

Dynamic Facades in Buildings In Case Of Decreasing Energy Usage

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Abstract

In order to meet the functional performance and requirements on the environmental, ecological, social and aesthetical aspects, it became a necessity to develop another options of building that would be more efficient in the provision of those requirements, so a new generation have appeared called “Smart Buildings” or “Intelligent Buildings” with their sophisticated parts and various details, one of those essential parts is the “Intelligent Façade” for it’s being the essential and primary defensive line for the building against the environmental and climatic variations. This research focused on presenting the most clearly and comprehensive perception of the intelligent façades, in a manner that serves the ability of the designer to apply them in his designs or while developing an existing façades in buildings. Intelligent facades need to be responsive and conscious to the local climate, outdoor environment, and indoor spaces with view to parameters such as energy performance, thermal comfort, indoor air quality, visual comfort, etc. The findings demonstrate that energy modeling and simulations should be performed during the early stage of design process of buildings to ensure the practicality and effectiveness of any green implementations in buildings. In conclusion, the study recommends the intelligent facades to become an inherent constituent of green buildings for future development of low energy buildings.

Key words. Intelligent, Façade, Smart Building, Double Skin, Solar, Ventilated

1. Introduction

A rapidly changing environment such as the one we find ourselves in is affecting building users as well as building performance. Despite the fact that the climatic characteristics have variable parameters, traditional façades are largely static; so, we use large amounts of energy in order to control internal comfort. Omrany et al. [1] indicated that energy consumption for space heating and cooling makes up 60% of the total consumed energy in buildings. Façade is the most strategic part in a requalification plan because it is the most visible part of the building [2]. This leads to an improvement of environmental and