

Simulation-based Evaluation of Hydrogen Storage Technologies for Mobile Applications

Description

To facilitate the use of hydrogen in the mobility sector, efficient hydrogen on-board storage is required. Depending on the specific application (car, bus/truck, train, maritime, aviation, construction machinery) and powertrain (fuel cell, combustion engine) the requirements for gravimetric and volumetric storage density and operating conditions (pressure) differ, making different technologies more or less suitable for a specific scenario.

Using HyCentA's existing MATLAB Simulink model library H2VPATT, (simplified) storage system layouts are modelled for the different storage technologies. Hydrogen filling and extraction simulations with gaseous, cryo-compressed, liquid and metal hydride storage are performed. Based on the simulation results the technologies can be evaluated and compared to determine the viability and storage efficiency of storage technologies depending on the application.

Work Packages

- Literature research on hydrogen storage systems & on-boarding into HyCentA's simulation tool H2VPATT (1 month)
- Definition of mobile application and their requirements (0,5 month)
- Implementation of the storage system layout models using the H2VPATT library in Simulink and definition of boundary conditions/model parameters (1 month)
- Simulation for the defined application scenarios with different storage technologies (1,5 months)
- Post-processing, evaluation and technology comparison (1 month)
- Written thesis (1 months)



- Start: immediately
- Duration: approx. 6 months
- Paid Master Thesis
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