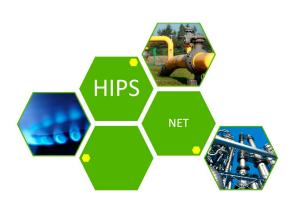
HIPS-NET

The feed-in of hydrogen in national natural gas networks may result in cross border distribution of the renewable gas. The topic hydrogen tolerance of the gas infrastructure including the connected customers therefore needs to be discussed on European level.

The Network "HIPS-NET" creates a common European understanding about the hydrogen tolerance of the natural gas grid infrastructure. Recent research is published in a quarterly newsletter. Workshops on an annual basis are organised to discuss the findings of the conducted research. HIPS-NET aims to establish a common level of knowledge on hydrogen tolerance of the gas infrastructure and to identify open research questions, which should be addressed in future, in the fields of transport, storage, distribution and application of hydrogen or hydrogenous gases. The network is the platform to address future research on European level together.

Update your knowledge and increase your personal network by contributing to HIPS-NET!



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POWER-TO-GAS

Strategies and system solution for the future





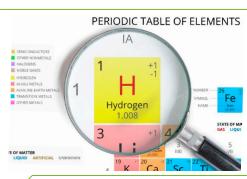
retrieved october 2018





Assessment of specific local conditions

- General spatial identification of preferred condition of locations for Power-to-Gas facilities
- Analysis and comparison of preselected locations and recommendations for suitable Power-to-Gas-Principles (methanation vs. direct injection of hydrogen)
- Consulting for selection of main facility components under consideration of specific local and operating requirements (e.g. operating characteristic, power and pressure layout, availabilities)
- Analysis of the effect of a hydrogen injection on characteristic gas parameters (higher heating value, Wobbe index, ignition behaviour, methane number, viscosity)
- Evaluation of the hydrogen tolerance of the gas infrastructure and impact on the gas grid, its components, and connected customers
- Dynamic network simulation of the hydrogen propagation in the gas grid
- Risk and safety analysis of hydrogen admixture and specific local risk assessment of the gas grid



Analysis and evaluation of the cross-sectoral applications of hydrogen

Design and basic concept of plants

- Development of basic concepts of Power-to-Gas and feed-in installation based on available energy sources, feed-in capacity of the gas grid and envisaged operating modus
- Technical layout of the measure concept as well as basic layout of main components as intermediary storage and compressor
- Estimation of space requirements for ways and sites as well as compilation of a basic space assignment plan plus realistic pipeline routing of the connecting hydrogen pipeline

Basic Engineering for feed-in installation and connecting pipeline

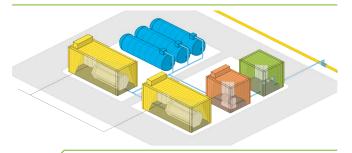
- Preparation of documents for administrative permit incl. permit procedure with the authorities
- Technical planning documentation for feed-in installation with P&I Diagram, isometry, list of material, shop drawings and asbuilt-documentation
- Specification for tender documents including bill of quantities

Consulting

- Development of project implementation plans under consideration of time frames for planning, administrative permit, and delivery of main components
- Consulting on administrative permit procedure
- Construction site supervision upon project realisation
- Assistance in risk assessment e.g. by hazard and operability analysis (HAZOP)

Analysis of cost-efficiency and application areas

- Estimation of capital and operating expenses for the components of the Power-to-Gas and feed-in installation as intermediary storage, compressor, and connecting pipeline including additional installations (e.g. filling station for vehicles and gas filling installation for trailers or pressure cylinders)
- Identification of potential application areas, potential revenue opportunities and assessment of potential economic benefits
- Economic assessment of different renewable gas application paths e.g.
 - Application as industrial gas
 - Feed-in into the natural gas grid
 - Application as fuel for mobility
 - Generation of electrical energy
 - Provision of operating reserve for the electricity network
 - Additional electricity services (e.g. peak shaving, load rejection)



Layout plan of a P2G-facility