

# Hydrogen Research & Innovation Days

24-25 November 2025



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# SHIMMER

Safety Hydrogen Injection Modelling and Management for European gas network Resilience

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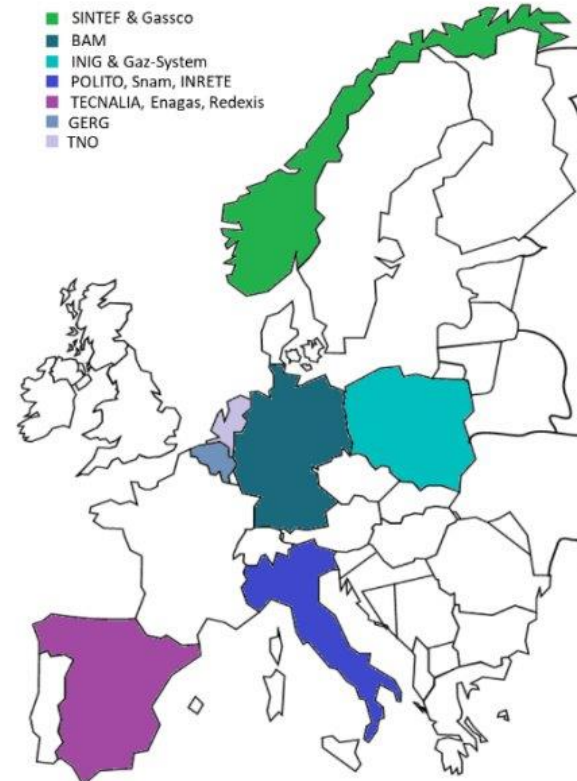


# SHIMMER Project Overview



## Project Snapshot

- Project Name: SHIMMER
- Grant Agreement ID: 101111888
- Call Identifier: HORIZON-JTI-CLEANH2-2022-2
- Duration: Sep 1, 2023 – Aug 31, 2026
- Consortium: 13 partners
  - 1 University, 6 Research Institutes, 6 Industry Partners
  - Countries: NO, ES, IT, PL, DE, BE, NL



Politecnico di Torino



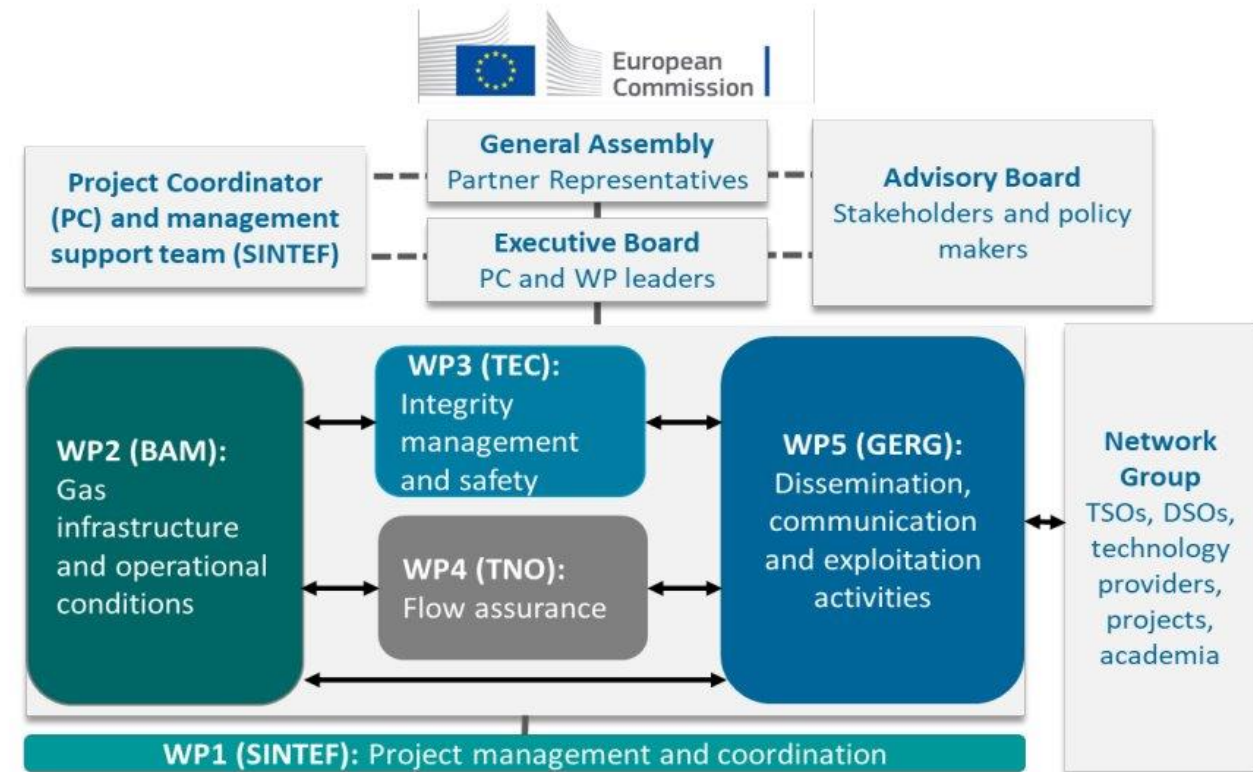
OIL AND GAS INSTITUTE  
National Research Institute





