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Investigation of the thermal behavior of a combined geothermal system for cooling with regards to Algeria's climate

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Abstract

In this study an experimental and numerical analysis, of the energy efficiency of a combined geothermal system composed of two series of connected underground tanks coupled with a cooling floor and a PVC earth-air heat exchanger for the pre-conditioning air of a multizone region, located in Oran (Northern Algeria) is presented. Data acquisition system was set up to analyse the energy performance of the cooling system according to the climatic conditions and the nature of the soil in the city of Oran. Experimental results show that this geothermal system provides an increase of 11 °C for the climate in this region. Using TRNSYS.16 software, a seasonal storage model has been implemented, where the results have been validated by those obtained in the experiment. Simulations have shown that the energy efficiency of the combined geothermal system is more significant in the arid zone of the south and in the semi-arid zone of the north of the country. A co-simulation between two types of

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