

# HERMES

HYDROGEN EFFICIENT PURIFICATION  
USING MEMBRANES IN INDUSTRIAL GAS STREAMS

## Clean Hydrogen, Smarter Systems: Powering a Sustainable Future

### About Project

**HERMES** is a pioneering European project aiming to revolutionize clean energy by advancing hydrogen separation and purification. As hydrogen becomes central to Europe's low-carbon goals, current purification methods remain too costly and energy-intensive. **HERMES** addresses this challenge with two cutting-edge membrane technologies—**Palladium-based and Carbon Molecular Sieve (CMS)**—designed to deliver high-purity hydrogen more efficiently and affordably. Prototypes will be built and tested in industrial settings in Italy and Türkiye, capable of processing up to **100 kg of hydrogen per day** from various gas streams, with targets of **under 3.5 kWh** energy use and production costs below 1 euro per kilogram.

Led by a strong European consortium of universities, research centers, and industrial partners, **HERMES** combines innovation with real-world testing. Beyond technology, the project includes environmental, economic, and safety evaluations—such as **TEA, LCA, LCC, and PHA**—and promotes public engagement to build trust in hydrogen solutions. With scalable, green, and cost-effective purification systems, **HERMES** is set to play a vital role in Europe's transition to a clean and resilient energy future.

### Objectives

**HERMES** aims to revolutionize hydrogen separation and purification by reducing costs through two advanced membrane technologies: **Palladium-based and Carbon Molecular Sieve (CMS) membranes**. Two prototypes will be developed and tested at industrial sites for **the separation of 100 kgH<sub>2</sub>/day** from streams with varying hydrogen content, using both membrane types.

- 01** Develop and test two TRL7 prototypes (100 kgH<sub>2</sub>/day) using advanced membranes for various industrial streams.
- 02** Ensure stable hydrogen purity from fluctuating input compositions.
- 03** Complete TEA, LCA, and LOC studies of **HERMES**.
- 04** Conduct preliminary safety analysis for all use cases.
- 05** Create protocols to assess membrane lifetime.
- 06** Identify new industrial applications for **HERMES** technologies.
- 07** Prepare for the exploitation of **HERMES** results.
- 08** Promote project results and strengthen stakeholder engagement.

### Contact

#### Coordinator

alejandro.barranco@h2site.com

#### Communication & Dissemination Leader

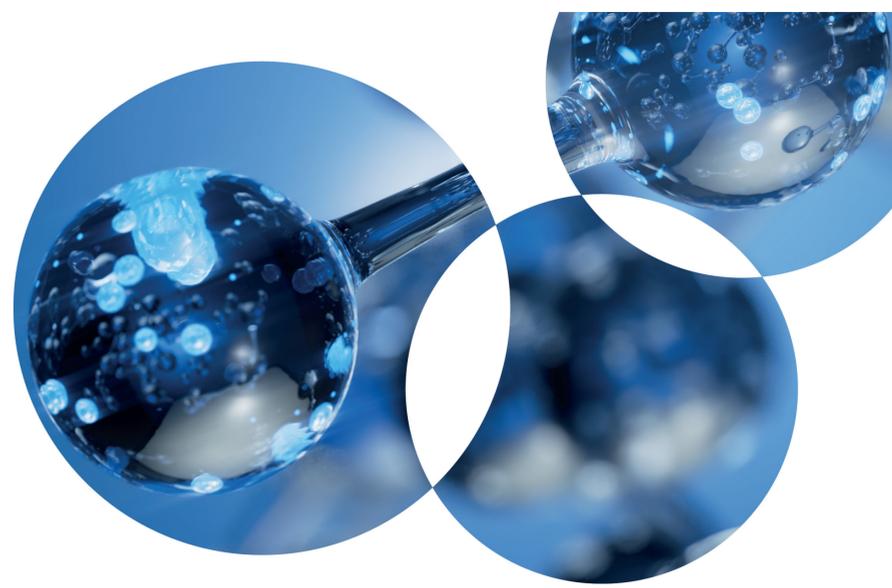
hermes-h2@intract.com.tr

 hermes-h2.eu

 hermes-h2-project

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### Consortium



#### Academic

- Fondazione Bruno Kessler ..... IT
- Eindhoven University of Technology ..... NL
- Fundacion Tecnalia Research & Innovation ..... SP

#### Industry

- Hydrogen Onsite (Coordinator) ..... ES
- Türkiye Petrol Rafinerileri Anonim Şirketi ..... TR
- SNAM S.P.A. .... IT

#### Horizontal

- Intract Inovasyon Dan. Ltd. Sti ..... TR

