



Press Information, January 12<sup>th</sup>, 2024

## **EUH2STARS – European Underground Hydrogen Storage Reference System**

### **Paving the way towards the future of European underground hydrogen storage**

- EU funding for the development of safe and market-ready hydrogen storage in underground gas reservoirs and the construction of hydrogen storage infrastructure
- Renewables become reliable and base-load capable – meaning that solar and/or wind energy can be utilized all year round in the form of hydrogen – without CO<sub>2</sub> emissions
- Decoupling the generation of wind and solar energy from its immediate consumption makes it possible to timeshift its use from moments of excess to moments of deficit
- Produce, store, transport and use green hydrogen all year round

Hydrogen is the key to increasing the security of energy supply in the context of the energy transition. As part of the Horizon Europe Framework Programme (HORIZON) call for proposals to investigate and scale up the large-scale underground storage of hydrogen, the EUH2STARS project submitted by an international consortium under Austrian leadership was awarded funding of around 20 million euros.

The project will demonstrate the economic and technical feasibility and qualify a complete storage system through testing of a large-scale underground hydrogen storage, its contribution to intermittent electricity management, security of supply, interface with hydrogen end-users as well as the economies of scale that can be realized.

### **EUH2STARS: Enabling and driving forward the energy transition**

*"The foundation for EUH2STARS is RAG's experience from its first hydrogen storage projects in Upper Austria. RAG was the first company to prove that hydrogen can be stored seasonally and in large volumes in underground natural gas reservoirs. By scaling up this technology, we are demonstrating how the summer sun can be utilized for heat and electricity in winter", says **RAG Austria AG CEO Markus Mitteregger**.*

EUH2STARS is of outstanding importance throughout Europe for companies, political decision-makers, authorities and the general public for the transformation of European energy systems and for enabling the energy transition. Basic technical and economic scenarios are being developed for a wide range of geological conditions and in very different energy environments. This will ensure that the results of the EUH2STARS project will benefit a wide range of stakeholders across Europe.



## Reference project with renowned partners

The EUH2STARS consortium, led by RAG Austria AG, with its complementary expertise in various disciplines, not only covers the entire hydrogen storage value chain – from the centrepiece of **storage** (RAG Austria AG/Austria, Shell Global Solutions International B.V./The Netherlands, Energie Beheer Nederland BV/The Netherlands, Hungarian Gas Storage/Hungary and Trinity Energy Storage/Spain), **hydrogen processing** (Axiom angewandte Prozesstechnik GmbH/Austria and Axiom Polska Sp.z o.o/Poland), **transport networks** (AGGM Austrian Gas Grid Management AG/Austria) and **energy suppliers** (LINZ AG/Austria) – but also integrates **key research institutions** (Montanuniversität Leoben/Austria, The Netherlands Organization for Applied Scientific Research (TNO)/The Netherlands and Energieinstitut an der Johannes Kepler Universität Linz/Austria).

In this European reference project, the consortium leader RAG Austria AG, together with its partners, will analyze and plan the measures necessary for a rapid ramp-up of the hydrogen economy along the entire value chain for the duration of the project until 2029.

EUH2STARS consists of the RAG demonstration plant "Underground Sun Storage" in Austria, whose analogue scaled implementation is being investigated in Austria, Hungary, the Netherlands and Spain. Geographically and geologically different reservoir characteristics in terms of rock types, storage capacity, depth and pressure ranges are covered in various European regions: Central Europe by RAG (AT) and Hungarian Gas Storage (HU), North-West Europe by Shell (NL) and Energie Beheer Nederland (NL) and Southern Europe by Trinity Energy Storage (Spain). These regions represent 75% of all regions with porous storage facilities in Europe and are connected to the main future European hydrogen production sites and import routes (North Sea, Ukraine, North Africa). It is essential to expand these storage capacities and make them available in order to ensure a stable supply.

In addition, the following further aspects in connection with the stored hydrogen are being investigated as part of the project:

- Optimal management of all environmental, legal and (future) regulatory, societal and market aspects to ensure a successful implementation of underground hydrogen storage in Europe.
- Hydrogen purification with high purity
- Certification for green hydrogen
- Best practice examples for the integration of hydrogen storage into local, national and European energy infrastructure and the energy market
- Establishment of an interactive process to involve interest groups in order to increase the acceptance of such infrastructure projects.

