



Press release
Paris, 21 March 2024

Launch of the FrHyGe project, an underground hydrogen storage demonstrator, involving 17 European partners and coordinated by Storengy

On 20 March 2024, the European consortium met for the official launch of the FrHyGe* project, supported and funded by the European Union through the Clean Hydrogen Partnership. This 43 M€ project aims to validate the underground storage of hydrogen in salt caverns on an industrial scale. The project will allow the deployment of an industrial demonstrator in Manosque, France, as well as the replication study on the Harsefeld site in Germany and more widely at a European scale.

**FrHyGE: Full qualification in France for large-scale HYdrogen underground storage and replication from Germany to all European countries*

A large-scale demonstrator for underground hydrogen storage in Europe

The FrHyGe project has 4 objectives:

- Converting a natural gas (or brine) salt cavern for hydrogen storage,
- Demonstrating the feasibility of injection and withdraw 100 tonnes of hydrogen over cycles ranging from 1 hour to 1 week in the converted caverns at the Manosque site,
- Studying the market penetration, the value chain and preparing for replication at other sites in France, Germany, and across Europe,
- Assessing the environmental impact, safety, and regulations in preparation for deployment on the GeoH2 (Manosque) and SaltHy (Harsefeld) projects.

As part of the FrHyGe project, Storengy, the project coordinator, and its partners will carry out technical, economic, regulatory, environmental, and safety studies. They will establish a roadmap to deploy the process of conversion and creation of storage caverns as quickly as possible and thus contribute to the creation of a true European hydrogen storage and transport backbone.

With a total budget of 43 million euros, of which 20 million are funded by the Clean Hydrogen Partnership, this project opens up new prospects for the development of renewable hydrogen storage in Europe.

Project timetable

This project, launched on 1^{er} March 2024, will run for several years:

2024 - 2025 :

- Studies and analyses for the implementation of the demonstrator at the Manosque site and the replicability of the technology at the SaltHy site (Harsefeld, Germany)
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2026 - 2027 :

- Construction period

2027 - 2029 :

- 100 injections and withdrawals from 2 caverns at the Géométhane site in Manosque
- Studies and analyses of hydrogen reactions according to the pressures to which it is subjected
- Comparison of predictions with theoretical results

Next, in the commercial operation phase, the two caverns in Manosque will allow the storage of 6,000 tonnes of hydrogen. In Harsefeld a storage capacity of 5,200 tonnes is planned.

"The project is supported by the Clean Hydrogen Partnership and its members."



Co-funded by
the European Union

Clean Hydrogen Partnership

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.

<https://www.clean-hydrogen.europa.eu>

"We are excited to kick-start the project FRHYGE which will demonstrate the feasibility of a smart and energy-efficient operation of a hydrogen underground storage facility in salt caverns in Manosque, France. Building on the findings of first demonstration project of Hypster in Etrez, both projects can be replicated to other sites and contribute to materialize the benefits of hydrogen technologies across the entire EU. The unique characteristics of the Manosque site will allow the FRHYGE project to take advantage of two neighbouring salt caverns to perform 100 storage cycles of hydrogen, thereby pushing the state of the art in underground hydrogen storage to an unprecedented level." says Mirela Atanasiu, Executive Director ad interim of Clean Hydrogen Partnership.

About our partners

Storengy

Storengy, an ENGIE subsidiary, is one of the world leaders in underground natural gas storage. The company has 21 sites in France, Germany and the United Kingdom. With 70 years of experience in exploring and exploiting the subsoil, it is working to transform its storage facilities to accommodate 100% renewable gases and is mobilising its skills to develop hydrogen storage infrastructures.

Its local roots enable Storengy to take concrete action on environmental, economic and social issues, for the benefit of local communities. Storengy also applies its expertise to industrial and energy storage projects in France and abroad.

www.storengy.com

ARMINES

ARMINES is a French private non-profit research and technological organisation. Mines Paris PSL and ARMINES signed an agreement on January 6th 2022, which renews the agreement and modified the relations that have historically bind them since 1967, to undertake and carry out research and study activities in the scientific, technical and economic fields in response to the needs of companies, to contribute to the dissemination of knowledge, to valorize the value of research activities carried out by transferring the resulting technologies, to provide research training with a view to the dissemination and application of the results of research activities in industry.

www.armines.net

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/>

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 54 employees in Holzwickede and Freiberg, as well as in its Leipzig and Stassfurt offices, in Germany. www.esk-projects.com

Enagás

Enagás is a Transmission System Operator (TSO) with 50 years' experience in the development, operation and maintenance of energy infrastructure. It has more than 12,000 kilometers of gas pipelines, three underground storage facilities and eight regasification plants, four of which are wholly owned by Enagás and four others in which the company has a significant stake. The company operates in eight countries: Spain, the United States, Mexico, Peru, Germany, Albania, Greece and Italy. In Spain, it is the Technical Manager of the Gas System and operates as provisional Manager of the hydrogen backbone network. In line with its commitment to energy transition, Enagás has announced its goal of becoming carbon neutral by 2040, with a firm commitment to decarbonisation and the promotion of renewable gases, especially hydrogen.

