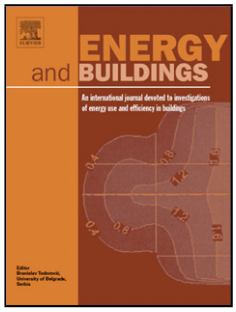

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Minimizing the energy consumption of low income multiple housing using a holistic approach

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Abstract

The present paper describes a holistic energy efficient retrofit of low income multiple social housing located in Athens, Greece. A holistic analysis was conducted in order to determine the optimum retrofit plan that includes innovative and state of the art commercially available technologies, passive techniques as well as renewable energy sources, aiming to reduce its energy consumption and carbon footprint, improve indoor environmental conditions and be cost effective at the same time. An extensive experimental campaign including air leakage measurements, thermal imaging, energy consumption and indoor environmental quality measurements was conducted before and after the implementation of the retrofit. In addition, advanced building simulation, occupant surveys and socioeconomic analyses were performed in order to evaluate the impact of the retrofit and estimate specific performance indicators.

Keywords: energy savings, thermal comfort, refurbishment, residential building, innovative technologies.

1. Introduction

The building sector representing the largest industrial sector in economic and resource flow terms has been the focus of European energy and environmental protection policies and regulations in recent years. Buildings in Europe are responsible for 40% of total energy consumption and 36% of CO_2 emissions while the corresponding global rates are 40% and