

PSIcontrol/Greengas

Decarbonization - Renewable gases in the energy system



PSI 

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Restructuring the gas grid infrastructure for the energy transition

The existing gas grid infrastructure is a good foundation for hydrogen transport networks. One of the biggest challenges in this regard is the increasing dependence on volatile renewable energy for hydrogen production. The gas inlets, which are volatile in terms of quantity and quality, must be continuously reconciled with the fluctuating gas demand.

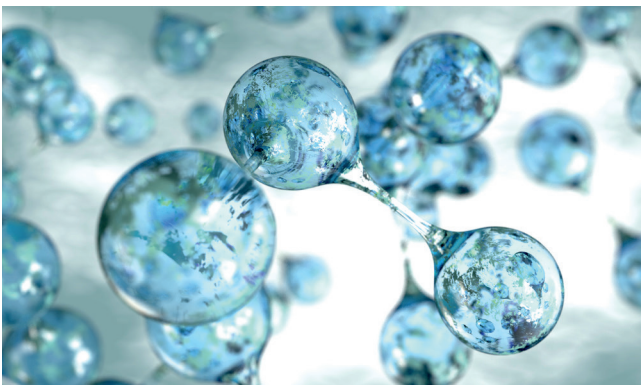
The PSIcontrol/Greengas software solution can be used to calculate control specifications for energy equivalent gas deliveries in the required gas quality.

Hydrogen hubs, biomethane and LNG deliveries can thus be integrated into the energy system by gas network operators via the well-developed gas network. For the grid infrastructure, hydrogen compatibility requirements as well as its compatibility states are visualized. Inlets of hydrogen, biomethane or LNG can be simulated.

New and restructuring measures for the inlet of renewable gases and LNG, as well as their transport and distribution, can thus be planned and controlled by gas network operators during ongoing operations.

The following functions are provided with PSIcontrol/Greengas

- + Forecasting of gas inlets from different sources and monitoring of gas properties at inlet and outlet nodes
- + Managing gas composition dependent storage capacities, such as pipeline network buffers, cavern and pore storage facilities as well as low, medium and high-pressure tanks
- + Visualization of compatibility requirements and compatibility states for hydrogen and biomethane
- + Providing compressor characteristic diagrams based on recorded measured values as basis for the predictive gas quality dependent control of the compressors
- + Decision support via control plan recommendations, optimized based on predefined target criteria of the dispatcher and energetic evaluation of control actions as well as displaying CO₂-equivalentsCO

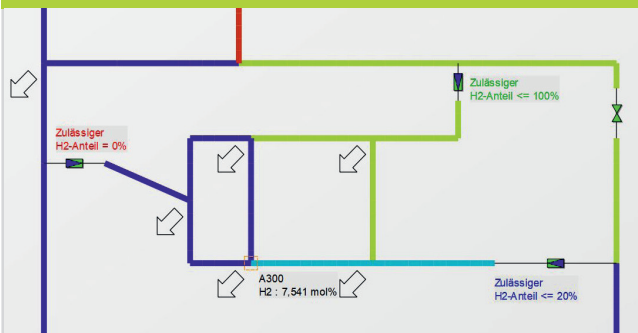


Application of PSI Software SE, BU Gas Grids and Pipelines, for the 2022 German Gas Industry's Innovation Award.

- Category: Intelligent Infrastructure
- Software-Product: PSIcontrol/Greengas



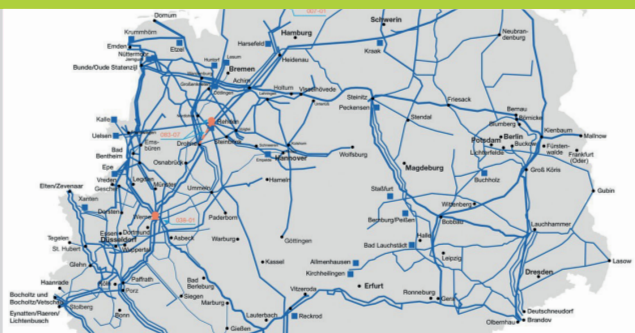
Gas Composition



Integrating renewable gasses

- + Inlet simulation of large volume imports and decentralized hydrogen and biomethane supplies into the gas network
- + Monitoring and forecasting of gas properties and calorific values along the entire gas process chain
- + Tracking origin and properties
- + Control plan recommendations based on multi-criteria optimization according to individual dispatcher targets

Gas Infrastructure



Restructure gas grid

- + Integration of hydrogen hubs, biomethane plants and LNG supplies into the existing gas infrastructure
- + Modeling of gas infrastructures based on expected import and transport flows as well as possible sector linkages
- + Visualization of compatibility requirements of the pipelines and operating equipment
- + Providing information on investment and operating costs and GHG emissions



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