

HOW CAN THE INTEGRATION OF ENVIRONMENTAL CONSIDERATIONS INTO CONSTRUCTION DECISIONS HELP?

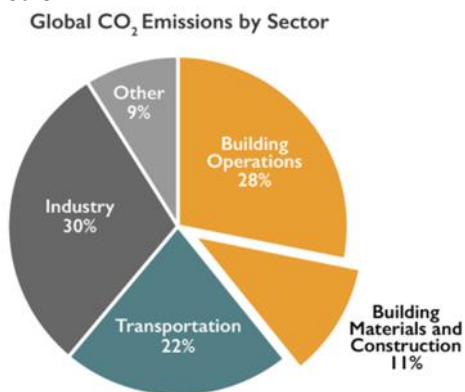
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Abstract

Buildings around the world (their design, maintenance and disposal) contribute significantly to global warming. It is no coincidence that achieving the sustainable operation of buildings is a priority objective worldwide, not only in terms of the choice of materials but also in terms of achieving the best possible technological solutions. The aim of the project is to deliver the highest possible quality results in a comprehensible way to all audiences in any way connected with the building industry: interested parties, renovators, builders, architects, contractors, etc.

Introduction



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The buildings (design, maintenance and end of life) contribute significantly to global warming, accounting for almost 30% of total greenhouse gas emissions, according to a recent study. This includes insulation, heating and cooling of buildings, but since everything is connected to everything else, it is in fact every component of it.

This paper shows the results of the Spread of Innovation Solution for Sustainable Construction project, what runs at the Adult Learning ERASMUS +-Strategic Partnership program. It is coordinated by LCA Center Association; from 2019.10.01 to 31/12/2021 and there four partners are working together, an Italian innovation spin-off company, Ecoinnovazione srl., a Finnish software developer, BIONOVA ltd., as well as the EMI Nonprofit Ltd.



The main goal is to create awareness of ordinary people to learn about the importance of sustainability in terms of construction and prior to weigh on the market building materials and their properties. This helps if you are the life-cycle approach presented extraction of the environmental impacts of housing and building / apartment maintenance of building materials in the manufacture of building materials, materials beyond the integration from the end of the building's life cycle, i.e. the dismantling or demolition re-use. Increasing environmental awareness also comes to the fore in the project, because through it, indirectly facilitated by a move towards sustainability criteria within the building materials manufacturers, designers and contractors.


The researches began with a questionnaire survey, which was designed to get an idea of what you know about the public about sustainability, how to understand certain concepts and provide what information, and formulate what is required by your Web Application or related to manual. Answers about governing customize the pre-project tasks. In general, about the man in the street it expects housing to be efficient, to be comfortable, casual, but we are less sure how environmentally friendly solution can be achieved. Therefore, the established application and preparation of the manual was an important input.

The project produced two main outputs:

- One of them a Handbook and its annexes, which include important information about the built-in, redecorating life-cycle approach. It was written in four languages, was completed in pdf format. The English version is now available on the website (howtobuildgreen.eu).



- Other one is a web application, which includes the main technical characteristics and environmental data, and some market information in a variety of building materials (CFP or energy content, EPD). In addition, it is preparing a guide to aid the construction or renovation of a sustainable, environmentally conscious, or smart house through practical councils. We support the man on the street sensitization for use in education, environmental problems developed for the project elements.



