BTESmart an innovative pilot to optimize the coupling of a borefield UTES and thermal solar panels

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The development of UTES (Underground Thermal Energy Storage) is a key element of the future green heat energy systems because the consumer needs generally do not match with the availability of renewable heat energy sources (can be hours, days or months depending on its origin and the seasonal climate variation). In that perspective, it is of primary importance to design and develop efficient heating solution in order to propose cost effective and reliable large scale heating system. The BTESmart project contributes to these objectives.

The backbone of the BTESmart project relies on the coupling of a borefield and thermal solar panels to conduct a seasonal heat storage. The project is currently on construction and will provide the heating needs for the administrative buildings of Storengy main natural gas storage facility located in Chémery (region Centre – Val de Loire) which represent 211 MWh. These needs will be addressed with about 260 m2 of solar panels combined with a BTES charged and discharged through 12 radial lines of 4 boreholes in series.

The BTESmart project includes R&D activities to improve the efficiency and reliability of such systems. First, the shape of the borefield is concentric in order to optimize the thermal storage but it includes in addition, an external thermal barrier composed of recovery boreholes with the aim of reducing the net lateral thermal losses in the ground (subsurface optimization). Other important R&D topics are related to the extended monitoring implemented with specific both surface and sub-surface data device acquisitions and the full characterization of the subsurface heterogeneities. Such data and information will enable to strengthen and validate the modelling tools in order to deliver more reliable forecasts. The final R&D objective is the global optimization on real time mode using the whole set of collected monitoring data through a smart system taking into account internal and external parameters in order to identify the best choices in terms of rate allocation towards the various components of the combined system.

Storengy BTESmart system construction has just started in December 2017 and the objective of this work is to present both the content of the project and the results obtained so far.

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