# Objective, work package and management structure of SHIMMER

SHIMMER aims to **develop the required tools, methodologies, knowledge, and recommendations** to overcome the technological, administrative and regulatory barriers towards a **higher integration of low-carbon gases and safer H2 injection management** in multi-gas networks across Europe

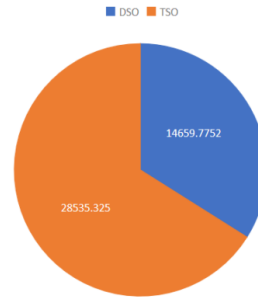




## SHIMMER Database (WP2)

- **Purpose:** Central repository for European gas infrastructure, material testing, standards, and project data.
- **Coverage:**
  - ~43,200 km of pipelines
  - From DSO and TSO all over Europe
- **Data Categories:**
  1. Infrastructure (pipelines & valves)
  2. Standards & Technical Committees
  3. Material Testing Reports
  4. European Pilot Projects & International Databases
  5. Data Analysis of European Infrastructure
- **Contributors:** TSOs & DSOs across Europe (e.g., Gassco, SNAM, Gaz-System, Enagás, Redexis)

Total length (km) provided by TSOs and DSOs



### Database - Shimmer Project



## Evaluation of monitoring technologies for detection of leakages and capability to perform risk assessment (WP3)

### ❖ Sniffers

- same equipment can be used
- higher detection limit
- resistant to composition changes

### ❖ Computational methods

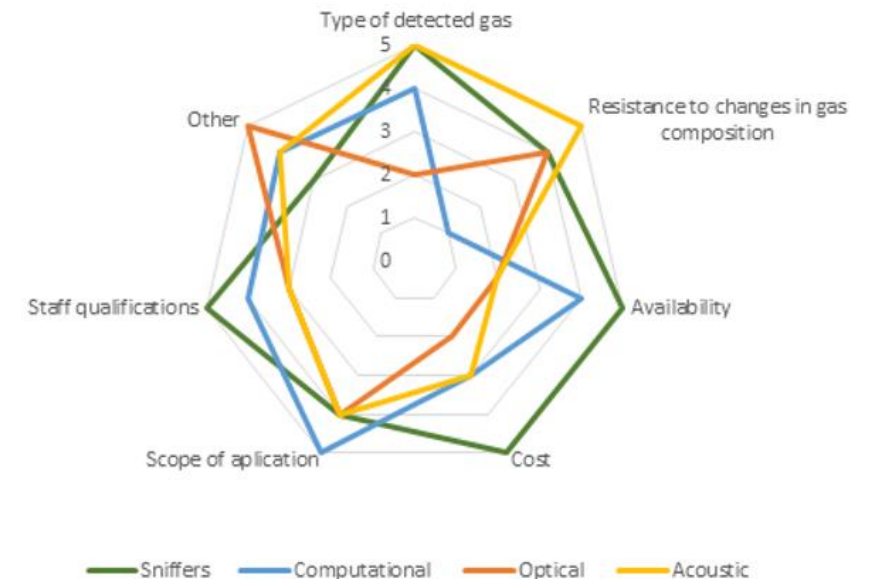
- same equipment can be used
- requires recalibration
- Not resistant to composition changes

