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Deliverable D 1.5

Multi-parameter geothermal mapping

WP1

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Project acronym	Cheap-GSHPs
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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	

Publishable summary

The D1.5 “Multi-parameter geothermal mapping” is a confidential document delivered in the context of WP1, Task 1.5, regarding the production of maps which could represent the feasibility of actual state HE and of newly developed Cheap-GSHPs technologies.

Firstly an empirical method for creating maps of €/kW was conceived. The method started with the collection of data from other tasks and WP. In particular, data from Task 1.1, 1.2, 1.3, 1.4 were collected and homogenized in order to provide an overview of geological, climatic and energetic characteristics across Europe. Data from Task 2.1, 3.4 and 3.5 was used as reference basis for costs calculation.

This data was the basis for the execution of a large amount of numerical simulations, which could correlate ground surface temperature, thermal conductivity and required BHE length for given energy demands (referential building types of Task 1.4). A first set of numerical simulations was performed for actual state double-U HE of Task 2.1, while a second set was performed for a large coaxial HE developed by Cheap-GSHPs, reported in Task 3.5 in order to subsequently compare the economic improvements on a spatial basis.

Regression algorithms between mappable parameters (GST, λ required BHE length) for each building types were developed. Seven case studies were considered for the application of the method, in order to test its reliability for different geologies, climates and data availability.

GST maps and thermal conductivity maps were produced for each of the analyzed case studies using respectively climatic normal and large scale geological maps (from 1:25000 to 1:100000): the identified regression algorithms were applied on these GST and λ maps in order to produce required BHE length maps which allowed the creation of €/kW maps.

The maps for actual state double-U technology and Cheap large coaxial were compared against each other to understand the potential savings of Cheap-GSHPs technologies compared with actual state ones. Qualitative feasibility maps for the helicoidal HE were also developed.

The deployment of the new drilling and HE technologies coming from Cheap-GSHPs seems to be very positive in terms of €/kW savings, with savings that frequently range from 8 to 20%, depending on country. Moreover, the method seems reliable, not only to create €/kW maps, but also semi-quantitative maps of other techno-economic indexes.

All the maps and information produced by Task 1.5 can be useful for planners, designers and architects in order to perform pre-feasibility sizing.