CANDHY

COMPATIBILITY ASSESSMENT OF NON-STEEL METALLIC DISTRIBUTION GAS GRID MATERIALS WITH HYDROGEN

Project ID	101111893
PRR 2024	Pillar 2 – H_2 storage and distribution
Call topic	HORIZON-JTI-CLEANH2-2022-02-01: Compatibility of distribution non-steel metallic gas grid materials with hydrogen
Project total cost	EUR 2 607 481.25
Clean H_2 JU max. contribution	EUR 2 607 481.00
Project period	1.9.2023–31.8.2026
Coordinator	Fundación para el Desarrollo de las Nuevas Tecnologias del Hidrógeno en Aragón, Spain
Beneficiaries	Fundacion Tecnalia Research and Innovation, Groupe Européen de Recherches Gazières, GRTgaz, Redexis Gas Servicios SL, Redexis SA, RINA Consulting – Centro Sviluppo Materiali SpA, Sumnistros Industriales Diversos SA, Università degli studi di Bergamo

http://candhy.eu/

PROJECT AND GENERAL OBJECTIVES

- Performing a full review of the state of art of the European gas distribution grids, the standards and codes for testing regarding material compatibility with hydrogen, and hydrogen embrittlement mechanisms to collect information for the development of useful testing protocols to derive the properties of the classes of materials studied in Candhy in their relevant operating conditions.
- Designing, developing and performing an experimental campaign to test the most relevant non-steel metallic materials found in Candhy under different hydrogen levels to assess their tolerance of this gas in the operating conditions usual for the distribution grid.
- Documenting and analysing the effect of hydrogen gas on the non-steel metallic materials tested in the experimental campaign mentioned previously.
- Developing models for the prediction of hydrogen embrittlement mechanisms.
- Proposing guidelines, procedures and areas of development to support the future standardisation of the testing and qualification of materials in the distribution network in the presence of H_2 / natural gas blends.
- Developing a technical database on the hydrogen compatibility of metals as a tool to aid in the selection of materials for use in hydrogen gas distribution.

PROGRESS AND MAIN ACHIEVEMENTS

- A questionnaire has been created and distributed among European distribution system operators and gas associations to collect data that will allow the determination of the current status of the grid, regarding the materials involved and other relevant parameters, and the operating conditions.
- The state-of-the-art development of relevant standards useful for studying embrittlement phenomena in non-steel metallic material is under progress. These standards will allow the definition of the conditions of the experimental campaign that will be developed next year.

FUTURE STEPS AND PLANS

- Completing an inventory of the gas grid.
- Extrapolating results of the review on current standards to define those relevant to the experimental campaign.
- Starting an experimental campaign on non-steel metallic materials with a round robin test.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Study of impact of hydrogen on non-steel metallic materials	number of materials analysed	Cover at least five types of material	
	Inventory of materials of the distribution grid	–	Collect as much information as possible from European DSOs	
	Review of state-of-the-art standards related to hydrogen embrittlement tests	number of standards	Review as many standards as possible	
	Database of compatible non-steel metallic materials	number	Create one database	
	Semi-empirical model to predict hydrogen embrittlement mechanisms	number	Construct one model to anticipate embrittlement	
	Harmonised guidelines	number	Propose harmonised guidelines for future standardisation	

Clean Hydrogen Partnership
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