



## PROJECT DURATION



### START DATE

01/03/2022

### END DATE

28/02/2025

## FUNDING

**2.99 Million €**  
**100% EU contribution**

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European  
Innovation  
Council



## DeepU PARTNERS

- \* RED S.r.l. (Coordination)
- \* Università degli Studi di Padova
- \* PREVENT GMBH
- \* Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.
- \* Terra GeoServ Limited
- \* Consiglio Nazionale delle Ricerche
- \* Wrocław University of Science and Technology

## COORDINATOR

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## Follow our progress on

[www.deepu.eu](http://www.deepu.eu)




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DeepU



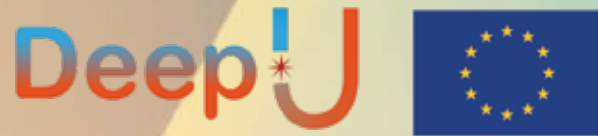
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## Deep U-tube heat exchanger breakthrough: combining laser and cryogenic gas for geothermal energy exploitation

DeepU





Increasing accessibility of deep geothermal resources for low carbon heating and power generation is a fundamental requirement to accelerate the development of decarbonised and indigenous energy supplies in Europe.

The DeepU project seeks to achieve the deployment of 'geothermal anywhere' and at providing a stable, uninterrupted, base load energy to meet global CO<sub>2</sub> emission reduction targets. The disruptive technology envisioned in the project will revolutionise the deep geothermal energy sector, offering a complementary approach and an alternative solution to traditional energy storage and production, decentralising the power supply also in areas where this is currently deemed uneconomic.

## ABOUT DeepU

The ultimate goal is to extract energy from the underground using deep (>4 km) vitrified, waterproof, non-cracked U-tube heat exchanger by combining laser and cryogenic gas into a single technological drilling solution. This innovative technology liquefies and vitrifies the rocks, leaving the borehole ready for heat exchange immediately after drilling. In addition, the demonstration at the laboratory scale produces the information required for assessing the technological, environmental and economic sustainability and defining the potential and commercial attractiveness of the proposed solution.

## OBJECTIVES

- \* Develop and calibrate the drilling technology by: selecting a cryogenic gas able to cool in a controlled manner the rock melted by a laser; developing an innovative lightweight drill string able to host the gas and the laser at the same time; developing specific temperature control analysis and innovative laser lenses able to convey the heat and to sustain multilateral drilling;
- \* Determine the physical-thermal phenomena affecting different kinds of rocks to assess the borehole wall vitrification and integrity;
- \* Evaluate the legislative aspects and environmental standards related to the innovation proposed;
- \* Define the DeepU geothermal exploitation potential, including economic analyses, based on case studies modelling.