

Duration: 6 months

Starting Date: TBD

Proposal for Master Thesis

The best of both worlds? Re-assessing the role of nuclear power plants in Switzerland in the face of the energy and climate crisis

Russia's invasion of Ukraine and the consequential disruptions in global energy supplies have made governments rethink their energy security strategies, putting a stronger focus on developing more diverse and domestically based supplies. For multiple governments, nuclear energy is among the options for achieving this. At the same time, many governments have in recent years stepped up their ambitions and commitments to reach net-zero emissions.

In Switzerland, following the reactor disaster of Fukushima in 2011, the Federal Council and Parliament decided on a progressive withdrawal from nuclear energy production. This includes shutting down the existing five nuclear power stations at the end of their technically safe operating life and prohibiting the building of new nuclear power plants. However, facing the consequences of the climate and energy crisis, policymakers, academics, and the general public reopened the discussion on nuclear power.

This master thesis thus aims to contribute to the discussion on nuclear power plants **by assessing under which conditions the modernization of existing and/or reconstruction of new nuclear power plants can become part of the cost-effective path to a Swiss net-zero economy by 2050.** To do so, the student develops and assesses scenarios using the Nexus-e modeling platform. Tasks for the student could comprise:

- Conduct literature review on nuclear power included in energy system modeling
- Collect data on the costs of modernizing existing and constructing new nuclear power plants
- Include the modernization of existing and the construction of new nuclear power plants as candidate units in Nexus-e
- Develop, run, and assess scenarios on the role of nuclear power under varying assumptions and boundary conditions

We are looking for an excellent student who is highly motivated and able to work independently. Experience in energy system modeling, as well as a background in engineering, energy technologies and policies, or data science, is valuable. The student will be an integrated part of the dynamic Nexus-e team at the Energy Science Center in Zurich and will be supervised by at least one post-doctoral researcher and one professor, both members of the Energy Science Center.

Are you interested? Please send your CV, a short letter of motivation (max. one page), and transcripts of previously obtained degrees (with grades) to Dr. Marius Schwarz (mschwarz@ethz.ch). Applications from non-ETH students are welcome.

We look forward to receiving your application!

Zurich, July 2022