Hydrogen Europe:
European Hydrogen & Fuel cell Project Database

Project HELMETH

Integrated High-Temperature Electrolysis and Methanation for Effective Power to Gas Conversion

The objective of the HELMETH project is the proof of concept of a highly efficient Power-to-Gas (P2G) technology with methane as a chemical storage and by thermally integrating high temperature electrolysis (SOEC technology) with methanation. This thermal integration balancing the exothermal and endothermal processes is an innovation with a high potential for a most energy-efficient storage solution for renewable electricity, without any practical capacity and duration limitation, since it provides SNG (Substitute Natural Gas) as a product, which is fully compatible with the existing pipeline network and storage infrastructure. The realisation of the P2G technology as proposed within HELMETH needs several development steps and HELMETH focuses on two main technical and socio-economic objectives, which have to be met in order to show the feasibility of the technology: • Elaboration of the conditions / scenarios for an economic feasibility of the P2G process towards methane as chemical storage, without significantly deteriorating the CO2-balance of the renewable electricity. • Demonstration of the technical feasibility of a conversion efficiency > 85 % from renewable electricity to methane, which is superior to the efficiency for the generation of hydrogen via conventional water electrolysis. Within HELMETH the main focus lies in the development of a complete pressurized P2G module consisting of a pressurized steam electrolyser module, which is thermally integrated with an optimized carbon dioxide methanation module. The HELMETH project will prove and demonstrate that: • the conversion of renewable electricity into a storable hydrocarbon by high-temperature electrolysis is a feasible option, • high temperature electrolysis and methanation can be coupled and thermally integrated towards highest conversion efficiencies by utilizing the process heat of the exothermal methanation reaction in the high temperature electrolysis process.

Project Information

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Project partners

Coordinator :
KIT - Karlsruher Institut für Technologie
Partners :
Politecnico di Torino
Sunfire
DTU - Danmarks Tekniske Universitet
European Research Institute of Catalysis A.I.S.B.L.
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Sub project(s)

Sub project 1

Country: Germany
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Sub project categories
Research

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