

A blueprint to transport hydrogen via Europe's gas grid



Development of a pan-European hydrogen transmission network by 2030 is critical for meeting Europe's energy transition goals, including ensuring a secure, affordable and independent energy supply. The Clean Hydrogen Partnership funds projects that perform research aimed at repurposing Europe's gas grid to enable it to transport large quantities of hydrogen.

Competitive, clean energy

An integrated hydrogen transmission infrastructure will boost Europe's renewable energy supply and keep it competitive through the energy transition. By supporting the development of a transmission infrastructure, the Clean Hydrogen Partnership aims to speed up the deployment of hydrogen energy.

For example, project SHIMMER aims to improve hydrogen injection management in gas networks. Two other projects are testing the compatibility of gas infrastructure with hydrogen: PILGRHYM is focused on steel and CANDHY on non-steel infrastructure. OPTHYCS is developing technology to detect leaks and make hydrogen transmission safer.

Exploring viability aspects

This ongoing research is based on the extensive knowledge developed by the HIGGS project, which investigated the technical and legal barriers to the transmission of hydrogen through gas pipelines. HIGGS also made an inventory of materials used in gas transmission infrastructure and identified the parts of the grid most susceptible to problems when integrating hydrogen.

The project also established a state-of-the-art experimental test facility, where it has studied the impact of hydrogen on various grid materials and components.

An investigation of the financial and technical aspects of hydrogen integration and the potential impacts on consumers has led HIGGS to conclude that repurposing is technically and economically viable. Another element is a regulatory review to support the formulation of standard approval procedures for grid expansion.

GETTING EUROPE'S GRID HYDROGEN-READY

Repurposing Europe's existing gas pipeline grid is a cost-effective way of transporting large amounts of hydrogen and requires an increased knowledge of materials, technologies and procedures along with guidelines and standards to address safety concerns.

A DEDICATED HYDROGEN NETWORK

The projects and complementary activities such as the European Hydrogen Backbone have advanced the approach of using the gas grid to transport hydrogen across Europe. HIGGS, SHIMMER, PILGRHYM, CANDHY and OPTHYCS fill in the gaps in research on the materials, technologies, procedures and safety standards needed for an integrated hydrogen network. The research also supports the development of the European Hydrogen Backbone – a European energy infrastructure operators' initiative to develop a cross-border, connected hydrogen transmission network based on repurposed gas pipelines.

The goal? A natural gas grid could be repurposed as a shortcut to creating a Europe-wide, connected infrastructure for hydrogen transport and opening the way for its large-scale deployment.

Key results? HIGGS created an extensive inventory of materials used in current pipelines and transport facilities and conducted an extensive testing programme on a range of critical components at experimental testing facility it developed. The project also mapped the technical, legal and regulatory framework needed for a high-pressure gas grid, established a testing platform and evaluated materials, technologies and procedures for affordability and safety. HIGGS has led to research on several fronts being conducted by projects such as SHIMMER, PILGRHYM, CANDHY and OPTHYCS.



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www.clean-hydrogen.europa.eu/projects-dashboard

<https://higgsproject.eu>

<https://shimmerproject.eu>

<https://pilgrhym.eu>

<https://candhy.eu>

<https://opthycs.eu>



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KEY ACHIEVEMENTS

INVENTORY OF MATERIALS

used by current gas pipelines

3 000 HOURS

of pilot-scale replication of
a high-pressure gas grid

IDENTIFICATION

of grid segments most susceptible
to problems

ANALYSIS

of repurposing impact on consumers

IDENTIFICATION

of regulatory standards

TEST FACILITY

to study hydrogen's impacts
on the gas grid

TECHNICAL AND ECONOMIC CASE

for further exploration of hydrogen
use in the gas grid

IMPACTS

4 RESEARCH PROJECTS

support the development
of hydrogen gas grids.

TECHNOLOGIES AND MATERIALS

identified for transforming
gas networks.

LEAK DETECTION TOOLS

identified for secure transport.

STANDARDISED PROTOCOLS

developed for integration of hydrogen
into the gas grid.

HIGHER COST-EFFECTIVENESS

CASE made for repurposing gas
pipelines for hydrogen compared
with building new infrastructure.



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