Analysis of the environmental, economic, thermal and energy performances of green building technologies
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INTRODUCTION

- Environmental impact, high energy consumption and waste production connected to current building stock
- Need to adopt alternative and more sustainable green building technologies
- Avoid greenwashing

AIM AND OBJECTIVES

To estimate the performances of various «green» construction solutions between them, and to compare them with a commonly adopted technology in Italian and European building scene.

METHODOLOGY

1. Literature review on the most commonly used materials and technologies in green building;
2. Selection of the construction technologies to be investigated;
3. Definition of the stratifications and performances assessment according to Italian legislation;
4. Multicriteria analysis (cost analysis, embodied carbon, indoor comfort, energy needs, building envelope)

GREEN BUILDING TECHNOLOGIES

WIDELY USED TECHNOLOGIES IN THE GREEN BUILDING MARKET

Novel Technologies in the Green Building Market

CONVENTIONAL CONSTRUCTION TECHNOLOGY

ANALYSIS

The multicriteria analysis was conducted with DesignBuilder software, using the optimization analysis tool. This tool allows the optimization of certain variables – in this case the walls and the roof constructions - in relation to the achievement of certain objectives.

The chosen objectives are:
- Embodied carbon;
- Indoor comfort;
- Energy needs;
- Economic costs;
- Performance of the building envelope;
- Indoor air temperatures.

Mild temperate climate area (Csa - Koppen classification): Catania, 2020

The model used for the analysis provides for the presence of night cross ventilation and overhangs.

RESULTS

Embodied carbon

Energy needs analysis

Costs analysis

Building envelope performance

Indoor comfort analysis

Indoor air temperature profiles

FURTHER DEVELOPMENTS

- LCA of green building construction system
- Cost assessment comprising local construction and production costs

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