NHyRA

Stakeholder Advisory Board Meeting

pre-Normative Research on Hydrogen Releases Assessment

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6th of June 2024

Co-funded by the European Union

Clean Hydrogen Partnership

Agenda

1. Introduction
2. NHyRA Partners and Stakeholders Advisory Board
3. Project context and objectives
4. Project methodology and activities
5. Project Gantt
6. WPs activities

Introduction

NHyRA project

pre-Normative Research on Hydrogen Releases Assessment

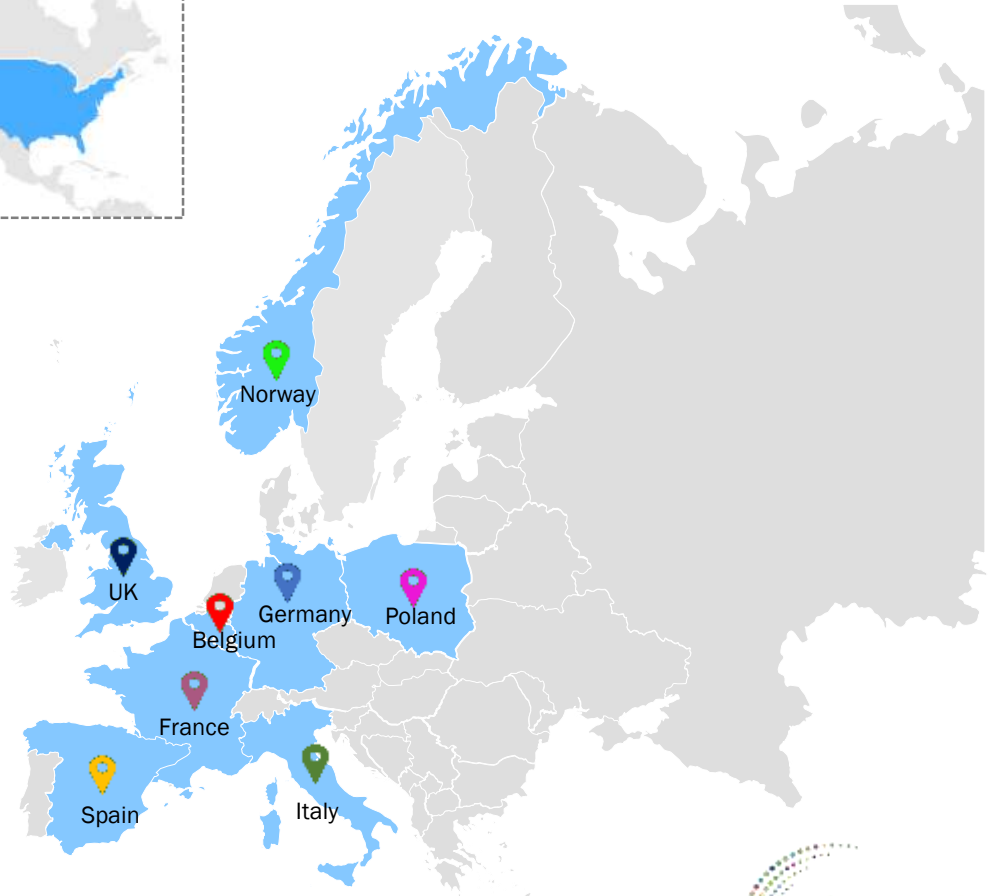
NHyRA project general info	
n° partners	15 (from 9 countries)
duration	36 months
Project budget	3,5 M€
Type of action	Research and Innovation Action
Start/end date	Gen 2024 – Dec 2026

HORIZON-JTI-CLEANH2-2023-05-03:

Pre-Normative Research on the determination of hydrogen releases from the hydrogen value chain

NHyRA Partners and Stakeholders

NHyRA Partners



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NHyRA Stakeholders Advisory Board

Context and Objectives

Project context

- H_2 as energy vector can play a central role in meeting the **Green Deal** target of climate neutrality by **2050**.
- H_2 **molecule** present in the atmosphere does not act as a direct greenhouse gas, it **can react with other molecules present in the atmosphere,** thus acting as an **indirect greenhouse gas**.
- To date, there is still **uncertainty regarding the amount of the H_2 releases** expected along the future H_2 value chain, the associated environmental impact and the size of the future H_2 market.
- A **dedicated normative framework**, including testing methodologies for Hydrogen releases, **does not exist**. Instead, the CH_4 emissions regulating scheme could be a methodological reference.

