There is an emerging need on different scales of decision making (country, city, industry sector, lifestyle, product portfolio, product category or individual product or service) to embrace the broader concept of Life Cycle Thinking (LCT). This may require adopting a trans-disciplinarily setting through e.g. accounting for expert and broader stakeholder knowledge. Hotspots Analysis in this wider framework (HSA) is a relatively new analytical tool that is being used as a pre-cursor to develop product sustainability information and support decisions at a number of different scales of application. It allows for the prioritization of resources and actions on decision making levels that reach beyond what is commonly known as LCA. More recently, it is also being used to assess the impacts and benefits of interventions to support the transition to more sustainable consumption patterns and lifestyles at different boundary levels (Company-wide, Europe, UN, globally). This session will not only showcase the work being undertaken in the UNEP/SETAC Life Cycle Initiative (LC Init) and UNEP but will embrace submissions for oral and poster presentations more widely to develop a common methodological framework, principles and best practices for hotspots analysis at different scales.

The session will highlight this work on behalf of SETAC, UNEP and welcome experts to share their work on both methodological challenges and case studies using examples of how not only conventional hotspots analysis and streamlined LCA methods but also new developments towards HSA applying LCT and many more lines of thought can highlight key (environmental) sustainability issues and the range of interventions available to respond to them. The objective is to foster an open dialogue within value chains, policy-making frameworks and both B2B and B2C communications experts on these new methodologies, principles and practices about how they can be applied or improved, as part of a global consensus-building processes in governments and businesses.

Preliminary session type: Platform and Poster

LCA and circular economy: what can LCA bring

Chairs: Tomas Rydberg

In Life Cycle Assessment (LCA), consistency is a key principle affecting both data inventory and impact assessment indicators. Next to consistency in modelling, other quality criteria are still important topics in the LCA research. For instance, the discussion around certain accounting issues (notably the necessity to increase spatial and temporal resolution of datasets along with the need to pinpoint data documentation on sources and ranges of uncertainty) has been progressing in the LCA community, given also the importance played by these aspects when it comes to the interpretation of assessment results. Increasing data availability is also necessary to facilitate the use of LCA. Nowadays, several data sources have also emerged facilitating data availability through a wide array of public outlets or through other forms of data exchange on demand. This has been made possible thanks to smart metering in production processes and social media, among others. One of the advantages of this profusion of data sources is that such information can, in principle, be harvested to create new LCI datasets and for quality assurance of existing datasets. Additionally, modern approaches for data mining and management and for dealing with imperfect data sources offer new possibilities for working with non-LCA data sources. Last but not least, access to linked data is recently advocated in the LCA community as well.

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Consequential LCA has gained interest and it is considered by many as a suitable policy support, because of its ability to model some consequences (presently at market level) that arise when a decision is taken. However, whether we adopt an ALCA, a CLCA or another life cycle-based model, still limitations exist: usually a steady-state and linear type of modelling is applied. This session does not want to debate about the use of ALCA vs CLCA but on whether and how LCA, considering all its modeling facets, can aid robust decision making. We invite contributions that present approaches on how to model complex systems, their strengths and drawbacks and the effective support they provide. Aspects related to the communication of these results to policy makers, i.e. acknowledging complexity and uncertainty of the assessment and results, clarifying how the uncertainty translate in risk, are welcome. We also encourage presentations discussing the role of LCA in the implementation of the circular economy, as well as its complementarities and discrepancies with other product design strategies, explicitly focused on the circularity of resources.

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Preliminary session type: Platform and Poster

LCA for marine systems: the status quo and the way forward

Chairs: Serenella Sala, Rosalie Van Zelm

The marine system is increasingly considered a key compartment in the sustainability discussion. On the one hand, we rely on marine ecosystems for food, fibers, energy, transport, infrastructures as well as for leisure and on the other hand human interventions on the land are creating pressures on sea and ocean water quality (e.g. nutrient and chemical loads, cooling water, salinity changes and fishery), and on the coastal system (e.g. erosion). Despite the key role of marine systems, relatively few studies have been adopting an integrated life cycle approach in assessing socio-economic driven impacts on marine systems. We invite for this session studies that apply life cycle thinking and assessment aiming at reducing environmental burden on the marine system. Life cycle inventories as well as life cycle impact assessment methods may need to be expanded and adapted to evaluate e.g. the life cycle impact of an off-shore plant, the development of new building/agricultural areas on the sea, the use of marine resource e.g. for energy and fibers, as well as fishing and aquaculture activities.

Preliminary session type: Platform and Poster

Life Cycle Data Developments - Networks, Databases, Datasets, Meta-Data, Interoperability and Everything in Between

Chairs: Bruce Vigon, Llorenç Mila i Canals

Much is happening to mainstream life cycle approaches these days. Given the criticality of well-characterized, accurate, and relevant data that are readily exchangeable across the globe, this session aims to present the range of ongoing research, development, and applications to support practitioners and decisionmakers. Included in the session topics are forums and working activities around making data sharable in the international and national arenas from a guidance and standardization perspective. Also included are recent developments in making data public, data review procedures and criteria, nomenclature and flow naming conventions, and ensuring user awareness of data quality characteristics during dataset development and data selection. The latter is often referred to as the documentation of meta-data, and efforts towards agreeing common frameworks on meta-data reporting are also invited to this session. All life cycle based approaches, Life Cycle Assessment (inventory and impact assessment), hotspots analysis, environmental product declarations and labels, and others are accommodated as long as the focus is on databases, data, and meta-data.

