

Masterarbeit

Thema:

Model-based analysis of Hydrogen Grid Infrastructure and Storages for the Net-Zero Scenario in Germany

Hintergrund und Inhalt der Arbeit:

A gas network model has been developed in the context of a project with a focus on infrastructure utilisation and security of supply (SoS) in Germany. The model follows a linear optimization approach considering a highly resolved grid infrastructure of gas transport pipelines, gas storages and cross-border connections to neighbouring countries for imports and exports purpose. Specifically, it focuses on natural gas grid infrastructure of Germany with more than two thousand pipelines and thousands of nodes. The spatial and temporal resolved gas demand (on an hourly resolution) is divided into three different sectors: industry, heating and electricity. The sectoral gas demand from electricity sector (Gas power plants (GPP) and Combined Heat and Power (CHP) units) is considered based on the demand from a energy system model. In addition to that, the model also considers the gas supply from the Power-to-Gas (PtG) units which is produced during the time of high electricity generation from Renewable Energy Sources (RES).

In the context of this work, a separate instance of model (extension of existing model) is expected to be formulated/modelled, implemented and evaluated that takes into account the developed of hydrogen infrastructure plans (e.g, 2030, 2045) and Hydrogen Storages. The main focus of this thesis is expected to be the methodical aspect. Firstly, relevant literature for hydrogen infrastructure development plans need to be identified and evaluated. Secondly, an optimization model for a specific time period needs to be developed and different scenarios should be envisaged. In the final step, a qualitative assessment/evaluation of model results based on different scenarios should be made.

Anforderungen:

Knowledge and/or skills in modelling (market and/or system), as well as energy economics are required. Basic knowledge in programming (i.e. Julia, Python, Matlab, ...) as well as optimization (i.e. JuMP, GAMS, ...) are expected.

Beginn der Bearbeitung:

Ab sofort.

Ansprechpartner:

Weitere Informationen sind auf Anfrage bei Abuzar Khalid erhältlich.

Tel.: +49 201-183-3389, abuzar.khalid@uni-due.de

Bei Interesse senden Sie bitte Ihre Bewerbungsunterlagen (Lebenslauf, Leistungsnachweise, Motivations schreiben) an die oben genannte Email-Adresse.