



Launch of the EU-funded project PilgrHYm: Pre-normative research on Integrity assessment protocols of Gas pipes Repurposed to Hydrogen and Mitigation guidelines

Press release – for immediate release

April 2024 – The fight against climate change will necessitate a profound transition in the energy sector, which currently accounts for over 70% of global greenhouse gas (GHG) emissions. Achieving carbon neutrality will require a substantial reduction in the use of fossil fuels in favour of renewable energy sources and low-carbon fuels.

Hydrogen (H₂) is being viewed as a promising energy carrier that could address the challenges of sustainability, especially when used in conjunction with electrification. This versatile resource has a wide range of applications across various industries including chemical processing, oil refining, food manufacturing, and transportation. H₂ potential as a low-carbon energy carrier is immense and can be extended to areas like heating homes and buildings, where it could substitute natural gas. H₂ presents a significant opportunity for achieving the European (EU) Green Deal's goal of carbon neutrality by 2050.

However, the implementation of H₂ as an energy carrier may require necessary adaptations to existing infrastructure, such as pipelines originally designed for natural gas, requiring in-depth understanding of their fitness for H₂ service. Existing standards, such as ASME B31.12, are often viewed as overly pessimistic, hindering the development of pure hydrogen networks. Further research is thus required to ensure the safe and efficient distribution and transport of H₂.

In this context, the R&D project *PilgrHYm* has been developed to address these challenges, and to help accelerate the implementation of a safe, efficient, and flexible H₂ grid by repurposing part of the existing EU gas networks. PilgrHYm's main goal is to contribute to the decarbonization of the energy sector by providing a European roadmap with comprehensive guidelines for safely and efficiently integrating pure H₂ into existing natural gas infrastructure.

Additionally, PilgrHYm's work will consist in the following:

- To provide quantified data on more than 70% of the European grid and to refine existing norms, codes, and standards by reducing over conservatism, and ensure the safety and reliability of flaw assessment methodologies;
- To provide a common understanding on compatibility of networks within the EU for hydrogen transmission. This will be obtained by conducting a comprehensive testing program on small-scale laboratory specimens, focusing on 8 base materials, 2 welds, and 2 heat affected zones that are representative of the EU gas grids. These specimens will be selected after a thorough review by multiple TSOs to address safety concerns,

lack of regulations, codes, and standards, as well as research gaps related to the compatibility of current pipelines with hydrogen;

- To help reduce the risk of business cases for the acceleration of Hydrogen ready infrastructures;
- To help characterize the effect of hydrogen on materials so that the impact of gaseous H₂ transportation can be taken into account for design or repurposing analyses;
- To support the development of an EU standard to ensure a proper methodology to safely convert pipelines aimed at natural gas to pipelines ready for pure hydrogen transportation;
- To develop newly innovative models which will allow TSOs to benefit from additional tools to assess the integrity of their pipelines using numerical approaches;
- To develop cost and time effective testing protocols to characterize the impact of hydrogen on different materials;
- To increase the level of safety of hydrogen technologies and applications.

Hence, the results from PilgrHYm will serve as the baseline for a harmonized European solution.

The project, coordinated by **GRTgaz**, kicked off in January 2024, in Villeneuve La Garenne, France. To accomplish this promising endeavour, a Consortium of 12 partners from 6 different countries has been established. In addition, an International Advisory Board (IAB) consisting of 17 members (TSO's, standardization bodies and associations) has been formed as a consultative body to ensure that the outcomes of the project are both effective and aligned with industry standards. The partners and members of the IAB, will be joining hands for 48 months to help achieve the goals of the PilgrHYm project.

Project partners:



GRTgaz is a European leader in NG transmission and a world expert in gas systems. In France, the company operates more than 32,000 km of buried pipelines to transport gas from suppliers to consumers connected to its network. Within GRTgaz, the Research & Innovation Center for Energy (RICE) is the division dedicated to the Research, Development, and Innovation of gas infrastructures. GRTgaz - RICE provides tested and proven industrial applications, as well as technical offers based on the development and the sharing of innovative ideas, scientific knowledge and technical expertise developed within the framework of the gas infrastructure, covering 3 main areas: 1) Energy transition, including Hydrogen and New methane, and methane emission reduction; 2) Optimisation of existing assets, and 3) Safety.



