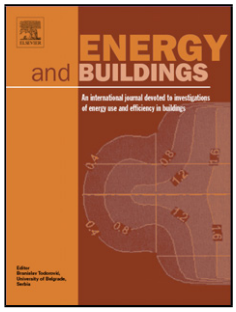

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THE INFLUENCE OF ATRIUM ON ENERGY PERFORMANCE OF HOTEL BUILDING

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This paper analyses annual energy performance of atrium type hotel building in Belgrade. The objective is to examine the impact of the atrium on the hotel building's energy demands for space heating and cooling. Integrated approach through numerical simulations that include Belgrade climate data and thermal comfort parameters, indicates an optimal model of hotel building with atrium for this area. Building energy simulation is carried out using EnergyPlus simulation engine, as a basic tool in the process of building energy optimization. The methodological approach includes the creation of a hypothetical model of an atrium type hotel building, numerical simulation of energy performances of several design alternatives of the hotel building with atrium, and comparative analysis of the obtained results. The main task of analysis is to change certain parameters in the particular model (for example, building structure, orientation, etc.) and to observe how the changes influence energy performance of the building. The goal of this research is to show that the atrium contributes to the heating and cooling energy savings in the rest of the building, but also that the atrium itself demands a lot of energy for its air-conditioning. The most sustainable solution should be to cover energy demands for atrium by using the renewable energy sources. In this case, the atrium can contribute to the energy efficiency of the hotel building in Belgrade climatic conditions, thus reducing its negative impact on the environment.

Key words: *hotel, atrium, energy performance, numerical simulation, heating and cooling demands*.

1. Introduction

Continuous technological development takes large impact on the environment and it needs to be based on the principles of sustainability. In addition to the many important aspects of sustainability in architecture (social, economic, environmental, technical), building energy efficiency is one aspect that touches the three most important issues nowadays - environmental protection, climate change and energy security. One of the causes for climate change is an excessive carbon dioxide emission as a result of the fossil fuels combustion, which is largely influenced by the energy consumption in buildings. Therefore, the fact that energy efficient buildings have less negative impact on the environment makes them inevitable in today's construction industry.