Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Energy Science Center

Duration: 6 months
Starting Date: tbd.

Proposal for Master Thesis

"Science-based policymaking - Do energy system scenarios provided by research actually ensure the security of electricity supply?"

In many countries, energy systems are transforming. To provide guidance during such transformation, national governments often set decarbonization and renewable energy targets. These targets often follow a set of widely agreed-upon scenarios that are increasingly based on computer models aiming to represent the energy system in detail. Typically these models provide a cost-optimal perspective on energy system changes, assuming a perfect behavior of the system and its actors. At the same time, as many assumptions and simplifications of the real-world system are necessary to keep computational complexity at bay, only a fraction of the uncertainties inherent to energy system transformations can be considered. Consequently, energy system scenarios could be overly optimistic in achieving a high degree of supply security.

This master thesis thus aims to **contribute to increasing the degree of supply security in energy system scenarios.** To do so, the student performs a system adequacy test based on scenarios developed using the Nexus-e modeling platform. Tasks for the student could comprise:

- Conduct literature review on supply security and system adequacy assessment
- Define input parameters and output indicators for assessing supply security under uncertainty
- Collect data for defined input parameters
- Get familiar with the Nexus-e platform
- Run and compare scenarios based on defined output indicators
- Develop a conceptual model to enhance supply security in scenarios

We are looking for an excellent student who is highly motivated and is 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