### ❖ Acoustic methods

- same equipment can be used
- resistant to composition changes

### ❖ Optical methods

- not for pure hydrogen
- methane can be considered as an indicator
- resistant to composition changes

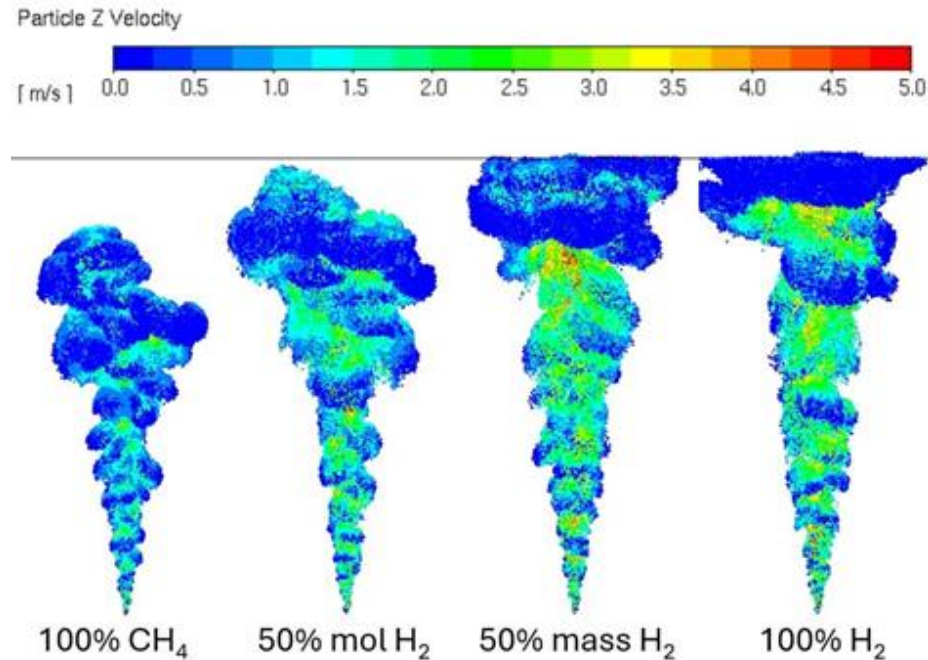


### CONCLUSION

- ❖ The leak detection methods currently used by TSO and DSO can also be used for NG-H2 mixtures
- ❖ Only in the case of calculation methods a change of approach is required
- ❖ Full report published on [Deliverables Archives - Shimmer Project](#)



## Risk assessment of severe accidental subsea gas releases (WP3)



Simulations of four subsea release scenarios with varying hydrogen blends, 75s after initiation

- A transient 3D model for **analysing underwater gas release from a damaged pipeline** has been further developed
- It has been applied to study release of **hydrogen/gas blends**
- The model's outputs can inform **emergency response planning** by predicting **gas surfacing locations** and **concentrations** under varying leak scenarios



## Flow Assurance (WP4)

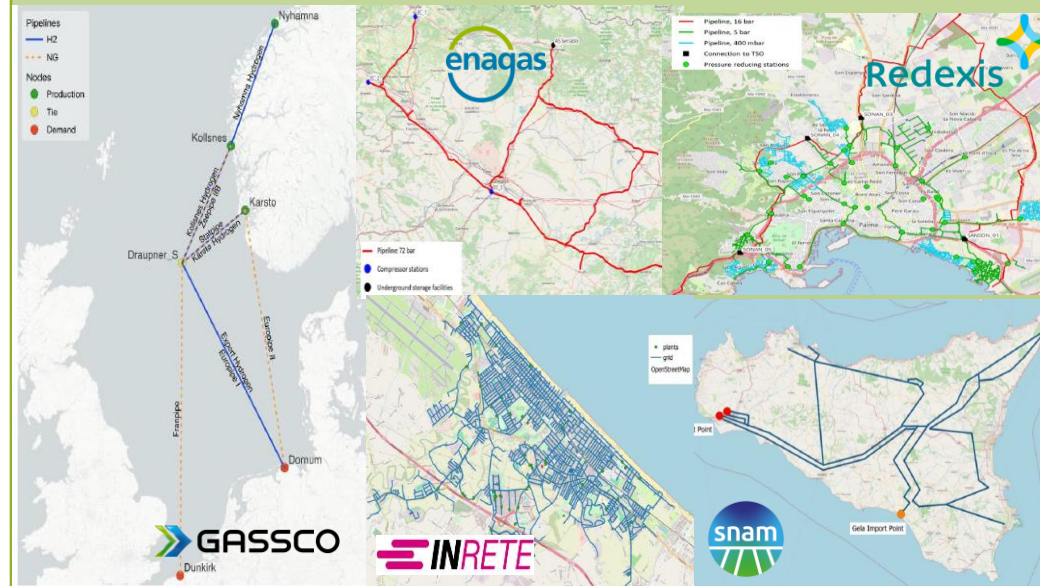
Open source  
simulation tool  
SHIMMER++

