

Event:
Date:
Place:

ENERGY in BUILDINGS 2019
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Athens, Hellas



#	<p>Mikaela D. Detsi Undergraduate student of the School of Mechanical Engineering of the National Technical University of Athens</p>	
Title:	Undergraduate student of the School of Mechanical Engineering of the National Technical University of Athens	
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Presentation title:	Energy Analysis of Thermochromic and Electrochromic Windows in an Office Building with a Solar-Assisted Heat Pump System	
<p>Nowadays there is an increasing need for energy savings in the building sector. Windows still constitute a weak point in the building envelope due to thermal losses from the interior to the exterior as well as overheating of the interior due to excessive incident solar radiation. Two advanced glazing types that are used in order to improve overall building energy performance are thermochromic (TC) and electrochromic (EC) windows. Due to their ability to dynamically alter solar and visible light transmittance and reflectance according to the window's temperature or an applied voltage respectively, these glazing systems are able to reduce solar heat gains and consequently cooling loads when the environmental conditions exceed those required for occupant thermal comfort.</p> <p>The present study includes an energy and techno-economic analysis of a virtual six storey office building with a total floor area of 2604 m² and an external glazing area of 892 m² in total. The application of EC and TC glazing systems with the simultaneous installation of an energy efficient thermal system that consists of a heat pump combined with solar collectors leads to a significant reduction of the building's total energy use. The evaluation of the glazing and thermal systems is achieved through a dynamic energy simulation using software available on the market. The techno-economic analysis is performed using the method of the Payback Period, while taking into account all the costs involved.</p> <p>The results of the energy simulation showed that the application of the thermochromic and electrochromic windows improved the building's energy efficiency by reducing the total annual HVAC loads by 4% and 6% respectively. Regarding the building's thermal systems, the combination of the heat pump and the solar collectors led to a reduction of 86% in the total primary energy use.</p>		
CV:		
<p>Undergraduate student of the School of Mechanical Engineering of the National Technical University of Athens, specializing in Energy Engineering and mainly in the topic of energy use in the building sector. My diploma thesis examines the energy savings that derive from the application of thermochromic and electrochromic windows in an office building with a large external glazing area. Provide a short CV (no more than 60 words) to be used for speaker introduction.</p>		