

# Success Story

## Interdisciplinary Research for Sustainable Energy Production



A Successful EU Framework Programme Participation



**The “REFLECT” project aims at investigating the properties of the geothermal fluids that are responsible for the transfer of heat between the geosphere and the engineered components of a power plant. This new knowledge will allow the functional improvement of the geothermal installation and work towards the creation of a sustainable energy resource. The project received funding from Horizon 2020, the 8th EU Framework Programme for Research and Innovation.**

Today, more than ever, electricity production is one of the topics that drive the debate on sustainability and the reduction of our environmental footprint.

One method of energy extraction is through geothermal technology, an alternative and renewable form of energy production whereby heat from fluids in the geosphere is converted into electricity in a geothermal power plant. In order for electricity to be generated, the fluids, which are naturally at a high temperature and pressure, are allowed to expand and cool down. This process generates steam, which is used to rotate turbines for electricity generation. However, it also results in chemical and physical processes like corrosion, precipitation and degassing, which have serious consequences for the operation of these power plants.

Because the chemical and physical components and the microorganisms contained in the fluids at high pressures and temperatures are so poorly defined to date, problems in geothermal installations are frequent and cause high maintenance costs, which elevate operational costs and

limit investment.

Thanks to the REFLECT project, several scientific groups are collecting new data about fluid properties in order to better understand and improve operational problems in geothermal power plants. The project presents a number of challenges, starting with the fact that each geological area has a different fluid composition that must be studied on a case-by-case basis.

The project brings together a large number of scientists from all over Europe working in various research fields. Geologists, physicists, modellers, and microbiologists are contributing to the research on the technological advancement of geothermal electricity production sites. Prof. Pilar Junier and PhD student Danaé Bregnard from the University of Neuchâtel are among the participants and are the only microbiologists in the project. Environmental sustainability is close to their hearts, which is why they have devoted their careers to studying microorganisms and how they interact with their environment.

*“If you understand the functioning of microorganisms, you can really try to use this natural resource in a way that allows you to find better technologies to improve human lives and also ecosystem health.”*

Participation in a project of this magnitude brings together different disciplines and concentrates a wealth of knowledge in the service of finding solutions for a sustainable future.

# “In many fields, a European network can be even more important than a local one” (Pilar Junier)

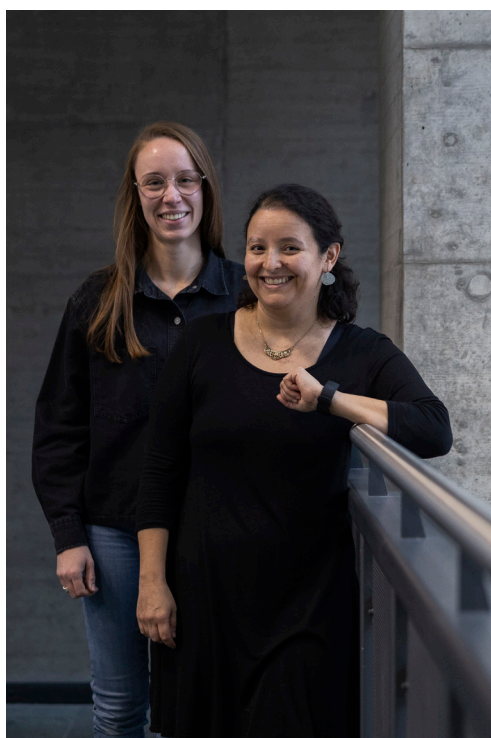
“In order to manage geothermal power plants more sustainably, we need to know the physical, chemical and also microbial properties of the fluids, so we need to have multiple points of view,” says Bregnard.

For Junier and Bregnard, an open mind for collaboration is the key to not missing out on great opportunities that may arise in the future.

Participation in EU Framework Programmes creates an international network between researchers, institutions,

and industry, which also benefits the researchers’ future careers.

REFLECT is a confirmation of the importance of networking internationally to address social issues in a sustainable way. Not least, it is also an example of progress in terms of fighting against gender discrimination “There are a lot of women working on this project, and a lot of them are in leadership positions, also in roles which are particularly technical. This is a good sign for the younger generation,” explains Junier.



Prof. Pilar Junier (right)  
PhD Student Danaé Bregnard (left)  
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## FACTS & FIGURES

**Project Name** REFLECT - Redefining geothermal fluid properties at extreme conditions to optimize future geothermal energy extraction

**Programme** Secure, Clean and Efficient Energy

**Interviewees** Prof. Pilar Junier, PhD student Danaé Bregnard

**Project Participants** Helmholtz Centre Potsdam – GFZ German Research Centre for Geosciences (Coordinator), and 13 other European partners

**Research Area** Electric power generation, Geothermal energy

**Project Dates** 01.01.2020 - 31.12.2022 (2 years)

**Project Cost** €4 992 761

**Project Funding** €4 992 761

**More Information** [www.reflect-h2020.eu](http://www.reflect-h2020.eu)

## PROGRAMME

Horizon 2020 Societal Challenge 3 (Secure, Clean and Efficient Energy) provided funding to support the transition to a competitive energy system. Research and innovation projects in this area try to overcome challenges such as increasingly scarce resources, growing energy needs and climate change.

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