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Registering as: Presenting Author

Please select one of the following options:

1. Presenting Author

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Presentation Title: "Performance investigation of a Ground Source Heat Pump system for space heating and cooling of a typical house in moderate climates"

Abstract (max 300 words):

Air Source Heat Pumps (ASHPs) are commonly used for the air-conditioning of buildings. They practically use the atmosphere as a heat source/sink to absorb/reject heat. A Renewable Energy System (RES) that exploits the ground to absorb/reject heat from the building is called Shallow Geothermal Energy System (SGES). The ground temperature is always lower in the summer and higher in winter compared to atmospheric air temperature. In such systems, the usual tool are Ground Source Heat Pumps (GSHPs) that are employed to further increase the heat pump efficiency and reduce the required electricity.

The evolution of the SGEs has led to competition with the ASHPs and the manufacturing of custom designed inverter technology ducted series HPs. It has also initiated the debate whether it is economically feasible to install GHEs as an alternative to the custom designed HP. This study presents such a case with the introduction of a typical house in moderate climate (Cyprus weather conditions) by using an experimentally validated Computational Fluid Dynamics model.

Different water inlet temperatures are examined for both summer and winter. The system efficiency is discussed in relation to the power rejected to the ground and the length of the GHE. Finally, a system cost analysis is presented for different length GHEs and a comparison of the total energy savings is obtained. The GSHP systems, although providing a sustainable and higher performance when compared to custom designed ASHPs, are proven to still fail to be a viable investment.

Topic: Energy Efficiency

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