<https://www.enagas.es/en/>

GRTgaz

GRTgaz is Europe's 2nd largest gas transmission operator, with 32,641 km of pipelines and 626 TWh of gas transported. The company employs 3,309 people and generated sales of over €2.1 billion in 2023. GRTgaz's raison d'être is "Together, making a secure, affordable and climate-neutral energy future possible". GRTgaz is an innovative company undergoing major transformation to adapt its network to ecological and digital challenges, and is committed to a 100% carbon-neutral French gas mix by 2050. It supports the hydrogen and renewable gas sectors (biomethane and gas from solid and liquid waste). GRTgaz carries out public service missions to guarantee secure gas supply to its 868 customers (shippers, distributors, industrial companies, power plants and biomethane producers). With its subsidiaries Elengy, Europe's leading LNG terminal operator, and GRTgaz Deutschland, operator of the German MEGAL transmission system, GRTgaz plays a key role on the European scene. The company exports its know-how internationally, in particular the services developed by its RICE research center.

<https://www.grtgaz.com/>

Mines Paris PSL

Mines Paris PSL (affiliated entity of ARMINES) trains engineers and produces essential knowledge to support companies in meeting the challenges of their times. Originally those of mining for the production of energy necessary for large industrializations, today those of ecological transitions and digital transformations. Founding member of PSL University, Mines Paris PSL is a leading French engineering school and the first in terms of partnership research. ARMINES and Mines Paris PSL are represented in this project by the Geosciences Centre which is working on salt caverns for solution mining and energy storage since more than 45 years and which developed skills in laboratory testing as well as in constitutive and numerical modelling.

www.minesparis.psl.eu/en/

Geostock

An international engineering company specialised in underground storage solutions for energies, Geostock has gradually established global leadership in underground energy storage. Building on more than 55 years of experience, Geostock has acquired top-level experience in all underground storage techniques, with unique expertise in the implementation of safe, economical and environmentally respectful infrastructure. Geostock is engaged in the development of underground storage of decarbonized energy, including hydrogen in salt caverns, porous media (aquifers or depleted fields) and mined lined rock caverns.

<https://www.geostockgroup.com/en/>

IFP Energies Nouvelles

IFP Energies nouvelles (IFPEN) is a major research and training player in the fields of energy, transport and the environment. From scientific concepts within the framework of fundamental research, through to technological solutions in the context of applied research, innovation is central to its activities, hinged around four strategic directions: climate, environment and circular economy – renewable energies – sustainable mobility – responsible oil and gas.

<https://www.ifpenergiesnouvelles.com/>

ECO-MED

ECO-MED is a biodiversity consultancy company created in 2003 to assist stakeholders to develop their projects with the best biodiversity management practices within the framework of the regulatory requirements.

Beyond the Provence-Alpes-Côte d'Azur Region, where the company headquarters are based, the field knowledge of ECO-MED's experts radiates throughout the Mediterranean basin, in the Occitanie, Auvergne-Rhône-Alpes, Bourgogne-Franche-Comté regions, in Corsica, but also outside our borders.

ECO-MED's activities revolve around 5 main fields of action: ecological expertise and advice, technical and scientific assistance, ecological mediation, ecosystems restoration and conservation, as well as technical and regulatory training.

ECO-MED's main objective is the conservation of biodiversity, contributing to the development of the local economy while pursuing a sustainable development approach.

<https://ecomед.fr/>

Géométhane

Géométhane is an Economic Interest Grouping (EIG) whose equal members are Storengy France and Géosud. Located in the communes of Dauphin and Manosque, Géométhane's facilities are on two separate sites less than 3 km apart: the Gaude site, where the surface facilities are located, and the Gontard site, where the salt caverns are located. Géométhane has 9 caverns, 7 of which have been operating for 30 years with natural gas. The other two caverns are in brine and could be used to store hydrogen. These two caverns will be used for injection/withdrawal cycling, thanks to the FrHyGe project demonstrator.

<https://www.geomethane.fr/>

Capenergies

The Capenergies competitiveness cluster facilitates the emergence of innovative projects and supports their financing and development to accelerate the Energy Transition in the territories. It runs a dynamic network of nearly 520 members - large industrial groups, companies including a majority of SMEs & start-ups, research and training centers, communities and financiers specializing in energy and associated uses. It intervenes for the benefit of low-carbon energy sectors and its established members in Provence-Alpes-Côte d'Azur, Corsica, Guadeloupe as well as in the Principality of Monaco.

<https://www.capenergies.fr/en/>

Artelys

Artelys is a French consultancy and software edition company specialised in the modelling and optimisation of energy systems. The solutions offered by Artelys inform investment choices (e.g., cost-benefit-risk analysis, hydrogen ecosystem sizing, etc.) and support the development of operational strategies to manage flexibility solutions taking into account multiple types of operational constraints (e.g., optimisation of the bidding strategies of flexibility solutions on electricity markets). Active for more than 20 years, Artelys successfully combines advanced techniques in mathematical optimisation, data science and artificial intelligence with a detailed understanding of the business issues faced by its clients. Project promoters, producers, associations, network operators, communities, regulators, ministries, etc. trust Artelys and its 130 engineers to inform their choices through studies and the implementation of software solutions.

www.artelys.com

Axens

he Axens Group (www.axens.net) offers a complete range of solutions for the conversion of oil and biomass into cleaner fuels, the production and purification of major petrochemical intermediates, the chemical recycling of plastics, natural gas treatment and conversion options, water treatment and carbon capture. Their offer includes technologies, equipment, furnaces, modular units, catalysts, adsorbents and related services. Axens is ideally positioned to cover the entire value chain, from feasibility studies to start-up and monitoring of units throughout their lifecycle. This unique position guarantees optimum performance and a reduced environmental footprint. Axens' international offering is based on highly qualified human resources, modern production facilities and an extensive global network for industrial, technical support and sales services. Axens is an IFPEN Group company.

www.axens.net