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Title:	Ph.D. candidate in Thermal Engineering at Lab. of Heterogeneous Mixtures and Combustion Systems, School of Mechanical Engineering, National Technical University of Athens, Greece	
Presentation title:	**The Effect of Vacuum Insulation Panels on the Energy Efficiency of Lightweight Steel-framed Drywall Buildings**	

During the last decade, steel framed/drywall lightweight buildings became increasingly widespread due to their economic efficiency and ecological performance. One of the main issues that affect the energy performance of such buildings is related to the heat losses/gains through their envelope due to the strong thermal bridges introduced by the steel skeleton. An effective way to increase the insulation level and minimize the thermal bridges of load bearing drywall assemblies is the use of a new generation of insulation materials – vacuum insulation panels (VIPs).

In this paper, we study the impact of VIPs on the thermal bridges, the insulation level and the energy consumption of drywall constructions by means of simulation and numerical approaches. The individual walls and the whole envelope assembly of a two-storey steel framed/drywall lightweight building insulated with VIPs are examined. All types of thermal bridges (repeated and geometrical) are calculated using dedicated numerical tools and standardized techniques. Their contribution to the overall thermal transmittance (U-value) of the building shell is determined and improvements on the current insulation practices are proposed. The energy simulation of the buildings carries out by means of the Energy Plus software. A methodology is proposed for the introduction of thermal bridges in the software. The energy performance of the building is then investigated for various climatic conditions.

The results showed that at the building level, the additional layer of the VIP at the external walls can reduce the total annual energy consumption by approximately 21.5% for all climatic conditions. For the examined building, this value can be translated into energy savings up to 34.2 kWhr/m^2 annually for the climatic conditions of Northern Europe. Finally, the proposed improvements on the current insulation practices can additionally reduce the energy consumption up to 9%, for the examined envelope.

CV:

Ioannis Atsonios was born in Athens in 1990. He is a Ph.D. candidate in Thermal Engineering at the School of Mechanical Engineering, National Technical University of Athens (NTUA) since 2014. He graduated as Mechanical Engineer from NTUA in 2012 and obtained his Master of Science in Computational Mechanics from NTUA in 2014.

Since 2012, he has been working as a senior researcher at the laboratory of Heterogeneous Mixtures and Combustion Systems at the NTUA. He has joined the research project "ELISSA" (Energy Efficient Lightweight – Sustainable – Safe – Construction).

He specializes in the experimental and computational methods for the energy assessment of the thermal performance of building envelopes. He has also participated in the experimental monitoring of several buildings with the purpose of assessing the thermal and hygrothermal performance of their building envelopes. Moreover, his research includes the experimental and numerical investigation of innovative insulation materials (Vacuum Insulation Panels). He has published several articles in international scientific journals and international conferences.