Open source  
optimization tool  
EMX

Grid simulation  
based on ML  
algorithms

Sensor tech, how to  
combine with tools?

Simulation & optimization of hydrogen injection  
scenarios based on realistic grids



Recommendations  
of mixing strategies  
and infrastructure  
needs.

Guidelines on  
operational control  
strategies, optimal  
monitoring points  
in the grid



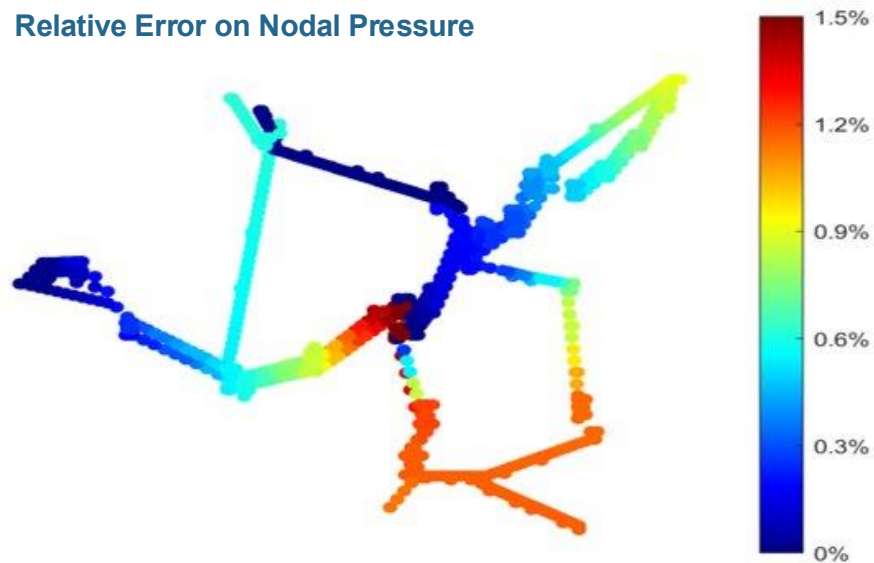
## Flow Assurance – Tools (WP4)

Open-source simulations tool (pressure, flow, quality)

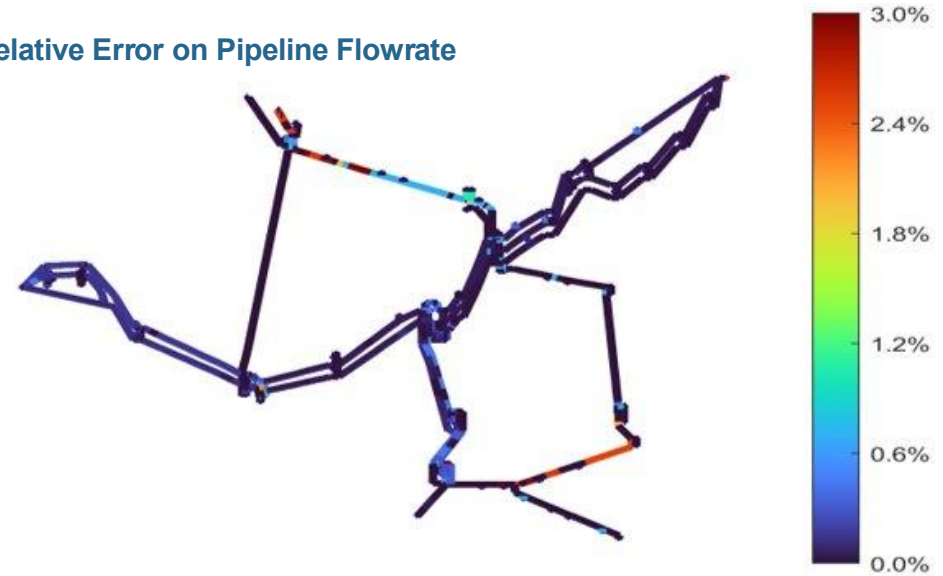
Validation with SAInt using a realistic case – Snam network



