



INNOVATIVE EDUCATIONAL INTEGRATION OF URBAN
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TASK 02/A.1.1 REPORT ON COMPILATION ON LEGISLATION OF LCA AND ITS APPLICATION IN CONSTRUCTION SECTOR IN ROMANIA

Task O2/A1.1

REPORT ON COMPILATION ON LEGISLATION OF LCA AND ITS APPLICATION IN CONSTRUCTION SECTOR IN ROMANIA



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1. Introduction

Life cycle assessment is increasingly being used worldwide to quantify the environmental performance of buildings, set impact reduction targets, and ensure a safe environment for future generations.

Life-cycle assessments (LCAs) involve cradle-to-grave analyses of production systems and provide comprehensive evaluations of all upstream and downstream energy inputs and multimedia environmental emissions. LCAs can be costly and time-consuming, thus limiting their use as analysis techniques in both the public and private sectors. Streamlined techniques for conducting LCAs are needed to lower the cost and time involved with LCA and to encourage a broader audience to begin using LCA. It has emerged as a valuable decision-support tool for both policy makers and industry in assessing the cradle-to-grave impacts of a product or process. Three forces are driving this evolution. First, *government regulations* are moving in the direction of "life-cycle accountability;" the notion that a manufacturer is responsible not only for direct production impacts, but also for impacts associated with product inputs, use, transport, and disposal. Second, *business is participating in voluntary initiatives* which contain LCA and product stewardship components. Together these developments have placed LCA in a central role as a tool for identifying cradle-to-grave impacts both of products and the materials from which they are made [3].

The "life-cycle" impacts include the extraction of raw materials; the processing, manufacturing, and fabrication of the product; the transportation or distribution of the product to the consumer; the use of the product by the consumer; and the disposal or recovery of the product after its useful life.

There are four linked components of LCA [3] [5]:

Goal definition and scoping: identifying the LCA's purpose and the expected products of the study, and determining the boundaries (what is and is not included in the study) and assumptions based upon the goal definition;

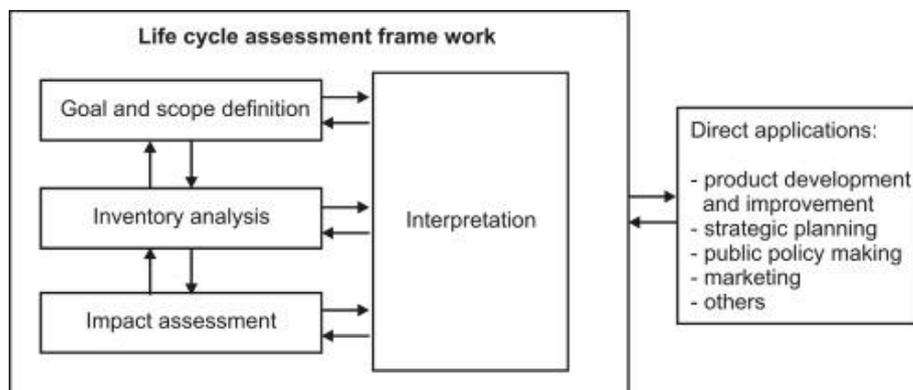


Figure.1 - LCA stages under the ISO 14040 guidelines [2]

Life-cycle inventory: quantifying the energy and raw material inputs and environmental releases associated with each stage of production;

Impact analysis: assessing the impacts on human health and the environment associated with energy and raw material inputs and environmental releases quantified by the inventory;

Improvement analysis: evaluating opportunities to reduce energy, material inputs, or environmental impacts at each stage of the product life-cycle.

LCA helps decision-makers select the product, process, or technology that results in the least impact to the environment. This information can be used with other factors, such as cost and performance data to find optimal solutions. LCA identifies the transfer of environmental impacts from one media to another (for instance: a new process may lower air emissions, but creates more wastewater, etc.) and between different lifecycle stages. The diagram below illustrates the main lifecycle stages to be considered in LCA:

