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GROUND SOURCE HEAT PUMPS COST ANALYSIS IN MODERATE CLIMATE

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ABSTRACT

A debate is taken up on whether it is economically preferential to install Ground Source Heat Pumps (GSHPs), Renewable Energy Systems, instead of Air Source Heat Pumps (ASHPs). To this end, a typical house heating/cooling load for moderate climates is chosen and the thermal response of Ground Heat Exchangers (GHEs) of GSHPs and their characteristics – based on experimental data and CFD-model simulations in FlexPDE – are discussed. The results indicate that with greater difference between the inlet GSHP temperature water and the ground, a higher heat rejection is observed. The GSHP capacity over the input power operating temperature is affected by the fluid temperature entering the Heat Pump, affecting the system cost as more GHE boreholes may be needed for reducing the temperature. A cost analysis is thus presented for different-length GSHP systems and a comparison of the total energy savings is obtained versus highly competitive inverter technology ducted series ASHP systems.

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