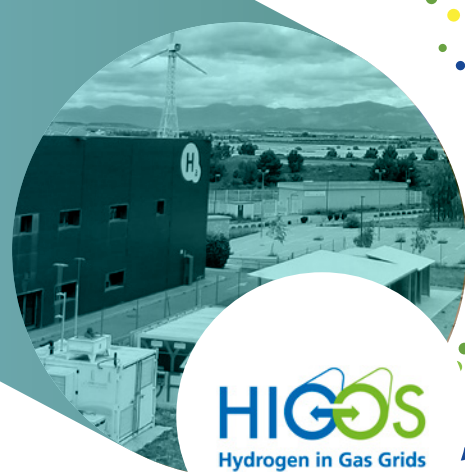


HIGGS

HYDROGEN IN GAS GRIDS: A SYSTEMATIC VALIDATION APPROACH AT VARIOUS ADMIXTURE LEVELS INTO HIGH-PRESSURE GRIDS



HIGGS
Hydrogen in Gas Grids

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| Project ID: | 875091 |
| PRD 2023: | Panel 2 – H2 storage and distribution |
| Call topic: | FCH-02-5-2019: Systematic validation of the ability to inject hydrogen at various admixture level into high-pressure gas networks in operational conditions |
| Project total costs: | EUR 2 107 672.50 |
| Clean H₂ JU max. contribution: | EUR 2 107 672.50 |
| Project period: | 1.1.2020–31.12.2023 |
| Coordinator: | Fundación para el Desarrollo de las Nuevas Tecnologías del Hidrógeno en Aragón, Spain |
| Beneficiaries: | Deutscher Verein des Gas- und Wasserfaches – Technisch-Wissenschaftlicher Verein EV, European Research Institute for Gas and Energy Innovation, Fundacion Tecnalia Research & Innovation, OST – Ostschweizer Fachhochschule, Redexis SA |

<https://higgsproject.eu/>

PROJECT AND OBJECTIVES

HIGGS aims to fill in the gaps in knowledge regarding the impact that high levels of H₂ could have on high-pressure natural gas infrastructure, its components and its management. To reach this goal, the project is mapping technical, legal and regulatory barriers and enablers; testing materials/components; completing techno-economic modelling; and preparing a set of conclusions as a pathway towards enabling the injection of hydrogen into high-pressure gas grids. The inventory of materials/equipment and the mapping of regulations, codes and standards (RCS) are mostly complete, tests are ongoing and the techno-economic model is under development.

NON-QUANTITATIVE OBJECTIVES

- The project aims to draw up recommendations on regulations, codes and standards. The first screening has been completed, and the work is ongoing.
- A pathway for stepwise integration of hydrogen into the EU gas network is being drafted.
- The project aims to develop a techno-economic model and study of the roles of technologies for integrating H₂/CH₄ and sector coupling at the EU level. This work has started with the Trans Europa Naturgas Pipeline and the Mittel-Europäische-Gasleitung.

PROGRESS AND MAIN ACHIEVEMENTS

- The testing platform has enabled dynamic and static tests to be carried out with blends of up to 20 % H₂.

- The project has adapted the techno-economic model, and initial scenarios have been modelled.
- A system has been created for hydrogen separation in natural gas blends with low concentrations of hydrogen. The gas separation prototype experimental campaign has been completed, with promising results.

FUTURE STEPS AND PLANS

- The project will complete all experimental campaigns in the testing platform and characterisation of materials before and after hydrogen exposure, using a 30 % H₂ blend and 100 % H₂, to evaluate the effect of the injection of hydrogen.
- Data from the RCS review at the European and national levels were collected, reviewed and compiled in a comprehensive report comprising diagrams and graphs that are to be presented on the project website and used for presentations and papers. The first review was shared publicly, and is due to be updated in 2023.
- The simulation of the initial scenarios on the Trans Europa Naturgas Pipeline and the Mittel-Europäische-Gasleitung and analysis of techno-economic aspects are ongoing and are due to be completed in late 2023. This work will finish with the publication of four publicly available reports.
- The main and final report will be the pathway description, due to be delivered by the end of 2023. The results are intended to be used beyond the project period.

QUANTITATIVE TARGETS AND STATUS

| Target source | Parameter | Target | Achieved to date by the project | Target achieved? |
|--------------------------|--|---|--|------------------|
| Project's own objectives | Blending percentage compatible with existing gas transmission networks | Technical compatibility of materials and equipment in transmission networks | Trials have been conducted with blends with 20 % hydrogen content, with and without trace impurities | |
| | Readiness of gas transmission networks for H ₂ distribution | Identify existing assets and their readiness for hydrogen transport | First inventory of the European grid | ✓ |
| | Techno-economic approach for grid repurposing | Start modelling | First scenarios modelled | |