


Event:
Date:
Place:

ENERGY in BUILDINGS 2018
Saturday November 3, 2018
Athens, Hellas



#	Prof. Luis Coelho (PhD in Mechanical Engineering)	
Title:		
email:	luis.coelho@estsetubal.ips.pt	•
Presentation title:	Study of the Application of the Thermal Energy Storage in an Office Building	
<p>The energy thermal storage has been study considering the application of PCM in active air conditioning system as well in a passive way, where the PCM is integrated in the construction elements of the building (e.g. external walls). The influence of the use of the TES systems in the energy building performance has been studied for different climate conditions (Lisbon, Barcelona, Graz and Warsaw). The building consists of a pavement area of 1420 m2, divided by two levels. Most of the spaces are office rooms and at the first level there is a restaurant, which the meal room has an area of 55 m2. It was used the reference thermal envelop solutions based in Energy Performance Certificate system (EPC) for each region studied. The air conditioning system consists of air source chiller/heat pump for cooling and heating. The thermal energy dissipation is assured by fan-coils and there is a handling air unit for ventilation. The building was simulated using the Design Builder software for the base conditions and for the PCM included in the external walls. The effect in the energy performance of the PCM in external wall was analyzed. For TES in active system they were considered thermal energy storage tanks in a modular way, for heating and for cooling. The net volume of PCM is 150 liters per tank. They were used organic PCMs, paraffin, with a melting point around 9oC for the cold PCM tanks (CPCM) and 44oC for the hot PCM tanks (HPCM). The number of CPCM and HPCM tanks was optimized for each climate conditions, take into account the typically electric tariffs schemes and the capital and operating expenses. It is possible to conclude that the use of TES, mainly in active systems for cooling and heating and for the cases studied, has an important contribution for increasing the energy efficiency of the buildings and for reducing the primary energy consumption, CO2 emissions and energy costs and at the same time, to contribute for the increase of the flexibility of the electricity distribution network.</p>		

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CV:

Luis Coelho is a graduate of Mechanical Engineering from the Technical University of Lisbon. He received his MSc degree in 1993 and PhD degree in 2005 in Mechanical Engineering at the same university. He is Assistant Professor at the Mechanical Engineering Department of Escola Superior de Tecnologia (ESTSetubal) of Polytechnic Institute of Setúbal (IPS) since September 1997 and Invited Assistant Professor at the Higher Institute of Engineering of Lisbon (ISEL) of the Polytechnic Institute of Lisbon, since September 2014. He was a research collaborator at IST from 1988 to 1997. He has collaborated in an important number of international R&I Projects since 1991, related to combustion, geothermal energy, solar energy, biomass, heating ventilation and air conditioning (HVAC), pollutant emissions, and air quality. He has been responsible for some scientific researcher's scholarships at IPS. He has several publications in Scientific Journals and International Conferences Proceedings. He has experience in design installations of HVAC systems and he is a Portuguese expert for the transposition and implementation of the European Performance of Buildings Directive (EPBD) in Portugal and it is consultant of the national energy agency (ADENE) for training expert on Building Energy Performance Certification. He is responsible for the IPS/ESTSetubal participation in 12 European R&I projects. HE is the coordinator of the H2020 TESSE2b project (680555) on thermal energy storage based in solar thermal energy and geothermal energy (GSHP) for heating, cooling and DWH production, for residential buildings.