Press release
18 September 2023

Inauguration of the HyPSTER project*, first demonstration facility for renewable hydrogen storage in salt caverns

Inaugurated on 15th September in Etrez (Ain) in the presence of Catherine MacGregor, Chief Executive Officer of ENGIE, Cécile Prévieu, Executive Vice President of ENGIE in charge of infrastructure, Charlotte Roule, Chief Executive Officer of Storengy, Mirela Atanasiu, Executive Director ad Interim of the Clean Hydrogen Partnership, numerous elected representatives and economic players in the hydrogen sector.

HyPSTER is the first renewable hydrogen storage demonstrator in a salt cavern supported by the European Union and the Clean Hydrogen Partnership. With an overall budget of 15.5M Euros, including 5M Euros of EU support, this unique demonstrator paves the way for the creation of an industrial-scale renewable hydrogen storage sector and technical and economic replicability to other sites in Europe.

*HyPSTER stands for *Hydrogen Pilot STorage for large Ecosystem Replication*

Renewable hydrogen storage in France goes from concept to implementation

Launched in January 2021, HyPSTER is moving to the implementation stage, to produce and store hydrogen at the Etrez site (near Lyon – France). On the production side, a 1 MW electrolyser will generate 400 kg of hydrogen per day. On the storage side, test operations will begin in the EZ53 cavity. This will be followed by around a hundred cycles of hydrogen pressure variation over 3 months, with no inflow or outflow of hydrogen. These tests will enable us to confirm our ability to store hydrogen with safety standards similar to those that have been in place for natural gas for over 70 years.

At the end of these test cycles, the hydrogen will be extracted and analysed to ensure the quality of the gas in the cavern.

Industrial-scale deployment starting in 2024

After this experimental stage, the scale will change in 2024: hydrogen production and storage will gradually amplify, until the salt cavern's full capacity is used up in 2026, i.e. almost 50 tonnes (equivalent to the daily consumption of 2,000 buses). This will enable us to supply the region's industrial players and hydrogen filling stations.

In the medium term, a hydrogen pipeline should link Etrez to the production and consumption sites, to support the growth of the industry.

Additional studies have already been launched this summer to prepare the follow-up to this project. They aim to develop massive hydrogen storage capacities at the Etrez site. Four caverns – at a depth of 1,300 metres – could be used, each capable of storing 6,700 tonnes of hydrogen.

> ***Key players in the Ain region join forces to develop hydrogen***
> *On 7 July, a partnership agreement for the development of a renewable hydrogen ecosystem was signed with the Communauté d'agglomération du bassin de Bourg-en-Bresse, the commune of Bresse-Vallons, the Chambre du Commerce et de l'Industrie de l'Ain and Mecabourg. The agreement will identify opportunities for setting up projects to meet the region's decarbonisation targets over the next 5 years.*

Cécile Prévieu, EVP Infrastructure of ENGIE, said*: HyPSTER demonstrator's inauguration in Etrez gives evidence of the strong acceleration of the energy transition in our regions. This innovative project also demonstrates the importance of gas infrastructure, which shall play a major role in decarbonising Europe and France. Hydrogen is an essential molecule for achieving our climate objectives; by taking up the challenge of storing it, ENGIE is proud of paving the way for the sector to grow at scale. This will be key to develop a real hydrogen economy.*

Charlotte Roule, CEO of Storengy, said: *HyPSTER is a real industrial challenge. It has been made possible thanks to the joint efforts of academics, industrial players and local authorities. Together, we are making hydrogen storage a reality. Cycling in salt caverns had never been tested, but it is launched now, in France. We are going to progress on the project to reach industrial scale and replicate the process in other sites all over Europe.*

Mirela Atanasiu, Executive Director ad Interim of Clean Hydrogen Partnership, said: *Underground storage of large quantities of renewable hydrogen will allow the matching of stochastic renewable energy sources with the constant supply needs of industrial and transport users. It will furthermore allow the seasonal storage of hydrogen. The Clean Hydrogen Partnership is proud to support the HYPSTER project by funding the first hydrogen storage salt cavern demonstrator. We are convinced that the unique launch of the testing site in Etrez can serve as a blueprint for other sites in Europe and contribute to developing technologies for a climate-neutral future.*

About the project
https://hypster-project.eu/

About the partners

Storengy
This subsidiary of ENGIE is one of the world leaders in underground natural gas storage. Drawing on 70 years of experience, Storengy designs, develops and operates storage facilities and offers its customers innovative products. The company owns 21 natural gas storage sites with a total capacity of 136 TWh in France, Germany and the United Kingdom. Storengy is also a key player in renewable gases (biomethane, hydrogen, synthetic gas). In the hydrogen sector, Storengy is a member of France Hydrogen (formerly AFHYPAC), as well as the association Hydrogen Europe. www.storengy.com

