

Power-to-H₂-to-Power as a future storage option? Techno-economic-environmental potential analysis of hydrogen-based energy systems.

Our Profile

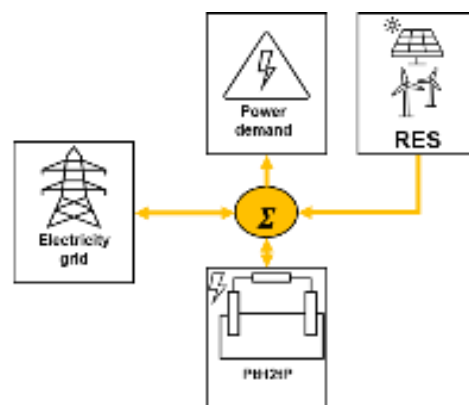
The working group Energy Systems Engineering deals with the development of methods for the computer-aided analysis and optimization of energy systems as well as the energetic and ecological evaluation of industrial production processes.

Background

In order to meet the current climate targets, solutions for decarbonizing industry are increasingly being sought. In addition to the increase of renewable energy sources, hydrogen is one of the keys to a sustainable energy economy. Hydrogen can be produced with renewable electricity by a water electrolyzer. The hydrogen can then be stored to be converted back into electricity in times or regions where there is not enough electricity available. In addition, the hydrogen can be utilized in the chemical industry, the heating sector or the mobility sector.

Tasks

Within the scope of the scientific work, an existing optimization model for calculating the operating costs will be extended using the life cycle assessment methodology so that the model can also be used to calculate environmental impacts. The model will then be used to evaluate the potential of power-to-H₂-to-power storage systems for different industries and customers from an economical and environmental perspective. A system with battery storage will serve as a benchmark.



Your profile

- You are studying mechanical engineering/industrial engineering/CES with a major in energy or process engineering,
- You are interested in current topics in the field of hydrogen and renewable energies,
- You have basic knowledge in Python/Matlab or a comparable programming language,
- You have knowledge/experience in life cycle assessment,
- You have knowledge/experience in mathematical optimization,
- You have an independent and goal-oriented work ethics,

Our offer

You will conduct research on current topics in energy and process engineering. You will be involved in developing solutions to assess and improve hydrogen technologies. Additionally, you will deepen your knowledge in the field of optimization. You will work in a nice, motivated team with close supervision. If you are interested, please send us an email with your curriculum vitae and current grades.