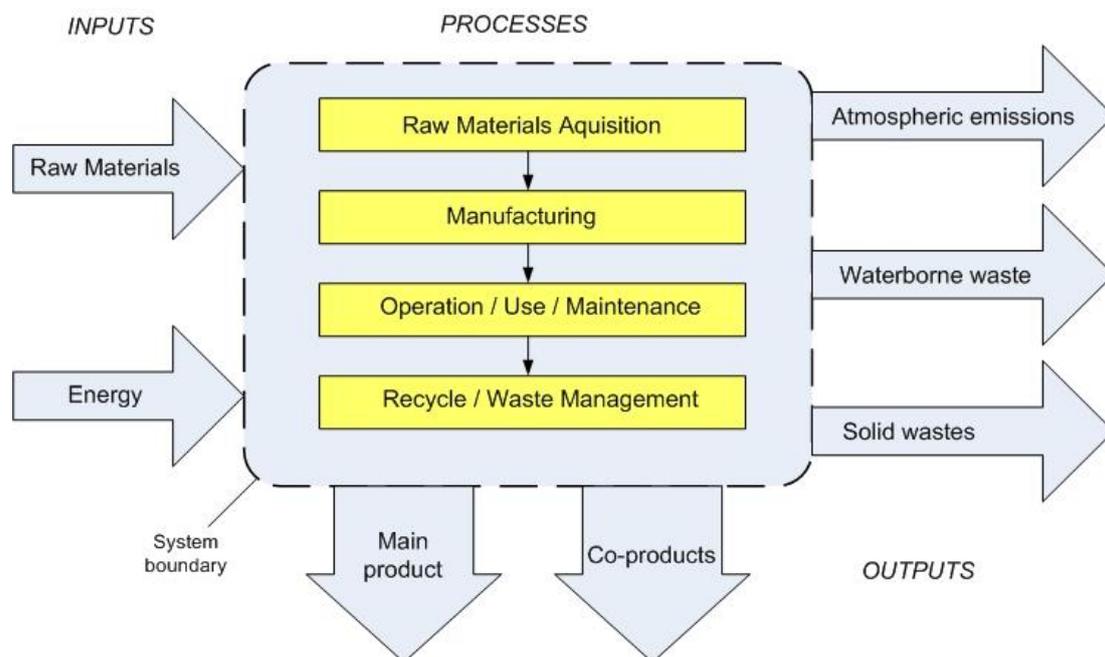


Figure 2 - Main stages and typical inflows and outflows considered in lifecycle assessment [4]

LCA Limitations:

LCA thoroughness and accuracy will depend on the availability of data; gathering of data can be problematic; hence a clear understanding of the uncertainty and assumptions is important.

Classic LCA will not determine which product, process, or technology is the most cost effective or top-performing; therefore, LCA needs to be combined with cost analysis, technical evaluation, and social metrics for comprehensive sustainability analysis.

Unlike traditional risk assessment, LCA does not necessarily attempt to quantify any specific actual impacts. While seeking to establish a linkage between a system and potential impacts,



LCA models are suitable for relative comparisons, but may be not sufficient for absolute predictions of risks.

When undertaking a life cycle assessment study the following issues need to be addressed:

The burdens imposed on the environment by human activities may be ascertained by accounting for the resources and energy (inputs) consumed at each stage in the life cycle of a product and the resulting pollutants and wastes (outputs) emitted. The inputs and outputs are then assessed for their adverse impacts on long-term sustainability of renewable and nonrenewable resources, human health, and biodiversity, amongst others. Once these are known, measures may be taken to mitigate the impact of the outputs (or inventories) on the environment [2].

The utilization of LCA method can help in the following [2]:

- searching the most available life cycles, e.g., those with minimal negative impact on environment,
- assuming the decisions in industry, public organizations, or NGOs, which determine direction and priorities in strategic planning, design or design product, or process change,
- choose important indicators of environmental behavior of organization including measurement and assessing techniques, mainly in connection with the assessment of the state of its environment,
- marketing with the link on formulation of environmental declaration or eco-labelling

2. Legislation of LCA and its application in construction sector in Romania

Life cycle assessment (LCA), one of the most important instruments that lead to the sustainable development by controlling the CO₂ fingerprint of materials or different investments, has a low level of interest for Romanian authorities, in comparison with other European countries. Such evaluation is often content of Environmental Product Declarations (EPD), which for construction products or materials, the private sector tends to show a growing importance. However, there are different initiatives of national interest, promoted by Romanian authorities, that tend to align with European regulations, mostly because obligative reasons. Unfortunately, the way in which the regulations are applied, are reflecting the lack of experience and consciousness regarding environmental issues, by Romanian authorities.

2.1. Applied standards in Romania regarding LCA

Life cycle assessment is established in the national legislation by the international standards listed below:

- [SR EN ISO 14021:2016](#) Environmental labels and declarations -- Self-declared environmental claims (Type II environmental labelling)

Specifies requirements for self-declared environmental claims, including statements, symbols and graphics, regarding products. It further describes selected terms commonly used in environmental claims and gives qualifications for their use. This International Standard also describes a general evaluation and verification methodology for self-declared environmental claims and specific evaluation and verification methods for the selected claims in this International Standard.

- [SR EN ISO 14024:2018](#) Environmental labels and declarations -- Type I environmental labelling -- Principles and procedures

It establishes the principles and procedures for developing Type I environmental labelling programmes, including the selection of product categories, product environmental criteria and product function characteristics, and for assessing and demonstrating compliance. ISO 14024:2018 also establishes the certification procedures for awarding the label.

