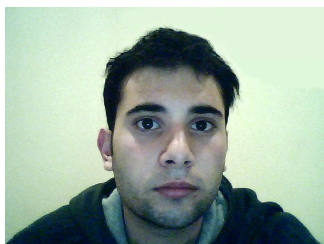


Event:  
Date:  
Place:

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



#	<p><b>Ioannis Konstantaras</b> MSc. Electrical Engineer</p>	
Title:	<p>Research Assistant in Energy and Environmental Research Laboratory, National &amp; Kapodistrian University of Athens (NKUA)</p>	
email:	Yiannis.konstantaras@gmail.com	
Presentation title:	<p><b>Validation of a Control Algorithm for the Efficient Charging of PCM Energy Storage Tanks using an Emulation Platform</b></p>	
<p>As the world energy production shifts towards Renewable Energy Sources (RES), sophisticated control algorithms are required in order to efficiently extract, store, and consume power from RES. Addressing the difficulties that the intermittency of these sources is introducing to energy systems, can have a significant effect on reducing the cost of operation for RES energy systems and transform them from supplementary to base line solutions. When it comes to energy storage in the form of heat a proposed solution is Phase Change Materials (PCMs). To study the operation of RES systems, a variety of test rigs are proposed but their drawback is that the experiments are dependent on the environmental conditions in the testing area. Therefore, testing platforms that emulate the environmental conditions can prove useful as they enable the researchers to test scenarios regardless of the actual environmental conditions during tests. In this work a control algorithm for the efficient charging of PCM energy storage tanks by Solar Collectors (SCs) is validated. The controller runs in real time, reads temperature in various points of the system and controls the flow rate of the heat transfer fluid in order to achieve maximum power extraction from the solar collectors. The solar collectors are emulated using a mathematical model and a real-time emulation platform. The created model runs in real time and its output controls a mixing valve connected to a buffer tank, to emulate various operating conditions of the solar collectors. The same control algorithm is used again to charge the PCM tanks with the use of the solar collector emulation platform. By using this method, the operation of SCs under various conditions was emulated and the effect in the charging of the PCM tanks was studied. If the emulator platform proves to be able to closely emulate the SCs, it can be used to test the charging of PCM tanks, without actual solar collectors installed, thus the tests will not depend on actual environmental conditions (solar irradiance and temperature).</p>		
CV:		
<p>Ioannis Konstantaras is a graduate of the Electrical Engineering department of Technological Institute of Sterea Ellada in Greece and has a master in Intelligent Management of Renewable Energy Systems (ΔΕΣΜΕΣ). He has worked as a quality control inspector for Halcor (ΒΙΟΧΑΛΚΟ) and since 2017 he is working as measurements and data analyst in the Energy &amp; Research Laboratory of National and Kapodistrian University of Athens (NKUA). His research interests include the sectors of measurements and control, renewable energy systems and power electronics. He has good knowledge of programs and platforms regarding measurements, control and simulations like Matlab-Simulink, LabVIEW, Simens-SIMATIC etc.</p>		