

The **Energy and Technology Policy Group (EPG)** offers a

Master thesis project: Innovation patterns of geothermal energy technologies

Research field and tasks

Deep geothermal energy is an established form of clean energy generation. Recently, interest in geothermal has resurged due to its potential to generate dispatchable electricity and high-temperature heat. Furthermore, there are several promising innovations that might reduce costs substantially. However, the buildout to date is still slow in most regions, and progress in cost reductions is lagging, especially when compared with wind and solar PV plants [1].

It is crucial to examine past developments in the industry and the mechanisms of technological learning involved to create an understanding of the ongoing innovation dynamics, not least to inform future developments [2].

A preliminary analysis showed that innovations in geothermal energy happen locally, due to different geographical circumstances and energy needs. As a consequence, the technologies used differ by country and region. Recently, we studied the geothermal innovation system in Germany [3]. In the next step, we will expand the analysis to further countries.

With this thesis, we will deepen our knowledge by focusing on a second country. The most obvious choice is the USA, due to its large generation capacity, long-standing research in geothermal energy, and vital landscape of industry players and start-ups in the field. In case of special interest from the master's student, it is possible to alternatively cover another country with relevance to the global development of geothermal energy, such as Indonesia, the Philippines, Turkey, Kenya, Mexico, or Iceland.

Your task will include:

- Retrieving and analyzing techno-economic plant data, expanding our existing geothermal project database
- Planning and conducting interviews with industry stakeholders, with the support of your supervisor
- Distilling innovation mechanisms and barriers and relating them to observed techno-economic developments

Requirements

We are looking for a student interested in renewable energy technologies. You should have a background in engineering, management, or other relevant disciplines. Basic experience with data analysis in Python and Excel is required. Fluency in English is required. Other languages are a plus if relevant to the case study country.

Conditions

You will be primarily supervised by Florian Mueller and colleagues from the Energy and Technology Policy Group ([EPG](#)). Applications from non-ETH students are welcome. The start date is negotiable.

Your application

Please send us your CV and transcript of records (with grades) and a short cover letter that describes your motivation, relevant experience, and preferences for the starting date. Please email your documents in one PDF file to Florian Müller (florian.mueller@gess.ethz.ch). We will review the applications on a rolling basis until the position is filled.

References

- [1] doi.org/10.1016/j.jclepro.2020.124827
- [2] doi.org/10.1016/j.joule.2019.11.012
- [3] [Mueller, F., Steffen, B., & Schmidt, T. \(2024\). Learning in geothermal power and heat generation – A German case study.](#)