Project objectives

NHyRA will focus on the **assessment of potential H_2 releases along the entire H_2 value chain**. Being the knowledge about the amount of anthropogenic H_2 in the atmosphere very scarce in literature, the improvement of the capability to quantify small and large releases, **delivering validated methodologies and techniques** for measuring or calculating them, is of outstanding importance.

1. Creation of a **hydrogen release inventory** for the anthropogenic H_2 releases from the hydrogen value chains

2. Development and validation of methodologies for detecting and quantifying the H_2 releases

3. H_2 releases quantification and definition **scenarios** considering different time horizons (e.g. 2030, 2050)

4. Provide **recommendations to International Standard Bodies.** and mitigation strategies for reducing the H_2 releases identified.

Activities and Methodology

Project activities

WP1: H_2 release inventory

WP2: Methodology development for H_2 releases quantification

WP3: Methodology validation and field tests assessment

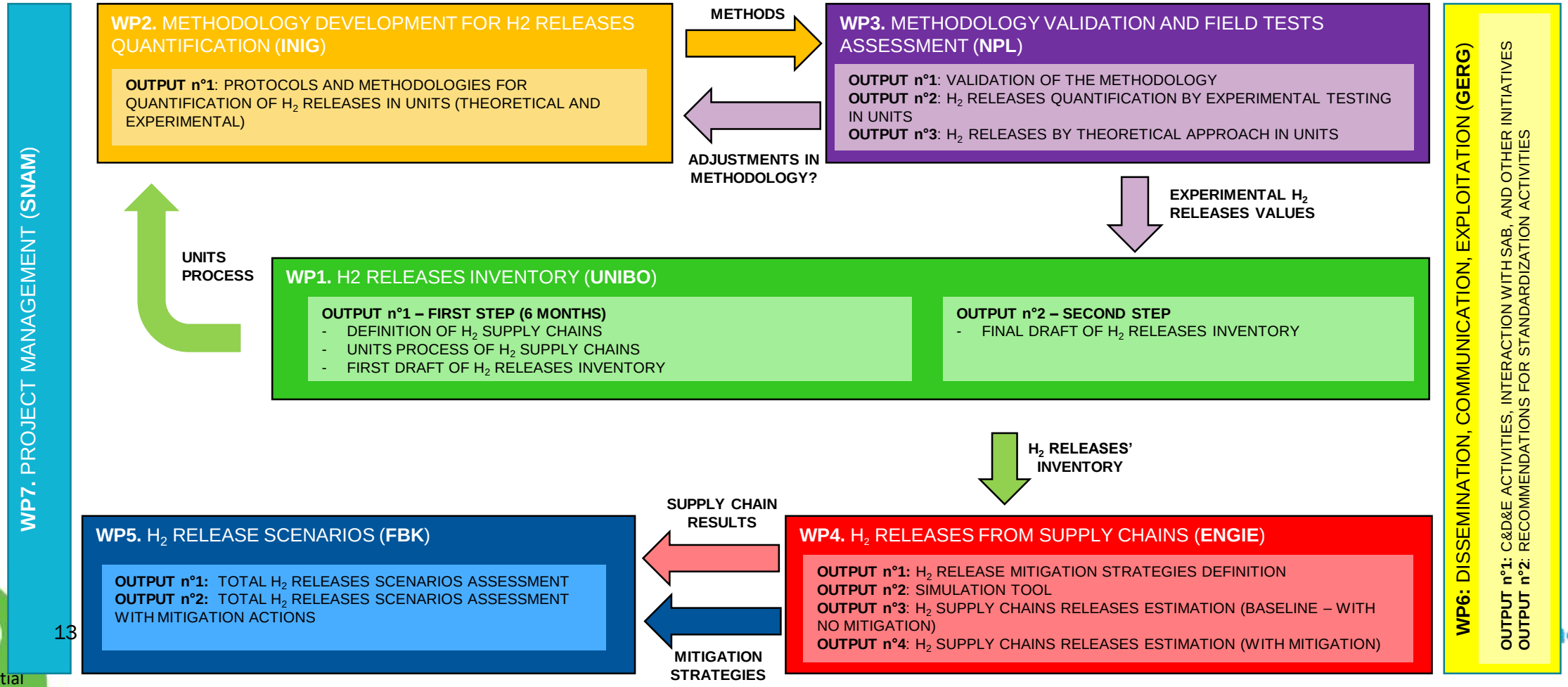
WP4: H_2 release from supply chains

WP5: H_2 release scenarios

WP6: Dissemination & Communication

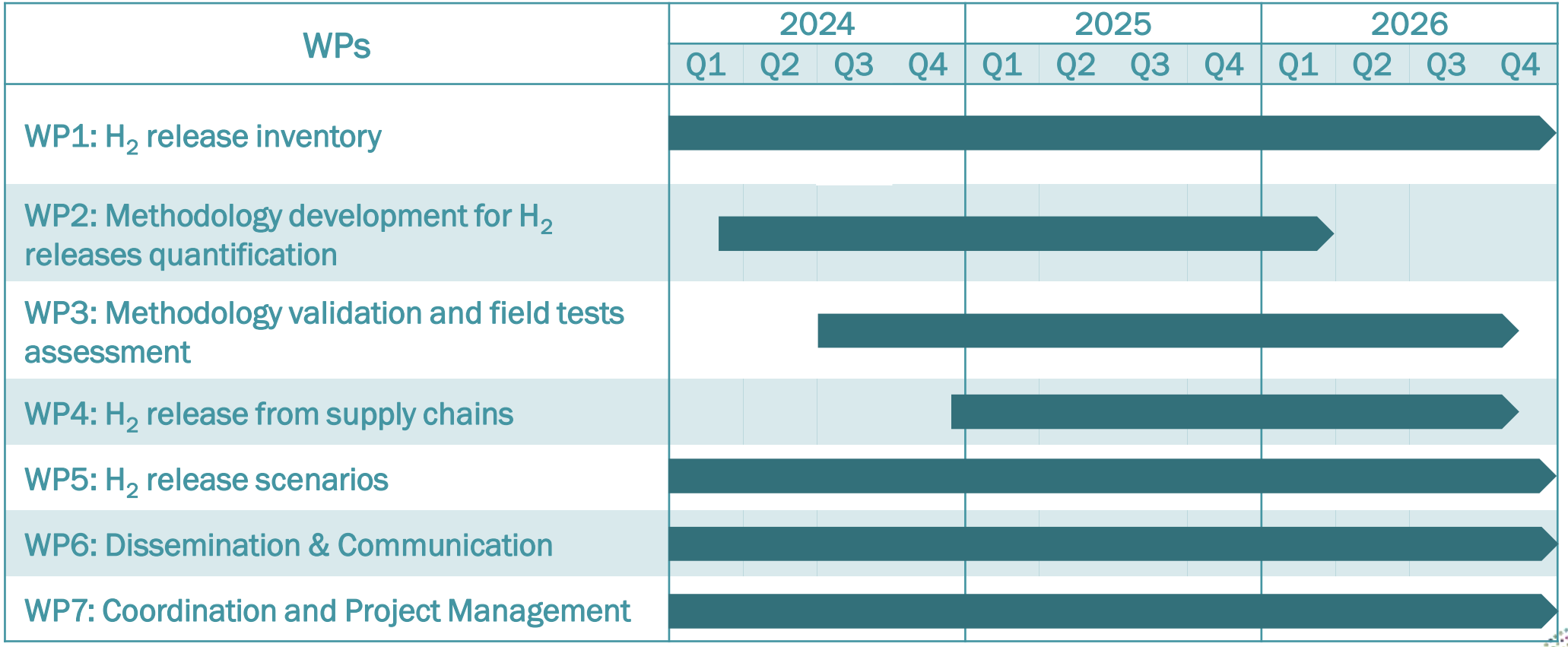
WP7: Coordination Project management

Project methodology



Gantt chart

Project Gantt



WP1: H_2 release inventory

WP1 – H2 release inventory

Objectives

- ❑ *To identify the most critical elements of the H2 value chain*
- ❑ *To develop a comprehensive inventory to collect and make available data about H2 emissions*
- ❑ *Link WP : WP2, WP3, and WP4*

Task 1.1 (M1 – M6)

Objective : *to describe the main routes in H2 supply chains as a collection of basic unit processes where to highlight H2 releases*

Task 1.2 (M1 – M6)

