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Deep regeneration vs shallow renovation to achieve nearly Zero Energy in existing buildings

Energy saving and economic impact of design solutions in the housing stock of Bologna

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Abstract

Whilst new nearly Zero Energy (nZE) concepts have been the first priority in the previous decade, in more recent years it has become widely acknowledged that renovating dwellings will have a large impact on the energy use in buildings. Using a simplified calculation method, this paper illustrates the high-energy consumption in several building types within the housing stock in Bologna. Among these, a specific building has been selected as the worst-case for an in-depth investigation. For this building the paper analyses a large set of possible scenarios for renovation -from the more standard operations up to higher levels of façade components' transformation- as technically feasible solutions to achieve a nearly Zero Energy Building (nZEB).

By discussing the economic/energy impact of each scenario, this paper aims at contributing to the debate on deep-versus-shallow renovation in existing buildings. In particular, it attempts at answering the following important research issues: whether the technical feasibility is associated to the economic feasibility in the retrofitting towards nZEBs; to what extent deep renovation and high transformation of buildings is competitive with respect to shallow retrofit; whether non-energy related factors can be considered to properly assess the economic competitiveness.

Energy and economic benefits are the main renovation's objectives in building renovation; nonetheless, non-energy related aspects are also helpful to expand the feasibility of nZEBs retrofit in the current building practises.

Contents

DEEP REGENERATION VS SHALLOW RENOVATION TO ACHIEVE NEARLY ZERO ENERGY IN EXISTING BUILDINGS	1
Abstract	1
1. Introduction	2
2. The existing building stock	4
2.1 The existing building stock in the urban context of Bologna	4
3. Energy analysis of the representative buildings.....	5
3.1 Building type	6
3.2 Opaque envelope	6

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