- [SR EN ISO 14025:2010](#) - Environmental labels and declarations -- Type III environmental declarations -- Principles and procedures

It establishes the principles and specifies the procedures for developing Type III environmental declaration programmes and Type III environmental declarations. It specifically establishes the use of the ISO 14040 series of standards in the development of Type III environmental declaration programmes and Type III environmental declarations. ISO 14025:2006 establishes principles for the use of environmental information, in addition to those given in ISO 14020:2000

- [SR EN ISO 14031:2014](#) - Environmental management -- Environmental performance evaluation – Guidelines

Gives guidance on the design and use of environmental performance evaluation (EPE) within an organization. It is applicable to all organizations, regardless of type, size, location and complexity.

- [SR EN ISO 14044: 2007](#). Environmental management. Life Cycle Assessment. Requirements and guidelines

Specifies requirements and provides guidelines for life cycle assessment (LCA) including: definition of the goal and scope of the LCA, the life cycle inventory analysis (LCI) phase, the life cycle impact assessment (LCIA) phase, the life cycle interpretation phase, reporting and critical review of the LCA, limitations of the LCA, relationship between the LCA phases, and conditions for use of value choices and optional elements.

It gives guidance on the design and use of environmental performance evaluation (EPE) within an organization. It is applicable to all organizations, regardless of type, size, location and complexity. The guidance in ISO 14031:2013 can be used to support an organization's own approach to EPE, including its commitments to compliance with legal and other requirements, the prevention of pollution, and continual improvement.

- [SR EN ISO 14045](#): 2012 Environmental management. Assessing the eco-efficiency of product systems. Principles, requirements and guidelines

Describes the principles, requirements and guidelines for eco-efficiency assessment for product systems including: the goal and scope definition of the eco-efficiency assessment; the environmental assessment; the product-system-value assessment; the quantification of eco-efficiency; interpretation (including quality assurance); reporting; critical review of the eco-efficiency assessment.

Requirements, recommendations and guidelines for specific choices of categories of environmental impact and values are not included. The intended application of the eco-efficiency assessment is considered during the goal and scope definition phase, but the actual use of the results is outside the scope of ISO 14045:2012.

- [ISO/TS 14048](#):2002 Environmental management. Life Cycle Assessment. Format of the data documentation

This Technical Specification provides the requirements and a structure for a data documentation format, to be used for transparent and unambiguous documentation and exchange of Life Cycle Assessment (LCA) and Life Cycle Inventory (LCI) data, thus permitting consistent documentation of data, reporting of data collection, data calculation and data quality, by specifying and structuring relevant information.

The data documentation format specifies requirements on division of data documentation into data fields, each with an explanatory description. The description of each data field is further specified by the structure of the data documentation format.

- [EN 15804 + A1](#): 2014. Sustainable development of construction works. Product environmental statements. Basic rules for the category of construction products.
- [EN 15942: 2012](#). Sustainability of construction works. Environmental product declarations. Communication format business-to-business.
- SR EN ISO 14040:2007 - Environmental management — Life cycle assessment — Principles and framework

By the essential requirements of “Law 10/1995 regarding quality in building sector”, the seventh one (7. Sustainable use of natural resources) is regulating:

- Buildings must be designed, executed and demolished so that the use of natural resources must be sustainable and in particular to ensure the following:
 - a) Reuse or recyclability of buildings, materials and component parts, after demolition;
 - b) the durability of constructions;
 - c) the use in construction of environmentally compatible raw and secondary materials.

Thus, even though the Romanian regulations for building sector are mentioning the essential requirements, yet there are no specific methodologies for applying them.

The list below refers to other important regulations implying the use or of LCA instrument:

