

SHIMMER

SAFE HYDROGEN INJECTION MODELLING AND MANAGEMENT FOR EUROPEAN GAS NETWORK RESILIENCE



Project ID	101111888
PRR 2025	Pillar 5 - Cross-cutting
Call Topic	HORIZON-JTI-CLEANH ₂ -2022-05-03
Project Total Costs	3 037 265.00
Clean H ₂ JU Max. Contribution	2 999 156.25
Project Period	01-09-2023 - 31-08-2026
Coordinator Beneficiary	SINTEF AS, NO
Beneficiaries	INRETE DISTRIBUZIONE ENERGIA S.P.A., REDEXIS GAS SERVICIOS SL, REDEXIS SA, SNAM S.P.A., ENAGAS TRANSPORTE SA, GERG LE GROUPE EUROPEEN DE RECHERCHES GAZIERES, OPERATOR GAZOCIAGOW PRZESYLOWYCH GAZ-SYSTEM SPOLKA AKCYJNA, INSTYTUT NAFTY I GAZU - PANSTWOWY INSTYTUT BADAWCZY, GASSCO AS, BUNDESANSTALT FUER MATERIALFORSCHUNG UND -PRUEFUNG, FUNDACION TECNALIA RESEARCH and INNOVATION, POLITECNICO DI TORINO, NEDERLANDSE ORGANISATIE VOOR TOEGEPAST NATUURWETENSCHAPPELIJK ONDERZOEK TNO

<https://shimmerproject.eu/>

PROJECT AND GENERAL OBJECTIVES

To accelerate the transition to a low-carbon economy while exploiting existing infrastructure, hydrogen can be injected into the natural gas network. However, there are many technical and regulatory gaps that should be closed and adaptations and investments that should be made to ensure that multi-gas networks across Europe will be able to operate in a reliable and safe way while providing gas of highly controllable quality and meeting energy demand. Recently, the European Committee for Standardization concluded that it was impossibility to set a common limiting value for hydrogen injected into the European gas infrastructure, instead recommending a case-by-case analysis. In addition, there are still uncertainties related to the material integrity of pipelines and networks components with regard to their reduced lifetimes in the presence of hydrogen.

Results from previous and ongoing projects on the hydrogen readiness of grid components should be summarised in a systematic manner together with the assessment of the existent transmission and distribution (T and D) infrastructure components at European level to provide stakeholders with decision support and risk reduction information to drive future investments and the development of regulations and standards.

SHIMMER aims to enable higher levels of hydrogen integration and safer hydrogen injection management in multi-gas networks by contributing to the knowledge and understanding of hydrogen projects and their risks and opportunities.

NON-QUANTITATIVE OBJECTIVES

- To map and address European gas T and D infrastructure in relation to materials, components, technology, and their readiness for hydrogen blends.
- To define methods, tools and technologies for multi-gas network management and quality tracking, including simulation,



prediction, and safe management of transients, with a view to widespread hydrogen injection across Europe.

- To propose best practice guidelines for the safe handling of hydrogen in the natural gas infrastructure including risk management.

PROGRESS, MAIN ACHIEVEMENTS AND RESULTS

- Selection of key information for the infrastructure database to be implemented as part of the SHIMMER homepage. This includes details on European infrastructure, pilot projects, material testing standards, test qualifications for hydrogen readiness, and operational conditions for gas networks under hydrogen injection.
- Ongoing data collection on gas grid components and materials to be included in the SHIMMER database.
- Evaluation of gas leakage monitoring and detection methods, concluding that current methods used by transmission system operators (TSOs) and distribution system operators (DSOs) are suitable for natural-hydrogen mixtures, though some calculation methods had to be adapted.
- Execution of a literature study on inspection methods for non-piggable pipes.

- Inspection of a high-pressure gas pipeline using the MFL tool method. The results will be used in 2025 as reference for three additional inspection methods (i) acoustic emission, (ii) metal magnetic memory and (iii) stress concentration tomography.
- Online workshops with all TSOs and DSOs in the project to establish realistic cases, test cases, and scenarios for modelling gas network infrastructures.
- Review of state-of-the-art modelling tools for gas networks simulations. In 2025 three modelling tools will be benchmarked to simulate the selected scenarios. Models will be used for infrastructure planning and predicting operational conditions and gas quality tracking along the network.
- Consortium meeting in San Sebastian in October 2024.
- Drafting of the communication and dissemination plan which is currently being updated.
- The SHIMMER project was showcased at the 1st CANDHy Cluster workshop in July 2024.
- Establishment of an advisory board and networking group.
- Organisation of an online workshop in 2025.

- Presentation of SHIMMER at two conferences in 2024 (IGRC and EGATEC).
- SHIMMER featured in an interview with H₂-Magazine (HZwei-Magazin).

Integrity management and safety:

- Gathering information about materials and components used in natural gas grid of participating TSOs and DSOs.
- Identifying critical material properties and component factors.
- Reviewing existing in-line inspection methods and involving technology providers in test campaigns.
- Gathering information on common leakage detection methods among operators.

Flow Assurance

- Definitions of network models and case studies.
- Organisation of workshops with TSOs and DSOs.
- A realistic case requirement document of needed components and data was achieved.

FUTURE STEPS AND PLANS

Continue working with the project activities as described in the workplan.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Capability to control hydrogen presence over a served area.	km ²	TSO < 100 DSO < 5	
	Capability to track hydrogen spreading through network structure.	[delta%H ₂ / hour] [delta%H ₂ / km ²]	< 1 < 2	