



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 792355.



Deliverable D5.6

Evaluation of performance in real demonstration facility No 3 – Battel (Mechelen), Belgium

WP5

Grant Agreement number	792355
Project acronym	GEO4CIVHIC
Project full title	Most Easy, Efficient and Low Cost Geothermal Systems for Retrofitting Civil and Historical Buildings
Due date of deliverable	30/03/2023 (M60)
Lead beneficiary	15 – GEO-GREEN
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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

Deliverable D5.6 is a confidential document delivered in the context of WP5, task 5.3 and subtask 5.3.3: ‘Real case No.3 Residential Building in Mechelen, Belgium developed as part of the GEO4CIVHIC project.

The deliverable describes the design, installation and monitoring of three of the GEO4CIVHIC project technologies installed in a residential house in Mechelen. The house was completely stripped internally and renovated, including the roof. The task has designed and installed a 13.5 kW ground source heat pump developed by Galletti/Hi-Ref. The heat pump supplies high temperature and low temperature terminals installed in series, ensuring a high temperature gradient to the heat pump in the heating season. This allows the use of CO₂ as refrigerant, the refrigerant with the lowest global warming potential, whilst achieving a COP of about 3.3 in heating mode. The heat pump and the ancillary equipment are installed in a new technical room inside the renovated building. The objective of this demo case is to demonstrate solutions where part of the high temperature terminals cannot be replaced during renovation for cost or conservation reasons. The source side of the system comprises the installation of four stainless steel, highly efficient coaxial heat exchangers developed as part of the project.

The innovative Hydra-Red method was used for the installation of two of the heat exchangers using the compact drill rig developed within the project specifically for drilling in built environment. The rig has a reduced weight facilitating the lifting by crane into the garden of the house. The other two heat exchangers, developed in the project were inserted in a conventionally drilled borehole.

Due to the COVID-19 restrictions and the subsequent difficulties of materials supply, implementation delays incurred in the renovation of the building as well as in the installation of the proposed plant. The text of the deliverable provides a detailed overview of the design process and the realization of the system followed by the installation of the monitoring system and the performance result analysis.