Geothermal energy could be cheaper to access, thanks to a new drilling technology.

The ORCHYD project, abbreviated as Novel Drilling Technology Combining Hydro-Jet and Percussion for ROP Improvement in Deep Geothermal Drilling**,** funded by the European Union (EU), under the Horizon 2020 programme will develop a new drilling technique that combines the existing technologies to help reduce the operational time for geothermal exploration and thus the total cost to utilize the geothermal energy.

This project is led by researchers from ARMINES/ MINES-ParisTech in France. Their partners include Imperial College London (UK), SINTEF (Norway), University of Piraeus (Greece), China University of Petroleum (East-China) and a drilling company Drillstar Industries (France).

Geothermal energy harnesses the heat of rocks to convert water to steam and supply an uninterrupted power as opposed to wind and solar energy sources. This makes geothermal energy a leading candidate for a carbon neutral, efficient and a reliable source of renewable energy supply across the globe. However, the current drilling methods to reach the rocks at a depth of more than 4 Km are slow and inefficient - making geothermal sources supply less than 2% to the global energy share.

Now, a new €4 million research and innovation action grant from the EU, for a period of three years, will help researchers to evaluate a non-conventional, fully fluid-driven drilling technology. This approach combines a high-pressure water jet system with an advanced fluid-powered downhole hammer system, that will help cut the rocks at greater depths in an efficient and safe manner.

Using the envisioned drilling approach, researchers of the ORCHYD project aim to increase the unit drilling rate by four times than the average rate currently possible - drastically reducing the drilling costs by unto 65%. This first-of-its-kind drilling approach, combining two different and established rock cutting technologies, will make the utilization of geothermal energy cheaper and more widely available - a facilitator in the energy transition to tackle the global climate crisis.

Project leader ARMINES/ MINES-ParisTech will utilize their experimental facilities to test the new drilling approach on the test benches. The experimental data collected will be utilized by the partners - mainly Imperial College London and SINTEF - to understand the rock cutting process and to optimize the physical parameters to achieve the projected 4X increase in the penetration speed. China University of Petroleum is developing the fluid powered hammer system that cuts the rock using a percussive action. The industrial partner of this project, Drillstar bridges the gap between the industry and the academia, by providing relevant information about the real time drilling process and its physical limitations. A key segment overseeing the impact of geothermal energy on the energy security and in society overall, is carried out by University of Piraeus.

A continuous feedback loop setup in the consortium between theoretical and experimental work; academia and industry, is one of the major strengths of this project. The Scientific Coordinators Prof. Hedi Sellami and Dr. Laurent Gerbaud said: “The fundamental innovation of the project lies both in the development of a new principle to ‘free’ the deep rock from existing concentrated stress in the immediate vicinity of the drilling tool, allowing for an easier rock-cutting action, and the reflection of the impact waves on the slots cut by the high-pressure water jet.”

A new functioning prototype is expected to be built by 2024 which will be first tested on test benches at the ARMINES laboratory before field trials. Visit **here** for the project approval and **here** for further updates.

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