Deliverable D2.7

Overview of the existing very shallow and horizontal solutions

WP2

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Dissemination Level

PU	Public	
CO	Confidential, only for members of the consortium (including the Commission Services)	**X**
CI	Classified, as referred to in Commission Decision 2001/844/EC	

Introduction

Shallow geothermal energy can be defined as the heat output which is provided by a subsurface source like geothermal boreholes. However, this classification is not complete. Heat output as the extraction output (heating) is one aspect of shallow geothermal energy, another and lesser noticed one us the feed-in output (cooling), in which heat energy is dissipated into the ground (e.g. air conditioning of rooms in summer).

Depending on the location, the soil can have very different characteristics which derives of its geological origins and pedological history. It can be composed of unconsolidated rocks (e.g. gravel, sand, silt, clay, and their mixtures), solid rocks (e.g. granite, basalt, lime, salt) or organic deposits (humus, peat, coal or anthropogenic detritus). The rock-specific characteristics (e.g. mineral composition, density, storage, etc.) also determine the thermal properties of the rocks and soils (e.g. thermal conductivity and thermal diffusivity). The water content of the rocks and soils and the groundwater supply are also important factors for geothermal heating and colling purposes. E.g. for a borehole drilled to install a ground source heat exchanger (GSHE), several types of rock with different water contents/conduits are usually crossed. The efficiency of an GSHE consists of the individual performances of the surrounding rock- and soil materials and their influence depending by respective water content and water flow.

The specific thermal capacity of the soil and the performance of the GSHE determines the amount of thermal energy which can be extracted and/or injected into the ground during the operating time. On a field with several GSHEs, the GSHEs can influence each other, depending on their distance and relative position. For an efficient long-term use of geothermal energy, the design of the heat pump and other connected thermally active components (e.g. ground heat exchanger) is fundamental. Thus, the correct dimensioning of the heat exchanger field is determined by the specific soil conditions and the technical issues and performance of the GSHE. Which means, that a geothermal system can only be considered and evaluated in its entirety.