Objective : *to publish the first release version of the inventory for the H2 releases from the archetypes designed in Task 1.1*

Task 1.3 (M3 – M36)

Objective : *to develop and maintain updated a priority list of the most critical elements in terms of H2 releases in the value chain*

Task 1.4 (M7 – M36)

Objective : *to maintain updated the H2 emissions inventory through experimental data and new evidences from the literature*

Deliverables

- D1.1 H2 supply chains' unit processes (M6), Public
- D1.2 First version of the H2 releases' database (M6), Public
- D1.3 First version of the priority list of archetypes (M12), Public
- D1.4 Updated priority list of archetypes (M36), Public
- D 1.5 Final version of the H2 releases' database, (M33), Sensitive

WP2: Methodology development for H_2 releases quantification

WP2 – Methodology development for H2 releases quantification

Objectives

- ❑ *Development of methods for detecting and measuring H2 fugitive emissions*
- ❑ *Development of analytical methods for quantifying vent emissions based on engineering calculations*
- ❑ *Development of methods for emissions quantification at the area scale*

Task 2.1 (M3 – M6)
P: BH, ENGIE, SNAM, ENAGAS, INIG

Objective: *review of methods and providing recomendations*

Task 2.2 (M6 – M27)
P:BH, NPL, ENAGAS, ENGIE, SURREY

Objective: *development of leak detection and emission measurement methods*

Task 2.3 (M6 – M27)
P: SURREY, BH, NPL

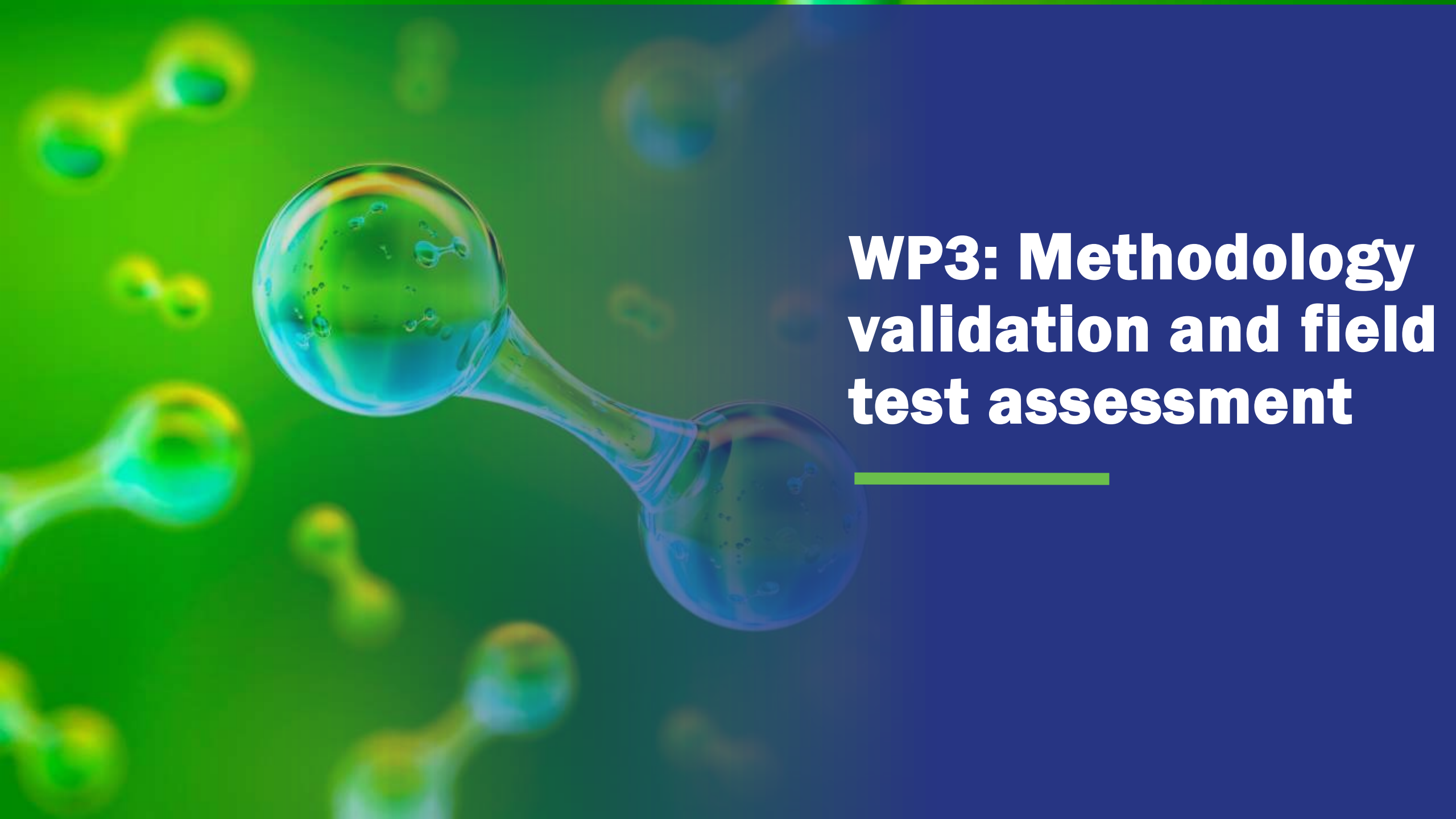
Objective: *development of a correlation method for estimating the amount of H2 emissions from fugitives*

