



The GreenH2Pipes consortium studies the promotion of hydrogen transport through existing infrastructures

Energy companies and research centres are stepping up their cooperation to promote the production, injection and future transport of hydrogen via the existing Spanish gas grid, as well as its storage.

Coordinated by Enagás, the initiative will cover the entire hydrogen value chain via three lines of work.

Madrid, May 6, 2022. A consortium of 8 companies (AMES, Estamp, Enagás, Exolum, H2Greem, H2Site, Nano4Energy and Rovalma) and 6 research centres (CEIT, Centro Nacional de Hidrógeno-CNH2, CSIC, ITECAM, Tekniker and the University of Rovira i Virgili-URV) have joined forces in the GreenH2Pipes project, to advance the research and technological development necessary to promote the production of hydrogen, its transport through the gas grid and its storage using liquid organic carriers.

This project, coordinated by Enagás and co-funded by CDTI, will help facilitate the decarbonisation of the energy system. It comprises three independent work lines covering the entire hydrogen value chain: from hydrogen production to subsequent injection, transport and storage.

Lines of research

The first line of work involves developing new methods and materials for manufacturing a new generation of PEM (Proton Exchange Membrane) electrolyzers, which will significantly reduce manufacturing costs while enhancing durability and efficiency. The companies and research centres in charge of this phase of the project will be Estamp, H2Greem, Nano4Energy and Rovalma, together with CEIT, CNH2, CSIC, ITECAM and Tekniker.

A second line of research aims to remove barriers to hydrogen injection into the gas system. It includes the design of a hydrogen injection system, the construction of a test loop (HyLoop) at the Enagás Metrology and Innovation Centre in Zaragoza, which, together with various material characterisation tests, will enable insights to be gained about the suitability of gas networks for hydrogen transport.

In addition, methods to ensure the quality of the injected hydrogen and technologies to separate hydrogen from natural gas will be validated. Furthermore, artificial intelligence will be developed to enable the operation of power-to-gas plants (facilities that convert electricity to hydrogen) and facilitate the integration of electricity and gas grids. This phase of the project will be co-led by Enagás Transporte and H2Site as well as CNH2, Tekniker, and Rovira i Virgili University.

The third and final area of work on GreenH2Pipes, which will be promoted by Exolum and CNH2, is the development of new materials for the production of catalysts which aid in the storage of liquid hydrogen through its combination with LOHC (Liquid Organic Hydrogen Carriers).

Hydrogen

Although it is the most abundant element in the universe, hydrogen is rarely found in its molecular form in nature. Rather, it is found in combination with other elements, which is





why it needs to be produced artificially for industrial purposes. It is an energy vector that does not produce greenhouse gases and favours the decarbonisation of many sectors that are difficult to electrify.

For hydrogen to be green it needs to be produced from 100% renewable energy sources, such as solar or wind power, which will be used to separate water into hydrogen and oxygen.

Decarbonisation through innovation

Public funding for the project has been received through the Science and Innovation Missions 2021 programme of the Centre for the Development of Industrial Technology (CDTI) in December 2021.

By supporting the decarbonisation strategies of the companies and research centres involved, this project aligns with the technological goals of the European Hydrogen Strategy.

About Enagás:

Enagás has 50 years' experience in the development, operation and maintenance of energy infrastructure, and operates in eight countries. It is also certified as a Transmission System Operator (TSO) by the European Union. Enagás has pledged to be carbon neutral by 2040 and is firmly committed to the decarbonisation process. In the area of renewable gases, Enagás promotes more than 50 specific projects in Spain with over 60 partners. One of the outstanding initiatives under way in this area is the Green Link initiative, which aims to facilitate connection to high-pressure gas pipelines for biomethane production and other renewable gases including hydrogen. www.enagas.es

About AMES PM TECH CENTRE:

AMES PM TECH CENTRE, located in Sant Vicenç dels Horts (Barcelona), is the research and development centre of AMES, one of the world's leading manufacturers of sintered metal components. Its main products are sintered structural components in different types of steel, sintered sweet magnetic parts for low and high frequency, self-lubricating sintered bronze and iron bearings with the standard SELFOIL® commercial range, AmesPore® porous metal filters and components and OsteoSinter® porous biomedical titanium implants. AMES is a financially and technologically independent company with 100% Spanish capital, founded in 1951. The company has 9 production centres in Spain, Hungary, the USA and China, 3 technology centres in Spain and a worldwide sales and technical support network serving more than 1,000 customers in over 60 countries.

About Estamp:

Estamp supports its customers on the journey towards electrification with solutions adapted to new technologies to achieve clean mobility. We have been leaders in our sector for over 35 years and pioneers in insulation solutions for leading vehicle manufacturers. We have a strong presence in the three main regions of the automotive industry: Europe, Asia and North America.

About Exolum:

Exolum is Europe's leading logistics company for liquid bulk and one of the world's leading companies in this sector. Our core business is the transport and storage of a wide range of liquid bulk products, in particular refined products, chemicals and biofuels, in a sustainable and efficient manner. We are also active in new sectors, such as eco-fuels, circular economy and the development of new energy sources, to achieve our corporate purpose: To create innovative solutions to make the world a better place. www.exolum.com





About H2Greem:

H2Greem is a Spanish technology company focused on the design, development and manufacture of hydrogen production equipment using small and medium-sized proton exchange membrane (PEM) technology. We also adapt to operational and maintenance requirements to ensure the profitability and success of each project. H2Greem has its own technology with a high level of innovation and efficiency developed by our technical management with almost 20 years' experience. We manufacture our own catalysts (based on platinum and iridium) and condition the membranes to integrate our own stacks into the electrolyzers. H2Greem is promoted by Enagás Emprende, Enagás' Corporate Entrepreneurship and Open Innovation initiative.

About H2Site:

By using a proprietary membrane reactor technology, H2SITE produces and separates H₂ with fuel cell purity from readily transportable and renewable feedstocks such as ammonia and ethanol, or from mixtures with low concentrations of H₂. The technology utilizes a compact system without moving parts, which allows for the generation of hydrogen locally for small and medium-sized consumers in the energy and mobility sectors.

About Nano4Energy:

Nano4Energy is a technology-based company with a strong international presence. The core business of Nano4Energy is the development and use of high added value coatings using magnetron sputtering technology for industrial coating systems. Due to the requirements of today's coatings, the company has become one of the world leaders in coatings applied by HIPIMS (High Impulse Power Magnetron Sputtering) technology. In addition, Nano4Energy specializes in the development and manufacture of HiPIMS power sources customised to meet the needs of coating companies.

About Rovalma:

ROVALMA, founded in 1977 and with a strong international presence, is an R&D-intensive SME dedicated to the development, production and marketing of tool steels and special alloys, as well as the development of innovative additive manufacturing technologies and the production of raw materials and production equipment for these technologies.

There are eight companies in the consortium as well as six research centres: **CEIT, National Hydrogen Centre-CNH₂, CSIC, ITECAM, Tekniker and Rovira i Virgili-URV University.**

