



Institute for Automation and Applied Informatics (IAI)

**Earliest start:
immediately**

Master's Thesis

Challenging Macro-Energy Models: Exploring Spatial Resolution and Technology Mix in European Energy System Modeling

Collaborators:

Karlsruhe Institute of Technology (Dr. Martha Frysztacki), ETH Zürich (Dr. Paolo Gabrielli), Carnegie Institution for Science (Dr. Ken Caldeira)

Abstract::

We invite students to join a collaborative research project. This master thesis opportunity focuses on extending the findings of a 2021 paper.

The work will employ the PyPSA framework to model the European energy system with varying spatial resolutions, particularly digging into lower grid resolutions, inspired by Frysztacki et al.'s and Tröndle et al.'s work. The project aims to enhance our understanding of aggregated energy models' usefulness, focusing on spatial resolution and technology mix's impact on the energy system dynamics, rather than regional self-sufficiency.

We aim to challenge the macro-energy model approach, which typically operates at very high levels of abstraction.

What You Need to Bring:

Prior experience in Python programming and a basic understanding of energy system modeling will be advantageous for this research project.