


Event:
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#	<p>Amândio Rebola (PhD in Mechanical Engineering)</p>	
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Presentation title:	<p>Assessment of the Influence of the Thermal Properties of the Grout Backfill Material on the Heat Exchange Process of Geothermal Boreholes</p>	
<p>This paper presents a numerical study of the heat transfer process in a vertical borehole with a simple U-tube heat exchanger. The main goal of the study is to assess the influence of the enhanced PCM (phase change material) grout material properties in the performance of the geothermal heat pump system. The simulations were developed for two cases: a Base case with a commercial grout backfill material and a case with a grout backfill material enhanced with PCM. The simulations were developed for the heating mode for a 24 hours period. A typical profile of extracted heat from the geothermal borehole, for residential heating, was set for both cases. The simulations were performed with the Ansys Fluent 16 code using the melting/solidification model. Based on the CFD results the time evolution of the heat transport fluid temperature trough the borehole, the heat transfer rate in the boundary between the ground and the borehole and in the U-tube surface, were analyzed. Despite the short period time considered in the simulations, the numerical results clearly have showed that enhancing the grout backfill material with PCM can improve the performance of the whole geothermal system. The PCM stabilizes the temperature inside the geothermal borehole and, as consequence, the heat transfer process in the geothermal heat pump evaporator occurs at a higher temperature levels.</p>		
CV:		
<p>Dr A. Rebola obtained a PHD in Mechanical Engineering from Instituto Superior Técnico (University Of Lisbon, Portugal) in 2010. Currently he is a researcher in H2020 Project TESSe2b at Instituto Politécnico of Setúbal. He has collaborated in 10 European projects on the energy field and has 18 publications in national/international conferences and peer-reviewed journals he is also author of a scientific Book chapter.</p>		