

Bachelors / Masters Thesis

Digital twins for modeling methanation of sewage gases in a changing energy market

Contents:

The gas supply in Germany is currently based almost exclusively on the use of fossil natural gas. In order to significantly increase the overall share of renewable energies, renewable energies should therefore be established in the gas market. The methanation of sewage gases represents one possibility in which a particularly large number of structural synergies can be utilized.

The Chair of Energy Process Engineering is currently working on the methanation of sewage gases in variable energy market scenarios as part of a research project. This enables a flexibilization of sewage plant operations away from exclusive electricity and heat production towards a sector-coupled carbon capture "prosumer". In the course of the project, different models of wastewater treatment plants and the energy markets will be created and compared as digital twins. Student work will be assigned on an ongoing basis. Initiative applications are very welcome!

Tasks:

- Literature research on the task
- familiarization with existing programming frameworks
- Definition of input parameters based on various previously defined scenarios
- Data acquisition and preparation
- Implementation of models for the prediction of target variables
- Validation and benchmarking of models and scenarios
- Written documentation of the work

Prerequisites:

- Interest in data analysis and building models
- Experience in modeling (Anylogic, Matlab, Java, Python) helpful but not required.

Start of work: ongoing



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