

New report details Switzerland's geo-energy potential

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When the Swiss government decided to phase out nuclear power in the wake of the Fukushima accident on 11 March 2011, it also launched a major nationwide research program to explore alternative energy

sources, with the goal of fully replacing the country's nuclear power with renewable energy by 2050. Some CHF 250 million in funding was deployed to develop and implement a comprehensive strategy. The nationwide research program entailed setting up eight Swiss Competence Centers for Energy Research (SCCERs) to explore seven energy-related topics. Universities and research institutes from across the country, in association with around 900 businesses and public-sector organizations, conducted 1,500 research projects through these Centers between 2013 and 2020. Innosuisse was commissioned to evaluate the results of the projects, and it issued its final report on 22 July 2021.

As part of this nationwide research program, EPFL led the effort in the area of geo-[energy](#), which included assessing Switzerland's potential for carbon storage and for deep and shallow geothermal energy. What are the main conclusions?

Carbon storage in Switzerland

"The research we've done over the past eight years shows that there's enough underground capacity in Switzerland to store large amounts of CO₂, primarily in the Swiss Plateau, from Fribourg to Zurich," says Prof. Laloui. "In fact, the carbon storage process would be easier than burying nuclear waste." Experts involved in the project estimate that 50–700 million tons of CO₂ could be stored in Switzerland's ground. These would mainly be emissions from the construction industry (cement and steel production), the biochemicals industry and agriculture. "Of the about 40 million tons CO₂-eq emitted in Switzerland each year, some 12 million could potentially be stored underground. That means for those emissions the country could become carbon-neutral, or even achieve negative emissions, for 70 years," says Prof. Laloui. However, he also points out that reaching this goal would require that today's greenhouse gas emitters decarbonize their production chains.

Over 20% share of shallow geothermal energy by 2035

Prof. Laloui's research on shallow geothermal energy indicates that there's considerable potential for this type of renewable resource. "The Swiss government had set a target of having 11% of the energy used for its buildings' heating and cooling systems come from geothermal energy by 2035. The project outcomes show that this percentage could easily be doubled," he says. With regard to deep geothermal energy—that is, natural heat located one to three kilometers underground—The activities conducted in the context of the geo-energy SCCER-SoE project with the Geneva Canton public utility which found that if heat accumulated during the summer was stored below Lake Geneva, it could be used to warm up some of the Canton's buildings during the winter.

The geo-energy SCCER-SoE study also looked at the scope for using geothermal energy to generate electricity. For now, the results indicated that as something that could be an option in the future. "Many researchers have looked at how rocks can be fractured without triggering seismic movements, but more research is still needed. We'll surely be able to do it one day, but we're not there yet."

Prof. Laloui believes a lot of important findings have come out of these years of intensive research. Switzerland now ranks among Europe's top centers of excellence in geo-energy, and the joint effort by 250 scientists across the country has been highly effective. He now hopes that the research will be taken further. "I strongly encourage the Swiss government to set up a national research center on geo-energy and carbon storage in order to leverage the discoveries we've already made and keep our solid skills in this area within the country."

Pilot test planned in Iceland

The latest report by the Intergovernmental Panel on Climate Change (IPCC) is unequivocal: it is only by implementing a portfolio of measures that the signatories of the Paris Agreement will be able to meet their targets and cut their greenhouse gas emissions. One measure that's needed urgently is carbon storage, and Switzerland has not yet decided what steps it will take in this regard. However, on 20 July 2021, Switzerland and Iceland signed a statement of intent to jointly support and develop negative-emission technology—and this includes carbon storage. A pilot test to that effect will soon be carried out in Iceland. For now, Switzerland does not have any plans for underground [carbon storage](#) within its borders.

More information: Energy Funding Programme 2013-2020: Final Report and evaluation. [www.innosuisse.ch/inno/en/home ... programme-SCCER.html](http://www.innosuisse.ch/inno/en/home...programme-SCCER.html)

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