Task 2.4 (M6 – M18)
P: BH, NPL

Objective: *developing calculation-based methods to quantify emissions from sources not covered by the experiments*

Deliverables and milestones

- **D2.1.** Report containing a list of techniques for detecting and measuring H2 emissions (M6), Public
- **D2.2&3.** Set of standards and improved procedures for detecting and quantifying H2 emissions (M18 & M27), first version and final version
- **MS3.** Set of standards and procedures for detecting and quantifying H2 emissions (M18)
- **D2.4.** Procedure for correlation method for estimating H2 releases (M27)
- **D2.5.** Calculation-based methods to quantify releases not covered by the experiment (M18)



WP3: Methodology validation and field test assessment

WP3 – Methodology validation and field test assessment

Objectives

- *Experimental validation of measurement-based methods for detection and/or quantification of H_2 emissions,*
- *Determine performance characteristics, undertake field assessments and develop measurement uncertainty budgets for the methods*
- *Linking Work Packages : Input and outputs predominantly to/from WP2. Outputs to WP4 and WP5 via WP1.*

Task 3.1 (M7 – M14)
Lead: NPL, P : INIG, SURREY

Objective: *Development of performance test specifications including requirements on testing facilities*

Task 3.2 (M14 – M22)
Lead: NPL, P : INIG, ENAGAS

Objective: Perform laboratory performance tests on H_2 sniffing and acoustic leak detection methods

Task 3.3 (M18 – M30)
Lead: NPL, P : INIG

Objective: *Establish the performance of* H_2 release quantification methods using traceable controlled releases

Task 3.4 (M18 – M30)
Lead: NPL, P : SNAM, SURREY, ENAGAS, INIG, ENGIE, LINDE, EQN

Objective : *Undertake field assessments of the methods at least five real-world sites*

