

THIS IS WHAT CLIMATE-FRIENDLY GEOTHERMAL HEAT FEELS LIKE



ERDF. Exploiting the potential of geothermal energy

In the GeoPuR project, the Helmholtz Centre Potsdam – German Research Centre for Geosciences (GFZ) is researching innovative seismic measurement methods using fibre optic cables. The aim is to map the subsurface so that natural deposits of geothermal energy can be used for heat supply.

On 26 June 2020, the subsurface in Potsdam shook when once again an unexploded bomb, this time an aerial bomb from the Second World War, had to be detonated in a controlled manner. What meant inconvenient closures and evacuations for the local population was a welcome opportunity for the GeoPuR research project from the German Research Centre for Geosciences in Potsdam to investigate the ground conditions based on the vibrations measured in the existing fibre optic network caused by the explosion.

The research aims to create a geological model of Potsdam's subsurface so that the as yet unexploited potential for geothermal energy production (heat) that lies hidden beneath the city can now be measured and mapped. GeoPuR is backed by the European Regional Development Fund (ERDF).

Project details



Beneficiary:

Helmholtz-Zentrum Potsdam
Deutsches GeoForschungs-
Zentrum – GFZ
Telegrafenberg
14473 Potsdam
gfz-potsdam.de



Priority:

Strengthening of research, technological development and innovation



Investment amount:

EUR 745,000, of which EUR 596,000 is ERDF-funding



Project term:

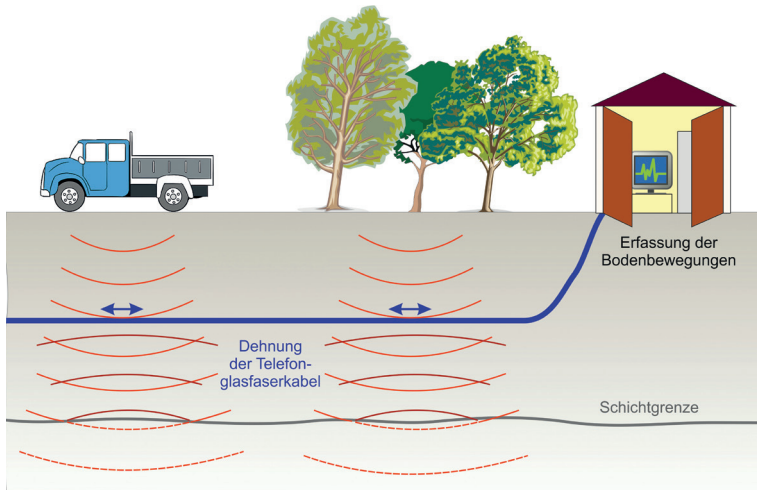
April 2020 to July 2022



WHY IT MAKES SENSE

- ✓ **Geological exploration of the subsurface** and deposits of potential geothermal energy
- ✓ **Expanding the data base, reducing the work and money required for seismic surveys** through borehole-free measurement methods and the use of existing infrastructure
- ✓ **Reducing CO₂ generation** for future heat supply in urban areas
- ✓ **Monitoring ground movements** and work carried out in the subsurface
- ✓ **Creation of two new jobs** and support for students' final theses

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Schematic illustration of telecommunication cables serving as seismic sensors © B. Schöbel

GeoPuR instead of drilling

The researchers measure minimal changes in the fibre optic cables triggered by traffic or vibrations, for example. The detonation of the bomb therefore provided an excellent signal source for a trial measurement. In a planned experiment, seismic vibrator vehicles were also used to generate sound waves that could be sent underground and observed through the fibre optic cables over a length of up to ten kilometres and with an accuracy of one metre. They were expected to provide information about the soil structure and, for example, heat deposits. The innovative technology of using the existing fibre optic network for the measurements makes seismic surveys easier and is also more cost-effective. Before this, several holes had to be drilled for this kind of exploration and numerous geophones installed as sound wave receivers.

Exploiting future potential

Using the heat deposits found through the GeoPuR project could help in the long term to advance climate-neutral heat supply for the city of Potsdam. Following successful implementation of the findings, there will also be opportunities for other municipalities to noticeably reduce the generation of CO₂ for heat supply in urban areas. In addition to underground exploration, this measurement approach opens up further fields of application for energy technology. Seismic shocks and earthquakes in other parts of the world, for instance, can be detected earlier. It also makes it easier to service critical infrastructure buried in the ground, for example, to detect a gas leak in a pipeline.



Seismic vibrator vehicles on Heinrich-Mann-Allee in Potsdam © C. Cunow

DID YOU KNOW?

The earth's core has a temperature of up to 6,000°C. The accessible depth range of 3,000 to 7,000 metres contains so much geothermal energy beneath the Federal Republic of Germany that it could theoretically supply the population of Germany with electricity and heat for an estimated 10,000 years. Up to now, this inexhaustible potential for a CO₂-neutral future has hardly been tapped into.