Borehole energy storage Guernsey

This study focuses on an evaluation of the subsurface ground temperature distribution during operation of a soil-borehole thermal energy storage (SBTES) system. The system consists of an array of five 9 m-deep geothermal heat exchangers, configured as a central heat exchanger surrounded by four other heat exchangers at a radial spacing of 2.5 m

From this aspect, the borehole system, as a interseasonal heating storage, can effectively utilize renewable energy to provide heating to ease the adverse impact from domestic heating.

Borehole thermal energy storage technologies use an array of boreholes (narrow shafts bored in the ground, either vertically or horizontally) to store excess heat in shallow geological environments and can provide seasonal energy storage ...

Geopolitical developments since February 2022 and the numerous debates on climate change such as the COP27 are pushing for a greater acceleration in decarbonising the energy sector. The use of geothermal energy for thermal energy production and storage in district heating and cooling (DHC) grids may also be a key element in overcoming short-term energy ...

Borehole thermal energy storage (BTES) systems facilitate the subsurface seasonal storage of thermal energy on district heating scales. These systems" performances are strongly dependent on operational conditions like ...

A seasonal thermal energy storage allows to store thermal energy over long periods (weeks or months); according to the review of Rad and Fung [8], borehole thermal energy storage (BTES) is ...

If it is impossible to exploit a suitable aquifer for energy storage, a borehole thermal energy storage system (BTES) can be considered. Vertical ground heat exchangers (GHE), also called borehole heat exchangers (BHE) are widely used when there is a need to install sufficient heat exchange capacity under a confined surface area such as where the ...

The BTES system consists of a heat source, borehole thermal storage, borehole heat exchangers (BHEs) and often a buffering tank due to the slow rate of charge and discharge [53]. The BHE is composed of a borehole, thermal grout, and u-tube arrangement encased within the grout to circulate the heat transfer fluid (HTF) along the vertical length ...

Borehole thermal energy storage (BTES) exploits the high volumetric heat capacity of rock-forming minerals and pore water to store large quantities of heat (or cold) on a seasonal basis in the geological environment. ...

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The Borehole Thermal Energy Storage (BTES) system is to store the solar energy, and successfully redistribute the regenerative solar thermal energy near the equator. It can store the regenerative heat and waste heat from a higher heat source temperature in summer and release it in the early winter season, ...

utilization of borehole thermal energy storage (BTES) emerges as a promising technology (Homuth et al., 2012). This method can guarantee a consistent and reliable heat supply even with fluctuating renewable energy sources (Lanahan and Tabares-Velasco, 2017; Miedaner et al., 2015; Welsch et al., 2016). ...

Seasonal energy extraction and storage by deep coaxial borehole heat exchangers in a layered ground. ... As a result, the effective energy load entering each borehole is likely lower than the nominal 12.5 kW. In our calculations, we do not incorporate those system losses, which may lead to a slight overestimation of the temperature-to-power ...

Borehole thermal energy storage (BTES) exploits the high volumetric heat capacity of rock-forming minerals and pore water to store large quantities of heat (or cold) on a seasonal basis in the ...

Borehole thermal energy storage (BTES) uses the underground itself as the storage material. Underground in this context can range from unconsolidated material to rock with or without groundwater. The material can contain pores or fractures in the case of hard rock. Depending on the water content of the underground it is called saturated if all ...

Besides density and specific heat of the storage material (energy density), other properties are important for sensible heat storage: the thermal conductivity and diffusivity, the temperature range of operation, the stratification of the storage unit and the heat loss coefficient as a function of the surface areas to volume ratio [12], [13 ...

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