InnProBio
FORUM FOR BIO-BASED INNOVATION IN PUBLIC PROCUREMENT

Factsheet No. 5

Life Cycle Assessment (LCA) and Life Cycle Costing (LCC)

What is LCA?

- LCA is a method to assess the potential environmental impact of a product or service throughout its entire life cycle. That is, from the supply of raw materials and production, to use, disposal or end-of life waste management (cradle-to-grave).
- It is an internationally standardised method under ISO 14040 and ISO 14004.
- LCA assesses environmental impacts, such as climate change or eutrophication over the life cycle of a product or service, as well as the impacts on natural resources and/or human health.
- Results of LCAs can be used for:
  - the identification of so-called 'hot-spots', which are aspects of a product or service that exert significant impacts on the environment, humans and/or natural resources. Revealing these hot-spots can then lead to identification of approaches to mitigate the impacts and/or the development of less harmful processes, product or service solutions
  - enabling the comparison of different products and services (benchmarking)
  - supporting public policies (such as for sustainable procurement)
  - for use as the basis for eco-labeling, such as Type I or Type I-like labels according to ISO 14024.

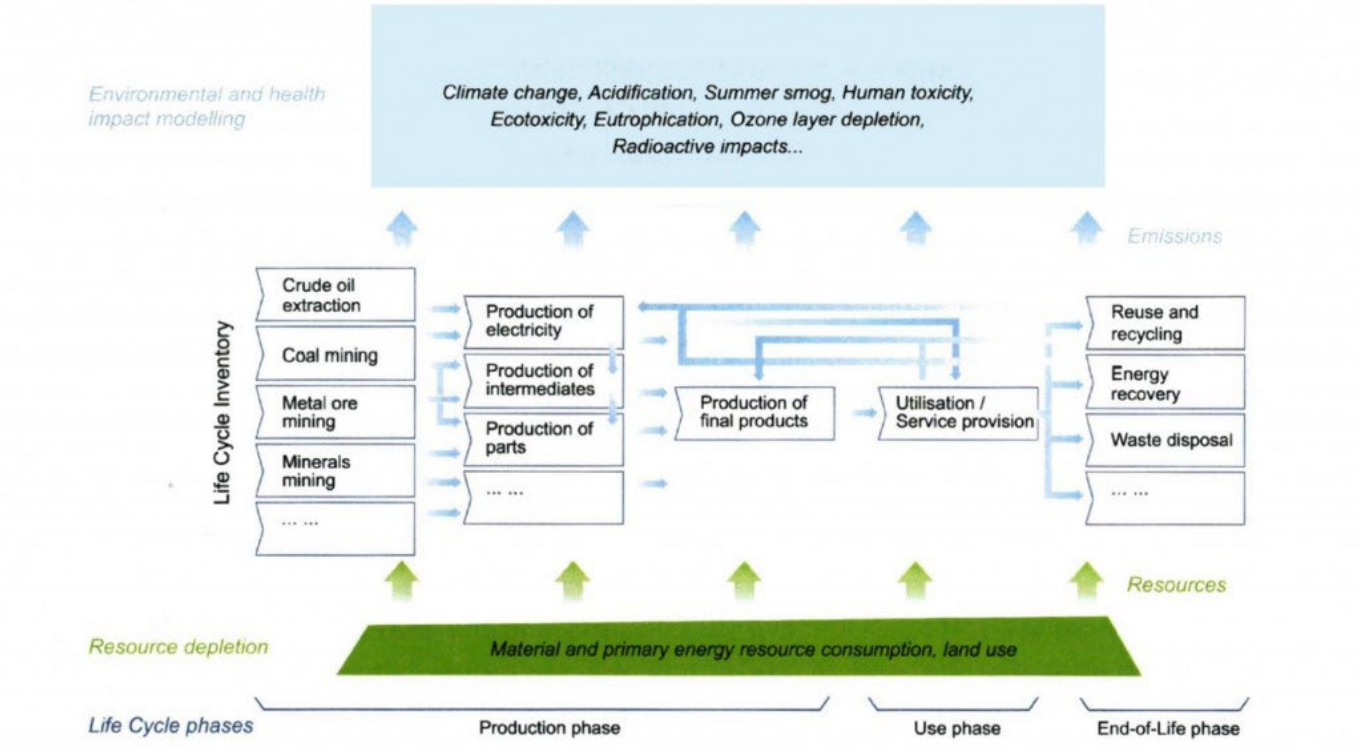

Figure 1: Stages of a life cycle assessment (LCA) according to DIN EN ISO 14040 (JRC 2017)

LCA and public procurement

Green Public Procurement (GPP) is defined in the EU Communication (COM (2008) 400) "Public procurement for a better environment" as "a process whereby public authorities seek to procure goods, services and works with a reduced environmental impact throughout their life cycle when compared to goods, services and works with the same primary function that would otherwise be procured." GPP is a voluntary instrument, which means that EU Member States and public authorities can determine the extent to which they implement it.