Task 3.5 (M30 – M34)
Lead: NPL, P : SURREY

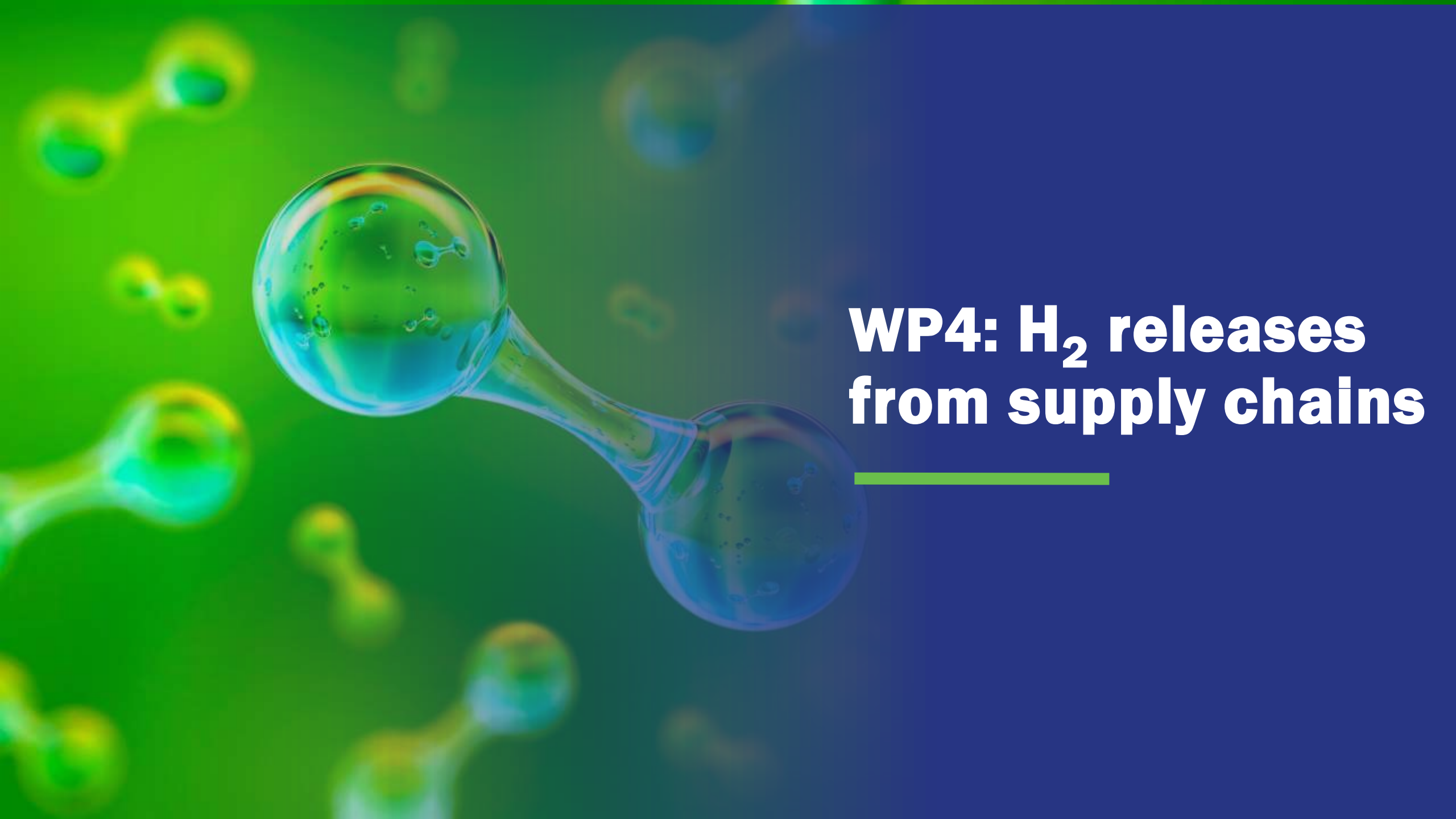
Objective: *Assessment of data and develop uncertainty budgets for measurement methods*

Task 3.6 (M19 – M27)
Lead: SURREY, P : INIG

Objective: *Validate the analytical approaches used by calculation-based methods for those elements of the inventory that cannot be measured.*

Deliverables

- D3.1: Performance test specifications (M14), NPL, Public
- D3.2 Laboratory test report (M22), NPL, SEN
- D3.3 Controlled release test report (M30), NPL, SEN
- D3.4 Uncertainty calculation examples (M34), NPL, Public
- D3.5 Validation of analytical approaches (M27) SURREY, SEN



WP4: H_2 releases from supply chains

WP4 – H_2 releases from supply chains

Objectives

- ❑ *Development of a methodology for upscaling emission data*
- ❑ *Development of a simulation tool*
- ❑ *Identification of potential mitigation strategies*

Task 4.1 (M12 – M26)

Objective : *get an overview of H_2 releases along the value chain defined in WP1.*

Task 4.2 (M18 – M30)

Objectives : *identify mitigation measures, engineering solutions, technologies, research and development actions to minimise the release of H_2;*
develop a methodology for validating and evaluating the benefits.

