

NHYRA

PRE-NORMATIVE RESEARCH ON HYDROGEN RELEASES ASSESSMENT



Project ID	101137770
PRD 2024	Pillar 5 – Cross-cutting
Call topic	HORIZON-JTI-CLEANH2-2023-05-03: Pre-normative research on the determination of hydrogen releases from the hydrogen value chain
Project total costs	EUR 2 086 683.75
Clean H₂ JU max. contribution	EUR 2 086 683.75
Project period	1.1.2024–31.12.2026
Coordinator	Snam SpA, Italy
Beneficiaries	Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile, Alma Mater Studiorum – Università di Bologna, Deutsches Zentrum für Luft- und Raumfahrt EV, Enagás Transporte SA, Engie, Equinor Energy As, Fondazione Bruno Kessler, Groupe Européen de Recherches Gazières, Instytut Nafty i Gazu – Państwowy Instytut Badawczy, Linde GmbH, NPL Management Limited, Nuovo Pignone Tecnologie SRL, Regents of the University of California, University of Surrey

<https://cordis.europa.eu/project/id/101137770>

PROJECT AND GENERAL OBJECTIVES

Several studies and analyses show that by 2050 hydrogen will become a pillar of the future energy system, representing up to 20 % of the future energy demand, and with this it is expected that anthropogenic H₂ emissions, which have an indirect impact on the greenhouse effect, will also increase.

Furthermore, there are currently large uncertainties regarding both the total amount of hydrogen that will be released from the H₂ value chain and the climate effect of the hydrogen released into the atmosphere.

The general objective of the project NHYRA is to perform an assessment of potential H₂ releases along the entire H₂ value chain. In particular, the project aims to:

- fill the critical knowledge gaps regarding technologies, methodologies and protocols for detecting and quantifying H₂ releases;
- develop H₂ release scenarios that will allow for the identification of the most critical elements of the H₂ value chain in terms of emissions;
- propose mitigation strategies, guidelines and recommendations for standardisation bodies in order to support the definition of a dedicated normative framework.

PROGRESS AND MAIN ACHIEVEMENTS

The NHYRA consortium organised a first workshop with the Hybrid power-energy electrodes for next generation lithium-ion batteries (HYDRA) project, during which the two projects presented their work and started discussions on how to cooperate, while considering each project's timeline, objectives and deliverables.

FUTURE STEPS AND PLANS

One of the central elements of the NHYRA project, and also one of the first activities that will take place, is the creation of a H₂ release inventory.

The first work package will involve an initial literature review and the collection of data and information from H₂ technologies, systems and infrastructure operators, which will lead to the identification of the most relevant H₂ supply chain and the most critical elements of the H₂ value chain in terms of H₂ emissions.

From these findings, dedicated methodologies will be developed with the initial aim of determining suitable techniques and instruments for the detection and measurement of hydrogen leakages. Then, measurement-based methods will be developed for detecting and quantifying H₂ emissions, considering both fugitive and vented emissions; calculation-based methods will also be developed to enable the estimation of hydrogen emissions when taking direct measurements is impossible or too complicated (as, for example, in the case of an accident or unburned fuel).

The methodologies developed will then be tested for validation, both in laboratories and in real cases, and the experimental data collected will feed the H₂ release inventory.

NHYRA will quantify the total potential H₂ releases along each H₂ supply chain and will develop mitigation strategies.

Finally, H₂ release scenarios that include all H₂ supply chains will be developed, considering various time horizons.

PROJECT TARGETS

Target source	Parameter	Unit	Target	Target achieved?
Project's own objectives	Workshop on H ₂ production with overview of H ₂ leakage in production	number	1	
	Workshop on H ₂ transport and storage with overview of H ₂ leakage	number	1	
	Workshop on H ₂ end use with overview of H ₂ leakage in end use	number	1	
	Engagement with EU/national associations	number	2	
	Invitation to join the Advisory Board sent to providers of H ₂ detection technology and equipment manufacturers	number	1	
	Dissemination in Clean Hydrogen Mission countries and at universities in at least nine countries	number	9	
	Communication toolkit tailored to a non-technical audience	number	1	
	Workshop presenting results relevant to policymakers	number	1	
	Number of archetype technologies assessed in terms of H ₂ releases and implemented in the simulation tool	number/ project	12	
	Measurement-based methods for detecting hydrogen emissions from individual elements of the value chain	number/ project	2	
	Measurement-based methods for quantifying fugitive or vent emissions from point or subarea sources	number/ project	2	
	H ₂ release inventory	number/ project	1	
	Participation in one conference on energy markets/finance to engage with financial stakeholders	number	1	
	Presentation at suitable measurement-related conference (e.g. CEM)	number	1	
At least two meetings with standardisation committees	number	2		

