Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Energy Science Center

Duration: 3 months
Starting Date: April 2022

Proposal for Semester Project

"The role of solar photovoltaics in the alps for the Swiss electricity system"

Already today, Switzerland has more electricity imports in winter than in summer as power generation from hydro peaks between April to September and electricity demand is highest in winter. The phase-out of nuclear power, the increase in electricity demand due to the electrification of heat and transport, and the focus on new renewables such as rooftop solar photovoltaics will likely even exacerbate the demand for electricity import in winter. But it remains questionable whether Switzerland's neighbor's Germany, France, Italy, and Austria will be able to offer electricity to Switzerland in the mid-to-long term as they are also aiming to achieve a carbon-free economy. Alpine solar photovoltaics could be a suitable option to mitigate the potential import dependency in winter. Placed in high altitudes, solar photovoltaics generate significantly more electricity in the winter compared to units placed on urban rooftops, mainly due to less fog, increasing efficiency with lower temperatures, and reflected sunlight by the snow cover. One example is the planned installation in Glarus, where 6,000 photovoltaic modules are to be attached to the dam wall of the Muttsee.

This project thus aims to **assess the role of alpine solar photovoltaics for the Swiss electricity system.** Tasks for the student could comprise:

- Conduct literature review on alpine solar photovoltaics (including policies and regulations)
- Develop dataset on the regional potential of alpine solar photovoltaics (based on available GIS dataset)
- Develop dataset on costs of alpine solar photovoltaics
- Include alpine PV in the Nexus-e database
- Compare and discuss (provided) Nexus-e scenarios with and without alpine solar photovoltaics

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!

Zürich, 21.02.2022