EUH2STARS is based on the results of several research projects such as HyUSPre – Hydrogen Underground Storage in Porous Reservoirs, Hystories – Hydrogen Storage in European Subsurface, Underground Sun Storage, Underground Sun Conversion and others.



*“TNO is proud to be part of the EUH2STARS project. EUH2STARS enables us to exploit the results from ongoing and recently completed research projects, among which the European-funded HyUSPRe project, to further advance the readiness level of underground hydrogen storage towards real-world demonstration at scale. We are confident that the EUH2STARS project consortium under the leadership of RAG, and with key players active in underground storage from several countries in Europe, will be able via EUH2STARS to increase the confidence level of stakeholders in this technology”*, **Remco Groenberg, lead scientist Subsurface Energy Storage at TNO.**

*“The joint undertaking – EUH2STARS – paves the way for the decarbonised European economy. Large-scale hydrogen storage systems are important nodes of future energy networks of the European Union which will allow the further development of wind and solar power”*, **Aleksander Makaruk, R&D Lead and Senior Engineer, Axiom.**

*“Hungarian Gas Storage Ltd. is committed towards green transition related innovations. Our aim in EUH2Starts is to generate knowledge and understanding on hydrogen related energy storage activities and take significant steps towards sector coupling as well as bringing sustainable additional value to our company in the long run”*, **Akos Kriston, CEO Hungarian Gas Storage Ltd.**

*“Hydrogen storage is one of the central blocks of the energy system of the future. It is a fundamental cornerstone of our energy infrastructure, which is why we are actively involved in the further development of these systems”*, **EIL Director, Robert Tichler.**

#### **Shell Statement still to be submitted**

*“I am delighted that AGGM is part of the EUH2STARS project. Over the past two years, AGGM has drawn up the H2-Roadmap for Austria, which shows the needs-based development of the hydrogen infrastructure in Austria from 2026 to 2050 and was confirmed by the Ministry of Climate Action in the Austrian network infrastructure plan. Hydrogen storage facilities are an essential part of this infrastructure. The EUH2STARS project is an important contribution to the actual development of the hydrogen infrastructure”*, **Helmut Wernhart, Lead of Infrastructure development, AGGM.**



*“As a utility company, LINZ AG is constantly working toward leveraging the potential of sustainable alternative fuels such as hydrogen, implementing measures that help us get fit for a future in which this energy carrier is put to great use. EUH2STARS, a trendsetting project of the European Union, represents a major milestone in this quest. As an energy supplier, our long-term goal is to use hydrogen as an energy vector for the seasonal storage of excess energy in summer for use in winter. During the cold season, LINZ AG will thus be able to supply people and businesses within its supply area with green electricity and green district heating produced from climate-neutral hydrogen”,* **Erich Haider, General Manager of LINZ AG.**

*“For Montanuniversitaet Leoben it is a big pleasure and also responsibility to participate in an international consortium to demonstrate that large scale high pressure underground hydrogen storage is possible. Hydrogen storage will give our society the possibility to switch from carbon based energy carriers to hydrogen basis. Considering the tremendous climate change this is a very important and necessary initiative to set the basis for accelerating the energy transition. Montanuniversitaet Leoben is looking forward to the impact of European Union project EUH2STARS“,* **Gregor Mori, Associate Professor for Corrosion and Hydrogen Embrittlement at Montanuniversitaet Leoben.**

*“Trinity Energy Storage is strongly committed to the European decarbonization strategy, which must make underground green hydrogen storage a reality, proved to be a promising technology to provide security of energy supply by covering the seasonal supply/demand gap. Trinity is delighted to be part of this adventure, pioneering the future of the energy transition”,* **Julio Matesanz, Trinity Exploration Manager.**

## Clean Hydrogen

The Clean Hydrogen Partnership is supporting research and innovation (R&I) activities in hydrogen technologies in Europe. It aims to accelerate the development of advanced clean hydrogen applications ready for market, across end-use sectors such as energy, transport, building and industry, while strengthening the competitiveness of the clean hydrogen value chain. The members of the partnership are the European Commission, fuel cell and hydrogen industries represented by Hydrogen Europe and the research community represented by Hydrogen Europe Research.



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For more information on the EUH2STARS project please visit:  
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## Consortium Members



Energising the transition

