



Introduction

The THOTH2 project, funded by the Clean Hydrogen Partnership under the HORIZON-JTI-CLEANH2-2022 call, aims to develop specialized methodologies for testing various measuring devices installed in gas transmission and distribution grids to accommodate the future transport of hydrogen. This 30-month initiative, which began in February 2023, is coordinated by SNAM and involves a consortium of 13 partners, including European TSOs, DSOs, research institutions, and metrology institutes.

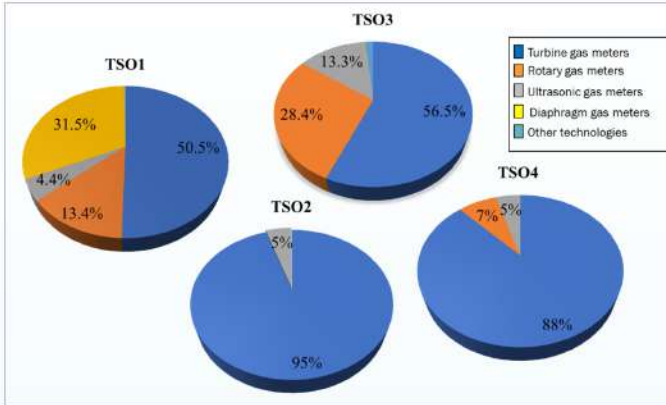


Fig. 1. Gas meters installed for TSOs, categorized by type of measuring technology

Methods

With a focus on H₂NG mixtures, THOTH2 adopts a pragmatic approach centered on the following key activities:

- 1) State-of-the-Art Analysis:** Identifying barriers and biases in metering devices
- 2) Development and Definition:** Establishing the methodology and protocols for testing
- 3) Testing and Characterization:** Conducting comprehensive tests and characterizations
- 4) Standardization and Exploitation:** Standardizing methods and leveraging the results for broader application

Results

"SoA analysis: identification of barriers and biases in metering devices" was concluded in August 2023. Three Deliverables were produced on gas grid measuring equipment and related regulating normative SoA, highlighting the gaps in existing measuring devices and standards in case of hydrogen injection into the actual natural gas grid. A paper has been published, and a second one has been submitted as outcomes of WP1 activities.

"Testing and validation": focuses on obtaining experimental validation to update existing testing protocols and standards for measuring the quality and quantity of hydrogen and H₂NG mixtures, addressing the current gaps identified. An experimental and rigorous approach is essential before introducing new protocols or standards for measuring the quantity and quality of H₂NG mixtures.

Conclusion

The completed Work Package 1 identified the state-of-the-art (SoA) measuring devices installed on NG transmission and distribution networks by developing a database of measurement devices, including barriers when operating with H₂NG mixtures, constituting a solid premise for choosing the models to test, designing test protocols, setting up test benches and carrying out standardization activities. Specifically, three deliverables describing the metrological performances and the standardization gaps when operating with H₂NG mixtures were published.

Based on the results of WP1, the measuring devices to be tested were identified in Task 2.1 while new testing protocols to carry out experimental activities were developed in Task 2.2. Available laboratories among the partners of the THOTH2 consortium have been identified to perform the tests based on the positive check of the operative working conditions performed in Task 3.1.

In this way THOTH2 project tries to develop:

1. New testing protocols to experimentally assess the H₂ limits in state-of-the-art NG measuring devices.
2. Suggestions for technical committees involved in the standardization roadmap.
3. Targets for research in NG metrology, starting from existing experience and know-how about the performance of SoA devices.



Fig. 2. A photo of the CESAME test bench.

References

- D1.1 SoA of measuring devices installed in NG transmission and distribution networks.
- D1.2 Barriers and gaps of SoA NG transmission and distribution measuring devices in H₂NG flows.
- D1.3 Normative Gaps towards H₂NG Gas Grid.
- Hydrogen blending effect on fiscal and metrological instrumentation: A review, International Journal of Hydrogen Energy, 2024. doi: 10.1016/j.ijhydene.2024.02.227.



Acknowledgments

The THOTH2 project has received funding from the Clean Hydrogen Partnership under Grant Agreement No 101101540. This Partnership receives support from the European Union's Horizon Europe Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research.