CEA LITEN is a major French technological research institute dedicated to the energy transition. It has been conducting research on hydrogen as an energy vector for more

than 20 years and is leading the field of hydrogen-energy in Europe, developing key components for hydrogen production, storage, and conversion. The institute is dedicated to spearheading the EU's efforts to limit dependency on fossil fuels and reduce greenhouse gas emissions in three key areas: renewable energy, energy efficiency/storage and development of materials. The Liten and its ecosystem innovate with the objective of creating value and transferring it to industry and the economic world. Its activities focus on several key areas: solar energy, smart grid management, batteries storage and hydrogen with the view to improving energy efficiency and circular economy approach. The entity also a participation at IEC TC105 and ISO TC197.



Enagás is the Spanish TSO (Transmission System Operator) and Technical Manager of the Spanish gas system, with 50 years' experience in the development, operation and maintenance of energy infrastructures. It has more than 12,000 kilometres of gas pipelines, three strategic storage facilities, eight regasification plants and operates in seven countries: Spain, the United States, Mexico, Peru, Albania, Greece and Italy. In accordance with its commitment to the energy transition, Enagás has announced that it is bringing forward its goal of becoming carbon neutral to 2040. The company is committed to the development of renewable gases (such as biomethane or green hydrogen), sustainable mobility and energy efficiency, among other areas. The company is a world leader in its sector in the main sustainability indices, as the Dow Jones Sustainability Index World, is included in the CDP Climate Change A List 2021, and has obtained the highest ESG rating in its sector in the FTSE4Good sustainability index.



FHa is Private, non-profit Spanish research centre created in 2003 to promote the use of hydrogen as an energy vector, has participated in over 100 regional, national, and European projects (27 within Clean Hydrogen JU) to contribute to the innovation of technologies based on green hydrogen. Its team manages R&D projects in cooperation with regional, national and EU companies. FHa has been supporting the regional strategy for the uptake of H₂ and fuel cell technologies, publishing the Hydrogen Master Plan in Aragón, and showcasing the whole H₂ chain from production to the efficient use, from renewable sources. FHa also develops training from students to technicians and D&C activities.



FLUXYS is an independent energy infrastructure group active in gas transmission & storage, operating 12.000 km of pipeline for gas transmission across Europe and Brazil. Fluxys participates in various working groups of the CEN/TC234 and is committed to building a cleaner energy future for generations to come. Fluxys wants to be the key infrastructure partner for accelerating the transition from fossil to renewable, and is building the necessary infrastructure with passion, plenty of ambition and an open mind for what the future will bring.



IWM Fraunhofer IWM is a European application-oriented research organization funded in 1949 and currently operating 76 institutes and research units throughout Germany with over 30,000 employees. The Institute for Mechanics of Materials (IWM) is the research and development (R&D) centre that provides know-how and technology on materials for project partners and a R&D partner for industry and public contracting bodies on topics related to component and systems reliability, safety, durability and functionality. The institute combines know-how and experience in all fields of materials technology and materials science. Within the scope of Materials Design, Manufacturing Processes, Tribology, Component Safety and Lightweight Construction and Assessment of Materials, Lifetime Concepts, we offer clients and project partners individual solutions, unexpected insights and immediately actionable results for the development, production and application of functional materials, high-performance components and resource efficient manufacturing processes.



GERG is the European Association representing the collaborative R&D needs of the European Gas Industry. Along with its member organisations, GERG works with the European energy community to develop innovative solutions connecting European gas infrastructure to the evolving energy system. GERG coordinates corresponding efforts of its members on an EU level and membership includes TSOs, DSOs, major NG suppliers, universities, and international research institutes, as well as international standardisation organisations. GERG partners with related organisations globally to ensure international alignment of its work and maximum effectiveness of its programmes. Moreover, GERG has experience leading Dissemination and Communication activities in several EU projects.



