

EUH₂STARS

EUROPEAN UNDERGROUND H₂ STORAGE REFERENCE SYSTEM



Project ID	101137798
PRR 2024	Pillar 2 – H ₂ storage and distribution
Call topic	HORIZON-JTI-CLEANH2-2023-02-01: Large-scale demonstration of underground hydrogen storage
Project total cost	EUR 27 228 904.25
Clean H₂ JU max. contribution	EUR 19 655 460.13
Project period	1.1.2024–30.9.2029
Coordinator	RAG Austria AG, Austria
Beneficiaries	Austrian Gas Grid Management AG, Axiom angewandte Prozesstechnik GmbH, Axiom Polska Sp z o.o., Energie Beheer Nederland BV, Energieinstitut an der Johannes Kepler Universität Linz Verein, Linz Strom Gas Wärme GmbH für Energiedienstleistungen und Telekommunikation, Magyar Földgáztároló Zrt., Montanuniversität Leoben, Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek, Shell Global Solutions International BV, Trinity Capital SL

<http://euh2stars.eu>

PROJECT TARGETS

Target source	Parameter	Unit	Target	Achieved to date by the project	Target achieved?	SOA result achieved to date (by others)	Year for reported SOA result
Project's own objectives	H ₂ purification achieved at exit of hydrogen purification unit	%	98 – Grade A according to ISO 14687	Unknown (novel purification configuration)		N/A	N/A
SRIA (2021–2027)	Hydrogen recovery factor of H ₂ purification unit	%	95	Unknown (novel purification configuration)		80	2030

PROJECT AND GENERAL OBJECTIVES

Euh₂stars's mission is to demonstrate best practice for a competitive, complete and qualified large-scale hydrogen storage system using a porous subsurface reservoir to enable the integration of European renewable energy sources.

The overall aim of the project is to demonstrate underground hydrogen storage in depleted porous natural gas reservoirs at technology readiness level (TRL) 8. RAG Austria AG is in a unique position, starting with an existing pilot facility developed as part of the Underground Sun Storage 2030 project (www.uss-2030.at) to TRL 6. Euh₂stars will bring the pilot to TRL 8 using results of several relevant projects (Hydrogen underground storage in porous reservoirs (Hyuspre), Hydrogen storage in European subsurface (Hystories), Underground Sun Storage, Underground Sun Conversion, etc.). To achieve the overall aim and maximise the exploitation of the project's results for replication in other regions of Europe, the following specific objectives and outcomes are planned.

- Provide recommendations to best manage all environmental, legal and (future) regulatory, societal and market-related aspects to ensure the successful implementation of an underground hydrogen storage facility in Europe.
- Provide recommendations on the topic of health, safety, environment and quality,

including a monitoring plan to ensure that the level of risk is as low as reasonably practicable when operating the demonstration site and future commercial storage sites.

- Run four cycles of seasonal operation with different characteristics and usage profiles to demonstrate their ability to be integrated with different energy infrastructure systems to achieve the highest hydrogen purification levels.
- Show transformation pathways to replicate findings from the demonstration in full-scale commercial settings at existing underground gas storage facilities and storage sites to be developed in depleted natural gas reservoirs in Europe located in Austria (RAG Austria), Hungary (Hungarian Gas Storage), the Netherlands (Shell Global Solutions International) and Spain (Trinity Capital SL).
- Show how to integrate hydrogen storage facilities into the local, national and European energy infrastructures and markets by showcasing specific use cases in Austria, Hungary, the Netherlands and Spain, and other use cases including integration into the European hydrogen backbone.
- Establish a sound interactive process for stakeholder involvement to maximise replication potential and the exploitation of the results of the demonstration.