LCAs can be helpful in a public procurement process to evaluate the inputs, outputs and potential environmental impacts of purchasing a particular product throughout its life cycle.

Life cycle considerations of products and/or materials are included as part of some eco-labels. The latter can help public procurers to define their requirements regarding bio-based products in their public tenders. For more information on eco-labels and certifications, please see InnProBio Factsheet #2.

What is LCC?

LCC is generally defined as an assessment of all costs which are related to a certain product, directly covered by one or several actors in the life cycle of the product (Hunkeler et al. 2007). Life Cycle Costing (in contrast to only focusing on the purchase price) is especially useful if a relevant share of costs are incurred during the use or end-of-life phase of the analysed product or service. The nature of life cycle costs depends on the specific product in question. Different cost elements are taken into account, depending on the product type.

LCC and public procurement

When using LCC to determine cost during the evaluation of a Call for Tenders, the EU Public Procurement Directives (2014) lay out clear rules for how this should be carried out and what may be included.

What are the advantages of using LCA?

- It provides a quantitative measurement of a product's potential environmental impact.
- Since LCA includes all stages of a product's life cycle it avoids sub-optimisation i.e. it avoids optimising a process in the life cycle which would lead to worsening the impact from another process within the same life cycle.
- There is a common basis (ISO standards) for how to conduct LCAs, which allows for at least a minimum of transparency and reproducibility.

At the award stage of a public procurement procedure, a procurer evaluates the quality of the tenders received and compares costs. Under the EU Public Procurement Directives (2014), all contracts must be awarded on the basis of most economically advantageous tender (MEAT). This means that contracts can be awarded on the sole basis of purchase price or overall cost-effectiveness, which opens the door for using a life cycle costing approach to establish the real cost of a purchase. This is particularly relevant for bio-based products as these tend to have higher purchase prices, however, may entail lower disposal costs.

How do you define the cost of a product over its life cycle? The following costs may be taken into account, whether they are borne by the contracting authority or other users:

(a) costs, borne by the contracting authority or other users, such as:
  (i) costs relating to acquisition,
  (ii) costs of use, such as consumption of energy and other resources,
  (iii) maintenance costs,
  (iv) end of life costs, such as collection and recycling costs.

(b) costs imputed to environmental externalities linked to the product, service or works during its life cycle, provided their monetary value can be determined and verified; such costs may include the cost of emissions of greenhouse gases and of other pollutant emissions and other climate change mitigation costs.

LCC and LCA

Where LCC calculates the costs of a product throughout its life cycle (which can include giving a monetary value to environmental externalities), LCA assesses the environmental impacts, such as global warming potential, over the life cycle.

Both aspects are of course important for the application of sustainable procurement. However, whereas LCC can easily be applied by procurers, LCA requires a lot more time and specialist expertise. It is therefore worth making use of already existing LCA comparisons, such as those used in the preparation of ecolabel criteria. Source: The Procura+ Manual (2016), page 75.

LCC tools for use in public procurement

Further practical information and guidance on how LCC can be used in public procurement is available from the Buying Green! Handbook on GPP (3rd edition published by the European Commission) and from the Procura+ Manual (3rd edition published by ICLEI). LCC tools available are as follows:

The National Agency for Public Procurement in Sweden	Several product specific LCC calculation tools available online (in Swedish). These are available here.
SMART SPP Guide and Excel Tool	A Microsoft Excel (R) tool specifically designed to calculate LCC and CO_2 in public procurement, with accompanying guidance and examples. It is available here.
Clean Fleets LCC tool	A tool to calculate LCC for vehicle purchases, which incorporates the methodology of the Clean Vehicles Directive for monetising externalities.
SEAD lighting costs calculator	Tools to evaluate the light quality, energy consumption, and life cycle costs of indoor and street lighting alternatives.
LCC for sustainable construction	Methodology for LCC in construction developed on behalf of the European Commission, together with guidance and examples.
Harvard University LCC calculator	LCC calculator for new construction, renovation, equipment replacement and other projects.
Buy Smart Tools	A general LCC calculation tool produced by the Berliner Energieagentur (Berlin Energy Agency) within the Buy Smart project, together with specific tools for the product groups: lighting, vehicles, domestic appliances, IT and green electricity.

Sources

(1) European Commission 2016: http://ec.europa.eu/environment/gpp/what_en.htm

(2) European Commission, Joint Research Centre 2017: http://eplca.jrc.ec.europa.eu/?page_id=43

(3) EU Directive 166 (2014): http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32014D0166

(4) The Procura+ Manual (2016): http://www.procuraplus.org/fileadmin/user_upload/Manual/Procuraplus_Manual_Third_Edition.pdf

(5) https://www.umweltbundesamt.de/en/topics/economics-consumption/green-procurement/life-cycle-costing

InnProBio seeks to build a community of public procurement practitioners interested in the procurement of bio-based products and their associated services. This factsheet series aims to provide concise information on topics of relevance to public procurement of bio-based products and services.

Partners:

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