Relative Error on Nodal Pressure



Relative Error on Pipeline Flowrate

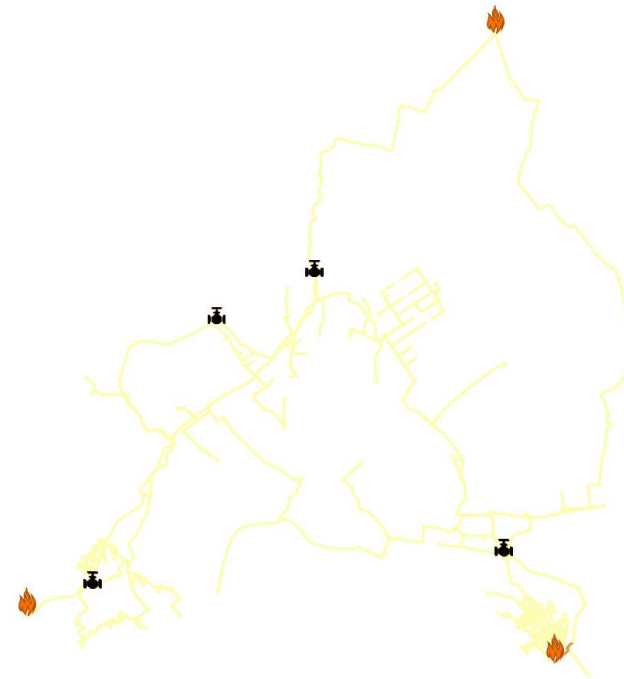




## Flow Assurance – Operational guidelines (WP4)

### Scenario analysis for hydrogen injection:

- **Sector coupling of power and gas** networks with line-pack management challenge in variable supply/demand profiles;
- Hydrogen blending and transport from **EU neighborhood** areas analyzing compression behavior challenge;
- Multiple industrial users with deblending technologies at final facilities as **quality assurance challenge**;
- **EU-interconnection** with deblending towards gas quality harmonization challenge;
- **Storage** system as dispatch/asset management challenge;
- **Multiple gas injection** in the network as smart flow/pressure control challenge.
- **Complex (meshed) grids** with multiple injection and supply (DSO)



Injection of 5% hydrogen in the Redexis DSO network. Two weeks to spread the hydrogen all over the grid.



## Dissemination (WP5)

- Publications and journals: 3 press articles
- Peer-reviewed papers: 4 papers in preparation
- Clustering meetings: common workshops organised with CANDHy, PilgrHym, OPTHYCS, and THOTH2 (July 2024 and May 2025)
- Conferences and posters: 13 international events  
Latest: SHIMMER has been accepted for two presentations at the EHEC 2026 in Sevilla

Website: [shimmerproject.eu](https://shimmerproject.eu)

LinkedIn page and newsletter



## BOOSTER

SHIMMER has requested the services of the **Horizon Results Booster** to support the project's DCE activities.

