

OPPORTUNITIES FOR BTES IN EXISTING BUILDINGS – IDEAS AND FIRST RESULTS FROM PROJECT GEO4CIVHIC

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INTRODUCTION: A major obstacle to decarbonisation in the building sector is the comparably low share of new construction, and the specific problems encountered when supplying heat and/or cold from renewable energies (RES) to existing, and in particular older, buildings. Without a solution to the problem of RES in refurbishment, however, the decarbonisation of the building stock will simply take too long. Shallow geothermal technologies like UTES have contributed substantially to decarbonisation in new construction. However, for a wider deployment in existing buildings, in particular in historical ones, the technologies need to be developed further and innovative ideas must be tested and brought to the market.

MATERIALS AND METHODS: Within the EU-funded project GEO4CIVHIC a survey was done to identify and understand all other possible barriers to BTES in existing building environment, be they technical or socio-economic, and the project partners work on suggestions for suitable solutions. The work then addressed two principal barriers, which are construction of ground heat exchangers under constrained site conditions, and adaption of heat pumps and other components to older heating/cooling systems. A specific emphasis is given to historic buildings, i.e. those dating from before the mid of the 20th century, including listed buildings, where the constraints are more severe. Development work is done to provide technical solutions for overcoming these barriers, e.g. with novel drilling tools and enhanced heat pumps. Several demonstration cases are under development to test the solutions found (4 real sites in Belgium, Ireland, Italy and Malta, and 12 “virtual” sites, where theoretical case studies for renovation with borehole heat exchangers are performed on real, existing buildings).

RESULTS: Less invasive, less costly and quicker drilling and installation methods for borehole heat exchangers (BHE) have been developed, partly drawing on results from the previous H2020-project Cheap-GSHPs and others. Also material development within the parallel project GEOCOND is taken into account and respective novel BHE materials are included in the tests. Test installation is partly performed on some pilot sites, and will continue at the 4 real demonstration sites. The size of the examples, in particular the “virtual” case studies, varies widely and comprises small systems with a few BHE as well as larger, true BTES installations.

In addition to new hardware, a Decision Support System is under development to help owners of potential renovation project in assessing if a geothermal system can be installed on a certain site and for a certain building, and if so, which options might be the most economically interesting ones. A database and GIS-system for suggested drilling method and estimated drilling cost is already implemented.

The presentation will give an overview of the project and explain the barriers identified, and will then focus on the new development to overcome barriers for drilling and BHE installation in the built environment, in particular for BTES applications.

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ENERSTOCK 2021

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