OCAS is an advanced, market-oriented research centre providing steel and metal-based products, services and solutions to metal processing companies worldwide. OCAS is a daughter company of FINOCAS and ArcelorMittal Belgium, FINOCAS being a joint-venture between the Flemish Region and ArcelorMittal Belgium. Within ArcelorMittal, OCAS is in charge of all ArcelorMittal R&D projects within the market of general industry for flat carbon steel. OCAS is equipped with state-of-the-art R&D tools and facilities in its laboratories in Zelzate and Gent-Zwijnaarde (Belgium). The research centre valorizes know-how by product and solution development. OCAS has a highly qualified team of over 140 researchers and engineers with an international orientation. The laboratories have a unique range of state-of-the-art analysis and simulation tools, and even a complete lab scale steel production line. All activities are supported by a state-of-the-art material characterization and testing laboratory, with unique facilities in coating, metal characterization and processing tools.



MEMBER OF BASQUE RESEARCH
& TECHNOLOGY ALLIANCE

TECNALIA is the largest private applied research and technological development centre in Spain, a benchmark in Europe and a member of the Basque Research and Technology Alliance. TECNALIA works with companies and institutions to improve their competitiveness, the quality of people's lives and to achieve sustainable growth. Its main areas

of activity are: Smart Manufacturing, Digital Transformation, Energy Transition, Health and Food, Sustainable Mobility, Circular Economy and Urban Ecosystem. TECNALIA has been working in the field of hydrogen for more than 20 years, developing innovative technologies and providing high value-added services that cover the entire hydrogen value chain. Among others, TECNALIA works on materials compatibility with hydrogen, hydrogen safety, electrolyzers, membrane reactors for hydrogen production and purification, process modelling for H₂ systems, H₂ mobility applications and H₂ combustion technologies.



SINTEF is a large European independent research organization with over 70 years of experience conducting research within the area of clean h₂ value chain from production to transport, storage and end use. Since 1950, SINTEF has created innovation through development and research assignments for business and the public sector at home and abroad. Its purpose is to contribute to the development of society by carrying out research in the natural sciences, technology (including construction and civil engineering), and health and social sciences in collaboration with the Norwegian University of Science and Technology.



SNAM is an Italian energy infrastructure company, having participated in more than 10 EU projects. It builds energy infrastructures and offers integrated services. A leading operator in natural gas transport, It operates a pipeline network of approximately 41.000km in Italy and abroad. With its 80 years of experience in the construction and management of infrastructure, SNAM ensures supply security and promotes the energy transition through investments in green gases (biomethane and hydrogen), energy efficiency and CCS (Carbon Capture and Storage) technology. The Company also creates new green areas through a benefit company focused on urban forestation projects. SNAM is one of the first companies in the energy sector to have committed to achieving zero net greenhouse gas emissions (Scope 1 and Scope 2 emissions) by 2040. Starting in 2021, the company set itself a Scope 3 reduction target on indirect emissions by 2030 compared to its subsidiaries and suppliers. Its corporate business model is based on sustainable growth, transparency, the development of talent and diversity and the protection and social development of local communities.



**UNIVERSIDAD
DE BURGOS**

The University of Burgos (UBU) is a Spanish public university, recognized among the best young universities in the world, which develops its mission based on comprehensive and quality teaching, very close to the student and focused on internationalization, as well as promoting quality research under 96 research teams. In relation to the capabilities and possibilities around hydrogen, the University has a state-of-the-art Hydrogen Technologies Laboratory (H₂-Lab), which has the necessary equipment to study the behaviour of materials in H₂ environments and the susceptibility to embrittlement of various alloys. In addition to testing, numerical models and predictive tools are developed for hydrogen-related technologies. As part of its teaching activity, the University of Burgos offers an on-line "Master's Degree in Hydrogen Technologies", whose main characteristic is the

participation of more than 30 companies, technology centres and universities, bringing a panel of professionals from the H2 sector of the highest level.

About the 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.



**Co-funded by
the European Union**

This project has received co-funding from the European Commission and the Clean Hydrogen Partnership under Grant Agreement No 101137592. This Partnership receives support from the European Union's Horizon Europe Research and Innovation program, Hydrogen Europe and Hydrogen Europe Research

Co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the granting authority can be held responsible for them

PilgrHYm Press Release ends.

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