

Life Cycle Thinking a Sustainable Built Environment

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Life Cycle Assessment is widely utilized to investigate the influences on global greenhouse gas emissions of various humankind activities and products [1,2]. Alongside this, Life Cycle Assessment-related methodologies exist such as Life Cycle Cost [3] and Social Life Cycle Assessment [4] which enable to holistically approach the analysis with specific focuses on the economic and social aspects, respectively. It is, therefore, necessary to establish a Life Cycle Thinking approach, particularly for the building sector, to deepen the understanding of the potential environmental, economic, and social impacts of construction materials and technologies, systems, and plants for energy production from renewable energy source. Within this framework, the Zero Emissions Building [5] and Zero Emissions Neighborhood [6] concepts, which, respectively, refer to carbon neutral buildings and districts, were outlined.

This book contains the successful invited submissions [7–13] to the Special Issue of *Energies* (ISSN 1996–1073) on the subject area of “Life Cycle Thinking for a Sustainable Built Environment” in the section “Energy and Buildings”. This Special Issue brings together current progress on Life Cycle Assessment which enables a better knowledge of the impacts of the building sector, but also a greater robustness of the Life Cycle Assessment methodology and the identification of low-carbon solutions.

Original research article and comprehensive reviews along with well documented case studies have been collected in this Special Issue. These works present both numerical and experimental investigations which focus on multiple aspects of the building design, ranging from the development of innovative and environmentally friendly materials to the implementation of highly effective plants for power and heat supply. Furthermore, methods to minimize carbon emissions from buildings since the early stages of the design process were presented, while a review article on the same topic highlights the state-of-art and outlines future research trends in this field.

As can be seen from the titles of the research articles, “Life Cycle Thinking” consists of a way of interpreting the built environment as a *unicum* in which the different elements are inter-connected, and they influence each other. In fact, design strategies and technology solutions which are applied throughout the building lifetime were demonstrated to influence several factors such as human health, carbon footprint, user comfort, and energy demand.

New research trends identified in this Special Issue encourage continued discussion about the strategies and solutions to design a sustainable built environment through Life Cycle Thinking-based approaches. The common objective must be the reduction in impacts of the building sector while maintaining adequate living standards.

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