

Annex 72 – Assessing Life Cycle Related Environmental Impacts Caused by Buildings

Summary

The life cycle assessment (LCA) approach as standardised by ISO (International Organization for Standardization) is suited to quantify the environmental impacts of buildings (ISO 15392:2008). The assessments performed using the LCA approach are very much in line with an economic assessment which follows a life cycle costing approach. Hence, LCA is suited to complement economic information on buildings with information on their environmental impacts.

Important developments on the topic in recent years have been the many international (such as ISO 21930:2007 and ISO 21931:2010) and European (such as EN 15978:2012 and EN 15804:2013) standards for the development of environmental product declarations of building products and construction works.

This research project will focus on the assessment of the primary energy demand, greenhouse gas emissions and environmental impacts of buildings during production, construction, use and end of life (dismantling), i.e. during the entire life cycle of buildings (Figure 1).

The purpose of this research project is (annex72.iea-ebc.org):

- To reach consensus on the assessment methodology, which yet allows to respecting national or regional traditions regarding data and modelling.
- To better link methods for the environmental assessment with methods and tools used during the design and planning process (i.e. building information modelling - BIM).
- To work towards the definition of national and regional benchmarks regarding primary energy demand, greenhouse gas

emissions and environmental impacts of buildings during their full life cycle.

- To support participating member countries in need in the task of developing national or regional life cycle assessment databases tailored to the building sector.
- To agree on recommendations for national and international standardisation work related to life cycle thinking applied on buildings (e.g. energy performance of buildings European directive).

This research project will comprise the following five main subtasks: Subtask 1: Harmonised methodology guidelines; Subtask 2: Building assessment workflows and tools; Subtask 3: Case studies; Subtask 4: Building sector LCA databases; Subtask 5: Dissemination. CERIS will participate actively in activities 1.1, 1.3, 4.1 to 4.3, 5.2 and 5.5.

Activity 1.1 will include an International survey on the methodologies applied to assess the environmental impacts of buildings. Activity 1.3 will result in a report on harmonised methodology to assess the primary energy demand, greenhouse gas emissions and environmental impacts of buildings.

Activity 4.1 will comprise a survey and report on national/regional life cycle assessment databases either in general use or particularly used in the construction sector. Guidelines and practical hints on how to establish a publicly available LCA database suited for the building sector will be developed in Activity 4.2. Activity 4.3 will correspond to the implementation of these guidelines in country case studies.

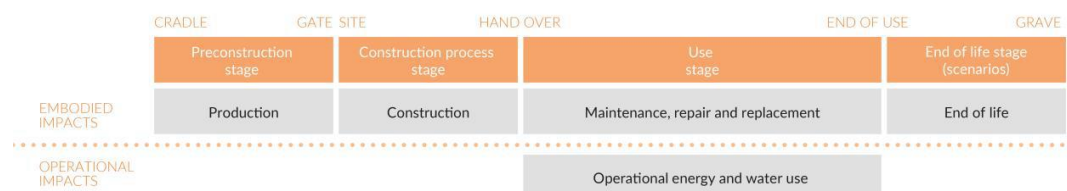


Figure 1. Building life cycle stages and environmental impacts.



Project Reference

EBC Annex 72

Leading Institution

treeze Ltd. (Switzerland)

Partners

University of Melbourne (Australia), TU Graz (Austria), Belgian Building Research Institute (Belgium), KU Leuven and VITO NV (Belgium), Federal University of Espirito Santo and University of Campinas (Brazil), École de technologie supérieure (Canada), Tianjin University (China), Czech Technical University in Prague (Czech Republic), Aalborg Universitet København (Denmark), ARMINES and Mines ParisTech (France), Fraunhofer Institute for Building Physics and, Karlsruhe Institut für Technologie (Germany), The Hong Kong Polytechnic University (Hong Kong), University of Palermo (Italy), Korea Institute of Civil Engineering and Building Technology (South Korea), SBSCentre and W/E Consultants (Netherlands), BRANZ (New Zealand), Norwegian University of Science and Technology and SINTEF (Norway), CERIS and University of Minho (Portugal), University of Seville (Spain), Chalmers University of Technology and Royal Institute of Technology (Sweden), ETH Zurich, HEIG-VD LESBAT and Paul Scherrer Institute (Switzerland), Edinburgh Napier University, Open University and Ulster University (United Kingdom), Texas A&M University (United States of America)

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2017-2022

Total / CERIS

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Project Website

annex72.iea-ebc.org