


Event:  
Date:  
Place:

**ENERGY in BUILDINGS 2019**  
Saturday September 28, 2019  
Athens, Hellas



<b>#</b>	<p><b>Prof. Luis Coelho</b> (PhD in Mechanical Engineering)</p>	
Title:	Assistant Professor	
email:	luis.coelho@estsetubal.ips.pt	
Presentation title:	<p><b>Thermal Energy Storage an Overview of one Advanced System Based on the European TESSE2B Project</b></p>	
<p>This article gives an overview of the main results of the H2020 project, TESSE2b. The main objective of the project is to design, develop and demonstrate a modular and low cost system of thermal storage technology based on solar collectors and efficient heat pumps for heating, cooling and hot water production (DHW) contributing to the increase the share of renewables and to the flexibility of the electricity grid. The TESSE2b system consists of a set of thermal energy storage tanks based on phase change materials (PCM). Storage tanks with heat exchangers immersed in PCM were developed for heating, cooling and DWH.</p> <p>Through CFD simulations and laboratory tests, the best geometries and the most appropriate PCMs were selected, which ensure an adequate heat transfer rate and a quantity of stored energy that guarantees the optimal utilization of the solar thermal energy for heating and DHW preparation, as well as the production of cooling by geothermal heat pumps, with maximum energy efficiency and reduced operating costs. In order to increase the efficiency of geothermal heat pumps, PCMs were also introduced in boreholes heat exchangers.</p> <p>The solution is being demonstrated in three demo sites (Austria, Cyprus and Spain), where the solution is being validated and its energy performance assessed.</p> <p>Preliminary results show that the solution works quite well and that the objectives proposed at the beginning of the project will be achieved.</p> <p>This work was financially supported by the TESSE2b project that has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 680555. This article reflects only the authors' view and the European Commission is not responsible for any use that may be made of the information it contains.</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.