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Preliminary session type: Platform and Poster

Methodological challenges for LCA of agricultural supply chains producing food, fibre and bioenergy

Chairs: Angel Avadí, Sebastien Humbert, Funda Cansu Ertem, Hayo van der Werf

LCA theory and practice still feature a number of methodological challenges, some of which are not fully solved by the research community. When LCA is applied to agriculture (i.e. cradle to farm gate), as well as to agri-food, bioenergy and fibre systems (i.e. cradle to processing plant gate) and supply chains, specific challenges arise, regarding for instance, modelling of direct emissions, allocation strategies and their consequences, land use and land use change (LULUC) and their impacts on biodiversity and climate change, responsible sourcing of agricultural products, the role of LCA to assess production and utilisation of bioenergy; as well as the extrapolation of farm level assessment to describe agricultural regions.

Among methodological challenges, models for direct emissions in particular have been continuously developed and expanded to address the transportation and fate of pesticides (see FATE track), LULUC, carbon sequestration, and specific soil and water emissions, among other topics. A key question regarding direct emission models would be whether a common methodological framework is possible and desirable. Regarding the use of LCA to compare competing agricultural strategies, including bioenergy and fibre production, both at the farm, regional and supply chain (i.e. beyond regional) levels; certain methodological challenges hinder the validity of these comparisons.

This session intends to advance discussion on methodological challenges to agricultural LCA and its solutions, with emphasis on convergence of methods towards a common framework acceptable for both academia and industry. It will appeal to LCA practitioners studying agri-food, bioenergy and fibre-based systems and supply chains, but also to modellers dealing with agricultural systems at the field, farm and regional levels. The presentation of case studies is acceptable when it contributes to introduce methodological developments towards overcoming current (and future) challenges of LCA of agricultural systems and supply chains, including bioenergy production systems.

Preliminary session type: Platform and Poster

New Developments on Social Life Cycle Assessment

Chairs: Marzia Traverso, Alessandra Zamagni, Catherine Macombe

The interest on Social Life Cycle Assessment (SLCA) and its harmonization has been increased in the scientific community as well as among companies. The methodology is growing rapidly, and many new approaches have been proposed regarding i.e. development of impact pathways, inclusion of values in SLCA, how to address positive impacts, and frameworks for SLCA, to mention just a few. The ongoing discussion is now oriented on how to couple the engineering perspective adopted so far in SLCA, with the social science, to add consistency, coherence and a solid background for applications at several levels, ranging from products to more complex systems. It is undeniable that the engineering and mathematical approach is often challenged by the necessity to evaluate subjective and qualitative aspects for a correct and complete assessment of the social performance of a product. The need to take into account local conditions often makes difficult to define a standardized set of indicators that can capture the reality and allows for a correct interpretation towards the improvement of stakeholders' social conditions: e.g. the pathway of child labour to wellbeing. This session is open to contributions discussing the multi-facets of SLCA, both as a stand-alone method and within the Life Cycle Sustainability Assessment framework, in terms of scientific background (ontology, epistemology), methods and models (inventory and pathways), tools, data and databases, case studies, both at methodological and practical level, in order to move a step further toward harmonization of the approach and its integration to life cycle sustainability assessment.

Preliminary session type: Platform and Poster

Operational life cycle sustainability assessment and analysis

Chairs: Tomas Ekvall, Jeroen Guinee

It is a challenge to make life cycle sustainability assessment and life cycle sustainability analysis (both abbreviated LCSA) operational. Sustainability is a broad concept with a large number of environmental, economic and social aspects. The scope of a sustainability assessment can be overwhelming, particularly if it also has a broad systems perspective. In addition, many sustainability aspects can be difficult to quantify and/or communicate.

This session aims to present contributions to operational methods for LCSA. We invite case studies that test and demonstrate innovative LCSA approaches. Such approaches can include, for example, the selection of indicators, data collection and modelling, interpretation of the results, and communication of the study and its results. We also invite presentations of methodological advances in these areas.

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Preliminary session type: Platform and Poster

Organisational LCA: success factors, value creation and effective business change

Chairs: Paolo Masoni, Stephane Morel, Alessandra Zamagni

Recent developments in LCA have led to the proposal of a new method, targeted to organisations. The newly introduced Organisation Environmental Footprint, presently tested in pilots at European level, has been followed by the publication of the ISO/TS 14072 and by the UNEP/SETAC guidelines on Organisational LCA. This new method is a step forward in the LCA development, but at the same time represents the natural evolution of the Corporate Value Chain (Scope 3) Accounting and Reporting Standard: in fact, it stands out for including into the scope of the assessment the organisation, meant as the operations run under its direct and indirect control, and the whole product portfolio. The inclusion of the product portfolio is a key aspect that distinguishes it from the already well-known Environmental Management Systems, and - to a certain extent - this represents a simplification with respect to product-oriented LCA as it avoids allocation. The strengths of Organisational LCA rely on its capability to support interventions and improvements actions in a comprehensive way, following the materiality principle: by identifying what is relevant in the whole organisation, it allows prioritizing actions, also according to the level of influence. With these characteristics, Organisational LCA stands out as a promising method for an effective implementation of the Life Cycle Management, and it opens up opportunities for broadening the approach to include also socio-economic issues.

However, the key question is how to turn Organisational LCA into a business approach that goes beyond short-term success and aims at transforming organisations (Morel 2014) and create long-term value creation (Porter & Kramer 2011). This session invites contributors dealing with organisational LCA, critically discussing opportunities and challenges. We will also discuss the shared value creation when academics, NGO or business integrate each other to enhance more credibility, lower study cost, increase and share knowledge.

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Preliminary session type: Platform and Poster