



## The GreenH2Pipes consortium seeks to promote the transportation of hydrogen through existing infrastructures

Companies in the energy sector and research centres are joining their efforts to promote the generation, injection and future transportation and storage of hydrogen through the existing gas network in Spain.

The initiative, coordinated by Enagás, has three different lines of work covering the whole hydrogen value chain.

**Madrid, 6th May 2022.** A consortium made up of 8 companies (AMES, Estamp, Enagás, Exolum, H2Greem, H2Site, Nano4Energy and ROVALMA) and 6 research centres (CEIT, the Spanish National Hydrogen Centre [CNH2], CSIC, ITECAM, Tekniker and Rovira i Virgili University [URV]) have come together under the GreenH2Pipes project to promote the research and technological development required to boost hydrogen production, its transportation through the gas network and its storage through liquid organic carriers.

This project, coordinated by Enagás and co-financed by the Spanish Centre for Industrial and Technological Development (CDTI), will contribute to facilitating decarbonisation and has three separate lines of work covering entire hydrogen value chain: from hydrogen generation to its subsequent injection, transportation and storage.

### Lines of research

The first line of work involves researching new materials and processes to manufacture new techniques for PEM (Proton Exchange Membrane) electrolyzer generation, which will allow for a reduction of manufacturing costs while preserving efficiency and durability. The companies and research centres responsible for this phase of the project will be Estamp, H2Greem, Nano4Energy and ROVALMA, along with CEIT, CNH2, CSIC, ITECAM and Tekniker.

The second line of work is aimed at removing barriers to injection of hydrogen into the gas system. It envisages the conceptual design of hydrogen injection, the construction of a test loop (HyLoop) at the Enagás Metrology and Innovation Centre in Zaragoza which, along with different tests to characterise the materials, will allow us to gather information about the suitability of gas networks for hydrogen transportation.

Methods to ensure the quality of the injected hydrogen and natural gas separation technologies will also be validated. Additionally, artificial intelligence will be developed to optimise operations at power-to-gas plants (facilities which convert electrical energy into hydrogen) and to facilitate sector coupling between the electric and gas networks. This phase of the project will be led by Enagás Transporte and H2Site along with CNH2, Tekniker and Rovira i Virgili University.

GreenH2Pipes' third and final line of work, which will be promoted by Exolum and CNH2, involves the development of new materials to manufacture catalysts which suit liquid hydrogen storage through its combination with liquid organic hydrogen carriers (LOHC).





## Hydrogen

Hydrogen is the most abundant element in the universe, but it is hardly found in nature in molecular form. Usually, it is found combined with other elements, therefore it is necessary to produce it artificially for industrial use. Hydrogen is an energy vector which does not produce greenhouse gases and which favours decarbonisation in multiple sectors that are difficult to convert to electrical operations.

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

## Innovation for decarbonisation

The project received public financial support from the Missions Science and Innovation 2021 initiative of the Spanish Centre for Industrial and Technological Development (CDTI) in December 2021.

This project reinforces the respective decarbonisation strategies of the companies and research centres involved in it and is aligned with the technological objectives of the European Clean Hydrogen Alliance.

### About Enagás:

Enagás has 50 years of experience in the development, operation and maintenance of energy infrastructures and it operates in eight countries. It is also certified as a Transmission System Operator (TSO) by the European Union. Enagás has pledged to achieve carbon neutrality by 2040 and has a strong commitment to the decarbonisation process. In the field of renewable gases, Enagás promotes more than 50 specific projects in Spain, together with more than 60 partners. The Green Link initiative to facilitate connections to the high-pressure gas pipeline network to facilitate the production of biomethane and other renewable gases such as hydrogen is notable among the projects Enagás has launched. [www.enagas.es](http://www.enagas.es)

### About the AMES PM TECH CENTER:

AMES PM TECH CENTER, located in Sant Vicenç dels Horts (Barcelona), is the research and development centre of the company AMES, one of the world leaders in the manufacture of sintered metal components. Its main products are sintered structural components of different grades of steel, soft magnetic sintered parts for low and high frequency, self-lubricating sintered bronze and iron bearings, from the SELFOIL® standard range for sale to AmesPore® porous metal filters and components and OsteoSinter® porous titanium biomedical implants. AMES is a financial and technological independent company with 100% Spanish capital founded in 1951. The company has nine production centres in Spain, Hungary, USA and China, three technology centres in Spain and a worldwide sales and technical support network that serves more than 1,000 customers in more than 60 countries.

### About Estamp:

Estamp aids its global clients on their journey toward conversion to electrical operations, providing solutions adapted to new technologies to achieve clean mobility. We are leaders in our industry with over 35 years of experience and we pioneer insulation solutions by leading automotive 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 products and one of the largest in the world. Our main activity is the sustainable and efficient transportation and storage of a wide range of liquid bulk products, especially refined products, chemicals and biofuels. In addition, we operate in new sectors, such as eco-fuels, the circular economy or the development of new energy vectors to fulfil our company's purpose: creating innovative solutions to make the world a better place. [www.exolum.com](http://www.exolum.com)

### **About H2Greem:**

H2Greem is a Spanish technology company focused on the designing, developing and manufacturing hydrogen production systems using small and medium size proton exchange membrane (PEM) technology. We also adapt to operation and maintenance needs to ensure the viability and success of each project. H2Greem has its own highly innovative and efficient technology, developed by our technical management with almost 20 years of experience, manufacturing its own catalysts (based on platinum and iridium) and conditioning the membranes to arrange our own integrated stacks in the electrolyzers. H2Greem is promoted by the Enagás Empeñe programme, an Enagás programme for corporate entrepreneurship and open innovation.

### **About H2Site:**

H2SITE, with its proprietary membrane reactor-based technology, produces and separates H2 with fuel cell purity from renewable, easy-to-transport raw materials such as ammonia or ethanol, or from mixtures with low concentrations of H2. The technology is based on a compact system with no moving parts which allows for H2 to be generated locally for small and medium-sized consumers within the energy and mobility sector.

### **About Nano4Energy:**

Nano4Energy is a technology company with expansive international projection. Nano4Energy's main activity is the technological development of high value-added coatings using magnetron sputtering technology and by implementing these coatings in industrial coating systems. Due to current coating requirements, the company has become one of the world's leaders in coatings applied using HiPIMS (High-Power Impulse Magnetron Sputtering) technology. Nano4Energy also specialises in the development and manufacture of HiPIMS power supplies which meet the needs of custom coating companies.

### **About ROVALMA:**

Founded in 1977 and with an outstanding international presence, ROVALMA is a small and medium-sized R&D enterprise dedicated to the development, production and marketing of steels for tools and special alloys, as well as the development of innovative additive manufacturing technologies and the production of raw materials and productive equipment for these technologies.

In addition to the eight companies in the consortium, the following six research centres are part of this initiative: **CEIT, the Spanish National Hydrogen Centre [CNH2], CSIC, ITECAM, Tekniker and Rovira i Virgili University [URV].**

