

Construction of vertical boreholes for closed loop heat pump systems: Geoexchanger System for Buildings Heating and Cooling

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ABSTRACT: The move towards a de-carbonised world, driven partly by climate science and partly by the business opportunities it offers, will need the promotion of environmentally friendly alternatives, if an acceptable stabilisation level of atmospheric carbon dioxide is to be achieved. This requires the harnessing and use of natural resources that produce no air pollution or greenhouse gases and provides comfortable coexistence of human, livestock, and plants. This article presents a comprehensive review of energy sources, and the development of sustainable technologies to explore these energy sources. It also includes potential renewable energy technologies, efficient energy systems, energy savings techniques and other mitigation measures necessary to reduce climate changes. Geothermal heat pumps (GSHPs), or direct expansion (DX) ground source heat pumps, are a highly efficient renewable energy technology, which uses the earth,

groundwater or surface water as a heat source when operating in heating mode or as a heat sink when operating in a cooling mode. It is receiving increasing interest because of its potential to decrease primary energy consumption and thus reduce emissions of the greenhouse gases (GHGs). The main concept of this technology is that it uses the lower temperature of the ground (approximately 32°C), which remains relatively stable throughout the year, to provide space heating, cooling and domestic hot water inside the building area. The main goal of this study was to stimulate the uptake of the GSHPs. Recent attempts to stimulate alternative energy sources for heating and cooling of buildings have emphasised the utilisation of the ambient energy from ground source and other renewable energy sources. The purpose of this study, however, was to examine the means of reducing of energy consumption in buildings, identifying GSHPs as an environmental friendly technology able to provide efficient utilisation

Biography

Abdeen Mustafa Omer (BSc, MSc, PhD) is an Associate Researcher at Energy Research Institute (ERI). He obtained both his PhD degree in the Built Environment and Master of Philosophy degree in Renewable Energy Technologies from the University of Nottingham. He is qualified Mechanical Engineer with a proven track record within the water industry and renewable energy technologies. He has been graduated from University of El Menoufia, Egypt, BSc in Mechanical Engineering. His previous experience involved being a member of the research team at the National Council for Research/Energy Research Institute in Sudan and working director of research and development for National Water Equipment Manufacturing Co. Ltd., Sudan.

Recent Publications

1. Omer, A. M. (2008). Energy, environment and sustainable development, Renewable and Sustainable Energy Reviews, Vol.12, No.9, pp.2265-2300, United Kingdom, December 2008.
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