

A newly installed research infrastructure for geothermal energy in a subsurface sedimentary reservoir for direct-use heating

The TU Delft campus geothermal project

Abels, Hemmo; Barnhoorn, Auke; Daniilidis, Alexandros; Bruhn, David; Drijkoningen, Guy; Elliott, Kaylee; van Esser, Beer; Laumann, Susanne; Van Paassen, Piet; Vargas Meleza, Liliana

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A newly installed research infrastructure for geothermal energy in a subsurface sedimentary reservoir for direct-use heating: the TU Delft campus geothermal project

Hemmo Abels, Auke Barnhoorn, Alexandros Daniilidis, David Bruhn, Guy Drijkoningen, Kaylee Elliott, Beer van Esser, Susanne Laumann, Piet Van Paassen, Liliana Vargas Meleza, Andrea Vondrak, Denis Voskov, and **Phil Vardon**

Delft University of Technology, Civil Engineering and Geosciences, Delft, Netherlands (h.a.abels@tudelft.nl)

A geothermal doublet has been installed in a sedimentary reservoir for direct-use heating on the TU Delft campus, targeted to supply around 25 MW of thermal energy at peak conditions. This contribution presents the implementation and initial data collection from the doublet, including an initial evaluation of the logging and coring campaign. Nearly half of Netherlands natural gas consumption is allocated to heating, and the on-campus CO₂ emissions from heating exceed 50%. The doublet has been designed with two primary aims of research and commercial heat supply, with the wells being completed in December 2023. The project will be operated by a commercial entity, and built into a larger thermal energy system including a high temperature underground storage system, with the first energy production planned in 2025. The research questions relate to field-scale geothermal operations, e.g. how reliable is the long-term energy production?, how do materials perform in the long-term? and how can geothermal projects be best monitored? The research programme involves the installation of a wide range of instruments alongside an extensive logging and coring program and monitoring network. The doublet has been cored, with substantial continuous samples from the heterogenous reservoir, alongside a large suite of open hole well logs in the reservoir and through casing logs in overlying geological units. A fiber-optic cable will monitor distributed pressure throughout the producer reservoir section, at approximately 2300m depth, which will be installed during commissioning. A local seismic monitoring network has been installed in the surrounding area with the aim of monitoring very low-magnitude natural or induced seismicity. The project is a key national research infrastructure and is being incorporated into the European EPOS (European Plate Observing System, <https://www.epos-eu.org/>), such that accessibility and data availability will be as wide as possible. All observations will be included in a digital-twin framework that will allow to make better decisions in future geothermal projects.