Armines-École Polytechnique
Armines is the largest private contractual research structure in France. Under the supervision of the Ministry of Industry, it is supported by 48 research centres, including the École polytechnique, for which it is a federating operator. The École polytechnique is France's number-one institution associating research, education and innovation at the highest scientific and technological level. With its 23 laboratories, the École Polytechnique's Research Centre works at the frontiers of knowledge on major interdisciplinary scientific, technological and societal issues. www.armines.net www.polytechnique.edu

INOVYN
Founded on 1st July 2015 as a part of INEOS, INOVYN is one of the three world leaders in vinyl manufacturing. With a turnover of more than 3.5 billion euros, INOVYN has more than 4,300 employees with manufacturing, sales and marketing activities in ten European countries. INOVYN's portfolio includes a wide range of advanced products such as organic chlorine derivatives, chlor-alkali, general purpose vinyl, specialty vinyl, sulfur chemicals, salt, and electrochemical and vinyl technologies. The annual production volume amounts to more than 40 million tonnes. www.inovyn.com

ESK
ESK GmbH is a renowned engineering company for energy storage and systems services and has successfully completed national and international projects for many years. Its team of highly qualified engineers and geoscientists has extensive experience and know-how in the fields of aquifer and salt cavern storage technologies. In total, ESK has 80 employees in Holzwickede and Freiberg, as well as in its Leipzig and Stassfurt offices, in Germany. www.esk-projects.com

ERM
ERM is the business of sustainability.
As the largest global pure play sustainability consultancy, ERM partners with the world's leading organizations, creating innovative solutions to sustainability challenges and unlocking commercial opportunities that meet the needs of today while preserving opportunities for future generations.
ERM's diverse team of 8,000+ world-class experts in over 150 offices in 40 countries and territories supports clients across the breadth of their organizations to operationalize sustainability. Through ERM's deep technical expertise, clients are well-positioned to address their environmental, health, safety, risk, and social issues. ERM calls this capability its "boots to boardroom" approach - a comprehensive service model that allows ERM to develop strategic and technical solutions that advance objectives on the ground or at the executive level. https://www.erm.com/

Ineris

Ineris (Institut national de l'environnement industriel et des risques) is a public industrial and commercial establishment under the supervision of the Ministry of Ecological Transition. This institute conducts research activities on behalf of public authorities, industrial operators and public bodies in the fields of assessment, prevention and control of risks linked to industrial activities, particularly in underground environments. Over the years, Ineris has developed solid expertise in the field of environmental risk assessment related to underground storage activities. The institute has large-scale laboratories for tests involving hydrogen. Their expertise is based on experimental skills (especially in situ) in the fields of digital modelling and risk assessment methods in health, safety and the environment. https://www.ineris.fr/fr

AXELERA Auvergne-Rhône-Alpes

AXELERA is the reference cluster of the chemical and environmental sectors in the French region Auvergne-Rhône-Alpes. In France and internationally, it supports the development and innovation o actors involved in the controlled management of environmental materials and resources, for a sustainable development of territories. The cluster is committed to developing chemical solutions for the industry and territories, competitive and eco-efficient processes, technologies to preserve and restore natural resources, circular management of different materials, water, air, soil and energy. www.axelera.org.

Brouard Consulting

Brouard Consulting is an engineering firm specialising in underground storage founded in 1999 and operating worldwide. This company is providing expertise to the HyPSTER project by performing digital calculations to accurately simulate the thermodynamic behaviour of salt caverns and control the mechanical stability of the surrounding rock.
http://www.brouard-consulting.com

Equinor

Equinor is a company from the energy sector developing new energy solutions for today and tomorrow, transforming natural resources into energy for people and progress for society.

Clean Hydrogen Partnership

Clean Hydrogen Partnership succeeds to the Fuel Cells and Hydrogen Joint Undertaking (FCH JU). Its aim is to strengthen and integrate the European Union's research and innovation capacities in order to accelerate the development and improvement of advanced clean hydrogen applications which are ready to be commercialised, especially in the energy, transport, building and final industrial usage sectors, while strengthening the

competitiveness of the Union's decarbonised hydrogen value chain. This institution's three partners are the European Commission, the fuel cell and hydrogen industry (represented by Hydrogen Europe) and the community of researchers, which is represented by Hydrogen Europe Research.
https://www.clean-hydrogen.europa.eu

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