LEGE nr. 50 din 29 iulie 1991 privind autorizarea executării lucrărilor de construcții - Republicare*)	Law no. 50 of July 29, 1991 regarding the authorization for the execution of construction works - Republished *)
Planul Național de Gestionare a Deșeurilor	National Waste Management Plan
Legea nr. 211/2011 privind gestionarea deșeurilor	Law no. 211/2011 on waste management
Legea nr. 101/2006 a serviciului de salubritate a localităților, cu modificările și completările ulterioare.	Law no. 101/2006 of the sanitation service of the localities, with subsequently modifications and completions.
HG nr. 445/2009 privind evaluarea impactului anumitor proiecte publice și private asupra mediului	GD no. 445/2009 on the assessment of the impact of certain public and private projects on the environment
Hotărârea Nr. 17 din 11 ianuarie 2012 pentru modificarea și completarea Hotărârii Guvernului nr. 445/2009 privind evaluarea impactului anumitor proiecte publice și private asupra mediului	Decision Nr. 17 of 11 January 2012 for amending and completing the Government Decision no. 445/2009 on the assessment of the impact of certain public and private projects, on the environment.
Hotărârea nr. 668/2017 privind stabilirea condițiilor pentru comercializarea produselor pentru construcții, care înlocuiește Hotărârea nr. 622/2004 privind stabilirea condițiilor de introducere pe piață a produselor pentru construcții	Decision no. 668/2017 laying down the conditions for the marketing of construction products, which replaces the Decision no. 622/2004 laying down the conditions for the placing on the market of construction products
LEGE nr. 608 din 31 octombrie 2001 privind evaluarea conformității produselor	Law no. 608 of 31 October 2001 on conformity assessment of products
Legea nr. 24/1994 pentru ratificarea Convenției-cadru a Națiunilor Unite asupra schimbărilor climatice, semnată la Rio de Janeiro la 5 iunie 1992	Law no. 24/1994 for the ratification of the United Nations Framework Convention on Climate Change signed in Rio de Janeiro on 5 June 1992.
O.G nr. 68/2016 pentru modificarea și completarea Legii nr. 211/2011 privind regimul deșeurilor	EO no. 68/2016 for amending and completing the Law no. 211/2011 on waste regime.
Hotărârea nr. 204/2013 pentru modificarea și completarea Hotărârii Guvernului nr. 780/2006 privind stabilirea schemei de comercializare a certificatelor de emisii de gaze cu efect de seră	Decision no. 204/2013 for amending and completing the Government Decision no. 780/2006 on establishing the scheme for greenhouse gas emission allowance trading

<p>Hotărâre nr. 236 din 07/03/2007 privind stabilirea unor măsuri pentru asigurarea aplicării Regulamentului Parlamentului European și al Consiliului nr. 1980/2000/CE din 17 iulie 2000 privind sistemul revizuit de acordare a etichetei ecologice comunitare</p>	<p>Decision no. 236 of 07/03/2007 on the establishment of certain measures for the enforcement of the Regulation of the European Parliament and of the EU Council no. 1980/2000 / EC of 17 July 2000 on the revised Community eco-label award scheme</p>
<p>Hotărârea nr. 55/2011 privind stabilirea cerințelor în materie de proiectare ecologică aplicabile produselor cu impact energetic</p>	<p>Decision no. 55/2011 on establishing ecodesign requirements for energy-related products</p>
<p>CRITERII din 14 iulie 2005 de acordare a etichetei ecologice pentru grupul de produse materiale pentru pardoseli rigide</p>	<p>CRITERIA of 14 July 2005 on the award of the eco-label to the rigid flooring material group</p>

Different professional associations or non-governmental organisations (NGO's) promote implementation of international legislation adapted to Romanian realities that confront with important issues regarding environment and sustainable policies.

2.2. Environmental declaration and ECO labelling construction sector in Romania

Romania Green Building Council has established procedures for LCA with specific focus on EPDs to be easily integrated into the environmental certification tools such as GREEN HOMES and promotes similar instruments for point recognition in the LEED or BREEAM international certification. In the case of Living Building Challenge certification system, the Materials petal is designed to encourage a successful materials economy that is non-toxic, transparent and socially equitable. The two Imperatives directly addressed by Declare are Imperative 11 – Red List and Imperative 14 –Appropriate Sourcing.

In Romania there is no accredited body to emit EPDs and all the declarations are being issued by international entities. The National Institute for Research and Development in Buildings, Urbanism and Sustainable Regional Development “URBAN INCERC”, established in 2009, is the only recognized institution to perform testing on materials and emit performance certifications.

An important issue on LCA application is the waste management of materials during the entire life cycle, mainly on resulting wastes from site construction for building or demolishing. This kind of specifications are regulated by: National Waste Management Plan, Law no. 211/2011 on waste management, Law no. 101/2006 of the sanitation service of the localities, with subsequently modifications and completions. With the same purpose, regulations are still in progress to be realised. In the same time, there are different municipal decisions that control the waste management resulted of building sector, that prevent unwanted diffuse of waste in environment.



3. Conclusions

The theme of Life Cycle Assessment (LCA), as part of the Life Cycle Thinking (LCT) approach, needs to be substantially improved at national scale, not only toward a consolidated legislation, but also on the methodologies and instruments of implementation. Currently, the Romanian authorities as well as professional associations or non-governmental organisations make efforts to adapt to international tendencies, in order to adopt the international regulations regarding the sustainable development. The phenomena is in the same time encouraged by the evolution of green building certification market and companies are compelled by both demand and competition to promote greener and better products.

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