

HYUSPRE

HYDROGEN UNDERGROUND STORAGE IN POROUS RESERVOIRS



Project ID	101006632
PRR 2024	Pillar 2 – H ₂ storage and distribution
Call topic	FCH-02-5-2020: Underground storage of renewable hydrogen in depleted gas fields and other geological stores
Project total cost	EUR 3 714 850.00
Clean H ₂ JU max. contribution	EUR 2 499 850.00
Project period	1.10.2021 – 30.6.2024
Coordinator	Nederlandse Organisatie voor toegepast-natuurwetenschappelijk onderzoek, Netherlands
Beneficiaries	Centrica Storage Limited, Energie Beheer Nederland BV, Energieinstitut an der Johannes Kepler Universität Linz Verein, Equinor Energy AS, Fondazione Bruno Kessler, Forschungszentrum Jülich GmbH, Magyar Földgáztároló Zrt., NAFTA AS, Neptune Energy Hydrogen BV, RAG Austria AG, Shell Global Solutions International BV, SNAM SpA, Technische Universität Clausthal, University of Edinburgh, Uniper Energy Storage GmbH, Wageningen University

<https://www.hyuspre.eu/>

PROJECT TARGETS

Target source	Parameter	Target achieved?
Project's own objectives	Develop future scenario roadmaps for EU-wide implementation	
	Evaluate the amount of renewable energy that can be buffered versus time-varying demands	
	Establish a cost estimate and identify the business case for H ₂ storage in porous reservoirs	
	Visualise suitable H ₂ underground stores and their H ₂ storage potential based on GIS	
	Establish geochemical, microbial, flow and transport, and geomechanical processes for H ₂ in porous reservoirs	✓
	Map the proximity of hydrogen stores to large renewable energy infrastructures	

PROJECT AND GENERAL OBJECTIVES

Hyuspre studied the potential of large-scale hydrogen storage in porous reservoirs in Europe. This includes the identification of suitable geological storage reservoirs and a techno-economic feasibility assessment for hydrogen storage in these reservoirs. Hyuspre addressed specific technical challenges regarding storage, and involved the conduct of an economic analysis to facilitate the decision-making process to develop a portfolio of potential field pilots. The techno-economic assessment enabled the development of a roadmap for widespread hydrogen storage towards 2050.

NON-QUANTITATIVE OBJECTIVES

- Hyuspre aimed to conduct a study assessing potential matches between hydrogen supply and demand sites, including the need for hydrogen to buffer time-varying renewable energy demands.
- The project aimed to conduct a study on the potential of European underground hydro-

gen storage to facilitate the achievement of a zero-emission energy system by 2050.

PROGRESS AND MAIN ACHIEVEMENTS

After the extension of Hyuspre by 6 months until June 2024, the project operated according to plan. Laboratory experiments were concluded in March 2024, and results were subsequently analysed and reported. The hydrogen scenario studies (on the EU-scale H₂ system, guidelines for decision-making on reservoir suitability, levelised cost of hydrogen and hydrogen roadmap for Europe) were developed in close cooperation with the project's industrial partners.

FUTURE STEPS AND PLANS

Hyuspre is in its concluding phase. The consortium concluded all planned activities and delivered all planned deliverables by the end of June. A fifth webinar was offered on the European hydrogen roadmap in June. The final conference was held on 19 June in the Netherlands.