Task 4.3 (M30 – M34)

Objective : *perform of updates of the simulation tool, by adding mitigation measures.*

Deliverables

- D4.1, Method for upscaling H_2 emissions from measurements and analysis and application (M20), ENGIE, SURREY
- D4.2, Simulation tool for H_2 value chain (M26), ENGIE, SURREY
- D4.3, Ranking of the main elements of the H_2 value chain in terms of the estimated H_2 release (M26), ENGIE
- D4.4, Ranking of H_2 release mitigation actions (M24), FBK
- D4.5, Method for evaluating the impacts of mitigation strategies on H_2 releases (M30), FBK
- D4.6, Updated simulation tool for H_2 value chain (M34), ENGIE
- D4.7, Benefits of mitigation measures assessed at value chain level (M34), ENGIE

Milestones

- MS5, Simulation results (M26), ENGIE
- MS6, Mitigation action benefits (M28), ENGIE

WP5: H_2 release scenarios

WP5 – Hydrogen Release Scenarios

Objectives

- ❑ *Quantify H2releases in future hydrogen economy scenarios.*
- ❑ *Assess effectiveness of mitigation strategies developed by WP4.*
- ❑ *Bridge activities between Nhyra and Hydra.*

Task 5.1 (M12 – M24)
P : ENEA, SURREY, INIG, UNIBO, DLR; GERG

Objective : Select relevant H2 economy development scenarios from energy outlook reports.

Task 5.2 (M12 – M36)
P : ENEA, SURREY, ENGIE

Objective : Provide H2release mitigation strategies for European H2economies.
Quantify H2releases from a European H2economy for climate impact assessment

Task 5.3 (M1 – M36)
P : FBK, SURREY, INIG, SNAM, UNIBO, DLR, ENGIE

Objective : Facilitate coordination between Nhyra and Hydra towards the common goal of providing an accurate estimate of the H2 releases and their impact on the climate and identify effective mitigation strategies.

Deliverables

- D5.1, Review of H2economy scenarios (M24), FBK
- D5.2, H2releases of H2economy scenarios and effects of mitigation actions: benefits of H2release mitigation strategies (M36), FBK
- D5.3, Annual reporting of liaison activities with Hydra (M36), ENEA

WP6: Communication, Dissemination and Exploitation

WP6 – Dissemination, Exploitation and Communication

Objectives

- ❑ *Communicate project activities and results to the public and specific target groups, using the best means of communication/dissemination.*
- ❑ *Promote the use of the results (key exploitable results) by relevant stakeholders, beyond the project.*
- ❑ *Participant partners: All partners*

Task 6.1 (M1 – M36)
P : ALL

Objective : *Develop and implement the Dissemination, Exploitation and Communication Plan*

Task 6.2 (M1 – M36)
P : ALL

Objective : *raise awareness of the value of NHyRA, liaise with stakeholder community and actively disseminate research outcomes and best practices*

Task 6.3 (M1 – M36)
P : ALL

Objective : *Clustering activities, interaction with the advisory board, CHJU, standardization bodies and other initiatives*

Task 6.4 (M1 – M36)
P : ALL

Objective : *Develop and implement the exploitation and business strategy*

Deliverables

- D6.1 Dissemination, Exploitation and Communication Plan (M6), Public
- D6.2 Dissemination, Exploitation and Communication Plan (M18), Public
- D6.3 Dissemination, Exploitation and Communication Plan (M36), Public
- D6.4 Project Website (M3), Public
- D6.5 General stakeholder workshop for scientific/technical community (M18), Public
- D6.6 Closing public workshop (M36), Public

WP7: Coordination and Project Management

WP7 – Coordination & Project management

Objectives

- ❑ *Ensure the project progress in line with the budget and the schedule by assessing project risks*
- ❑ *Carry out the overall administrative and financial management and reporting of the project*
- ❑ *Manage the IPR related to the achieved results and ensure an appropriate data management plan*

Task 7.1 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Coordination of Knowledge and Innovation management activities*

Task 7.2 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Technical work coordination, project meetings and reporting*

Task 7.3 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Overall legal and contractual management including IPR management*

Task 7.4 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Financial and Administrative Management*

Task 7.5 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Project risk management*

Task 7.6 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Data management*

Task 7.7 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Annual reporting for the Clean Hydrogen JU*

Task 7.8 (M1 – M36)
Lead: SNAM, P : ALL

Objective: *Assessment of the progress towards the achievement of the project KPIs*

Deliverables

- D7.1: Management guidelines (M3), SNAM, SEN
- D7.2: Preliminary Data Management Plan (M6), UNIBO, SEN
- D7.3 Annual data reporting for the Clean Hydrogen JU 2025 (M15), SNAM, PU
- D7.4 Annual data reporting for the Clean Hydrogen JU 2026 (M27), SNAM, PU
- D7.5 Final Data Management Plan (M36), UNIBO, SEN

Thank you!

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