A 6-month Service Plan has been agreed with the Booster experts, which will provide for three selected Key Exploitable Results:

- Networking support
- Dissemination support
- Exploitation support – to be integrated into the SHIMMER Exploitation Plan deliverable



EGATEC 2024



EFCH 2025



ICHS 2025

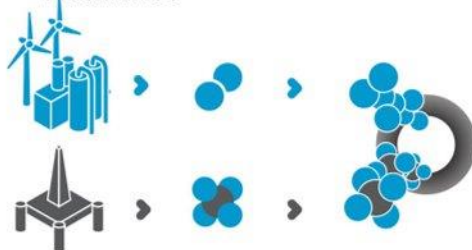
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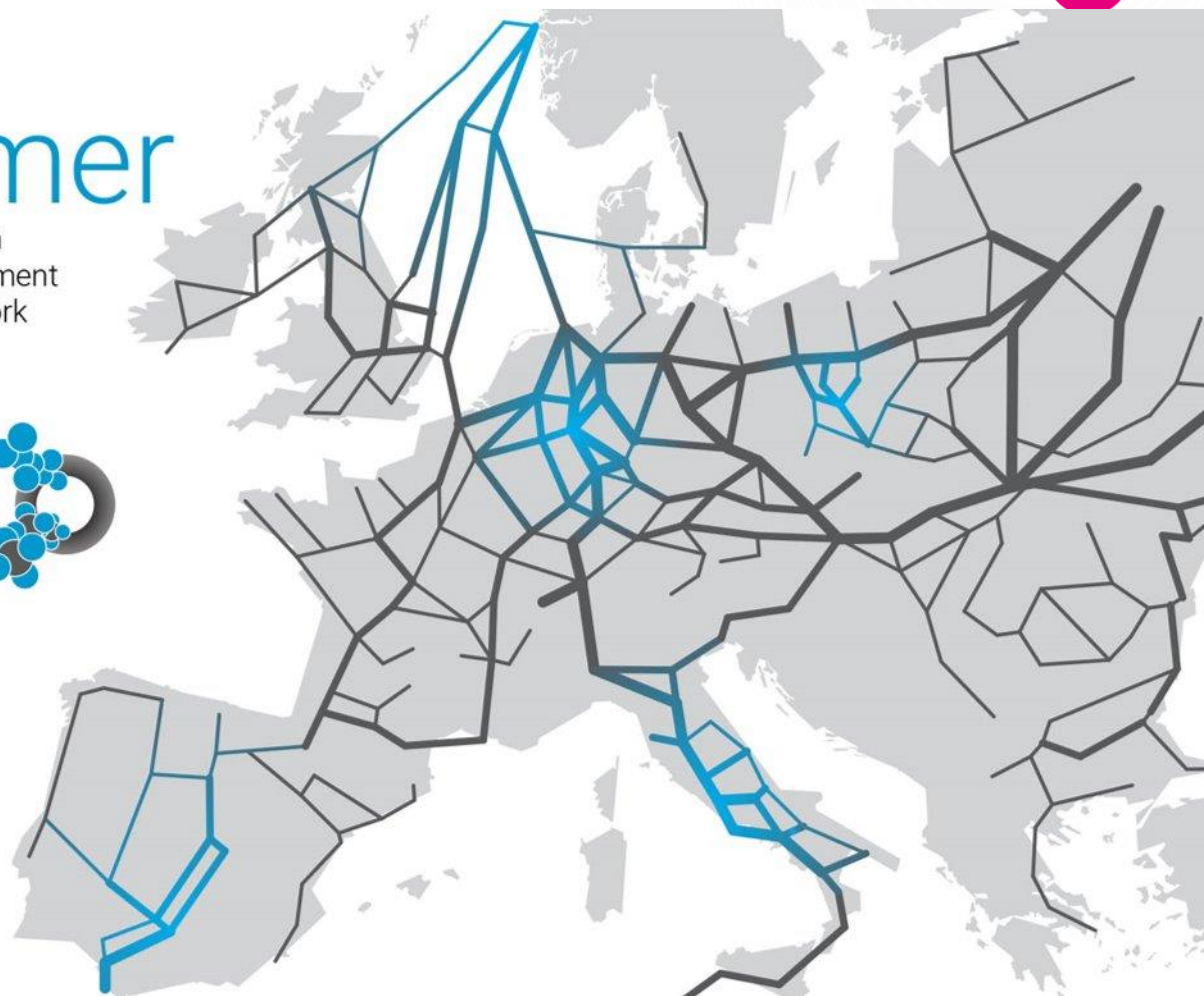


## Shimmer

Safe Hydrogen Injection  
Modelling and Management  
for European gas network  
Resilience



Regulations and guidelines



# THANK YOU