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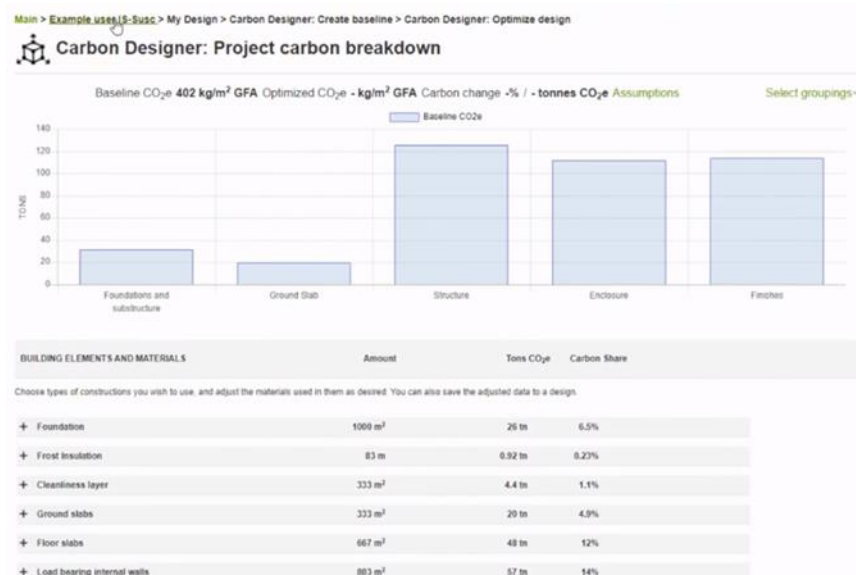
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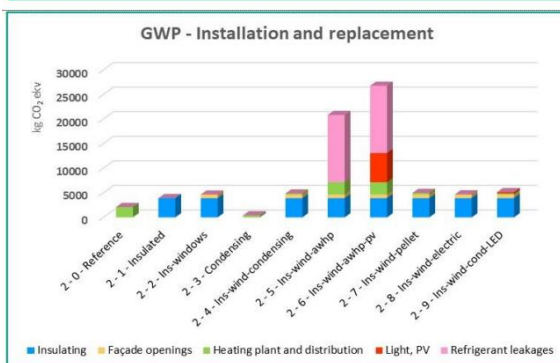
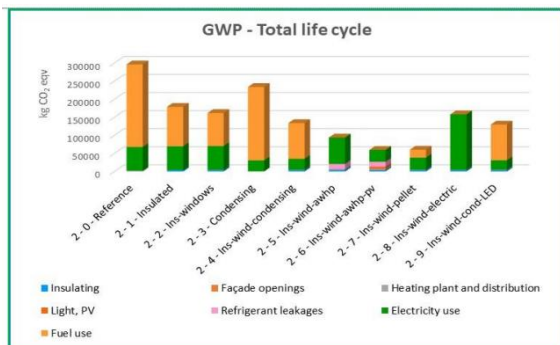
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In the project, we examined different materials, structures and finished buildings proposed by architects from an environmental and economic point of view. The analysis of alternatives helps an external party to understand which options are better and more advantageous, and can help in future choices.

This paper shows the LCA and LCC results of different solutions, especially the renovation of Kadar cubic.



CASE STUDY – ENERGY RETROFIT OF A HUNGARIAN DETACHED HOUSE

1. GENERAL INFORMATION

Building type: detached house

Net heated floor area: 91 m²

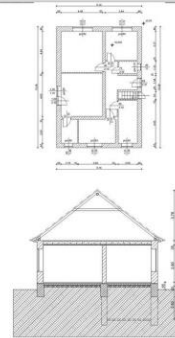
Gross floor area: 105 m²

Short description: The case study building is a typical Hungarian detached house, built with a nearly rectangular floor plan of approx. 100 m² and a pyramid hip roof. These buildings were built in large volumes between the 1950s and the 1970s, there are approx. 800 000 of them all around Hungary. Their nickname is "Kádár cube", named after a Hungarian communist leader of the period



2. ORIGINAL STRUCTURES AND TECHNICAL SYSTEMS

- External wall: The original external wall is made of concrete blocks with plastering. The thermal transmittance of the wall does not comply with the current regulations ($U = 1.1 \text{ W/m}^2\text{K} > U_{\text{max}} = 0.24 \text{ W/m}^2\text{K}$)
- Floor slab under the loft: the loft slab is made of prefabricated reinforced concrete beams and blocks with some slag on the top. The structure does not comply with the current regulations ($U = 0.95 \text{ W/m}^2\text{K} > U_{\text{max}} = 0.17 \text{ W/m}^2\text{K}$)
- There is a small unheated cellar under one part of the building and the rest has a slab-on-ground.
- The windows are old box-type windows with 2 layers of glass, without any special coating.
- Space heating is provided by a non-modulating atmospheric gas boiler and radiators, and hot water by an electric boiler operating with off-peak electricity.
- Lighting is provided with incandescent light bulbs.



Please note that these structures are meant to be characteristic of the typical original conditions. In many buildings, some retrofit measures have already taken place in the recent years, for examples the windows may have been exchanged.



Environmental life cycle assessment provides an opportunity to understand the environmental impacts of our acts, processes, products, etc. In this work, an excellent team of experts has worked together to provide high quality, and the same time understandable insights for construction decisions. The team hopes that its work will be useful for all.