



energy to inspire the world

# On Our Way to Zero through Technology and Innovation

*Enagas H<sub>2</sub> Technical Day*

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Madrid, April 8<sup>th</sup> 2024

# SNAM - An Italian and European leader in gas infrastructures

## International Presence



30,3%  
cdp CDP Reti



69,7%  
Private capital  
~80K investors

## Integrated operations in Italy



### TRANSMISSION

- 32.767 km of gas transmission pipelines
- 13 compressor stations (973 MW installed power)
- 75,77 bcm injected into the network



### STORAGE

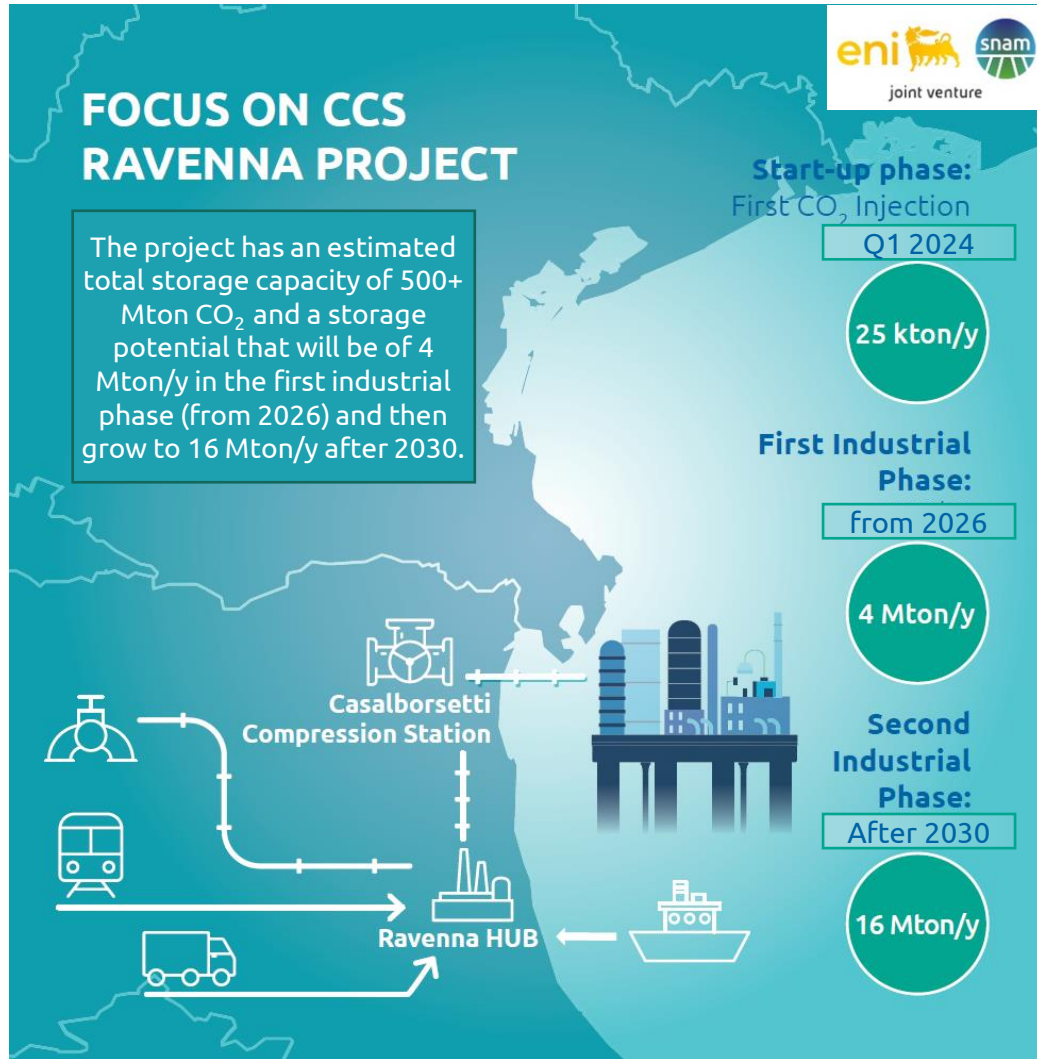
- 9 storage fields (each with a compressor station and a treatment plant)
- 17,0 bcm of total storage capacity (including strategic storage)



### LNG

- 3 small regasification terminals
- 2 RFSU (adding 5+5 bcm)

# CCS Ravenna will offer a CO<sub>2</sub> storage solution to emitters located in Italy and in the Mediterranean basin



## Decarbonization

CCS Ravenna will boost the **decarbonization** of the system securing the **productive continuity** of the industrial clusters, enabling the production of **clean flexible power** and promoting **negative emission solutions** for emitters located in Italy and in the Mediterranean

**Cumulative storage capacity 500+ Mton (30+ years activity)**



## Occupational benefits

Besides securing the productive continuity of the Hard-To-Abate sectors, CCS Ravenna will produce occupational benefits along all CCS value chain

	CCS Value Chain <sup>1</sup>	CCS impact on HTA <sup>1</sup>
<b>Jobs</b>	<b>18 k tot. impact<sup>2</sup></b> (6 k direct impact)	<b>1300 k tot. impact<sup>2</sup></b> (350k direct impact)
<b>Value Added</b>	<b>1.6 B€ tot. impact<sup>2</sup></b> (0.5 B€ direct impact)	<b>63 B€ tot. impact<sup>2</sup></b> (19 B€ direct impact)

1. Source: the European House Ambrosetti 2023, value related to Phase 2

2. Tot. Impact= Direct impact + Indirect Impact + Induced Impact

# South<sub>2</sub>Corridor Overview



<https://www.south2corridor.net/>

Note that the map represents projects within the PCI context but some TSOs are developing additional branches not displayed here.

## Key facts

- **South<sub>2</sub> Corridor collaboration between 4 TSOs**
  - Snam (Italy) [Italian H2 Backbone](#)
  - TAG (Austria) [H2 Readiness of the TAG pipeline system](#)
  - GCA (Austria) [H2 Backbone WAG + Penta-West](#)
  - bayernets (Germany) [HyPipe Bavaria – The Hydrogen Hub](#)
- **Interconnection between North Africa, Italy, Austria and Germany**
  - Main flow direction: NA – IT – AT - DE
- **3.200 km of dedicated hydrogen network with a pipeline capacity of**
  - Import: 448 GWh/day from North Africa
  - Export: 150 GWh/day to Germany
- **~ 75% of repurposed midstream infrastructure**

- Repurposed Network
- New Built Network
- Partner Network
- Demand Centre
- Production Centre
- Potential Storage

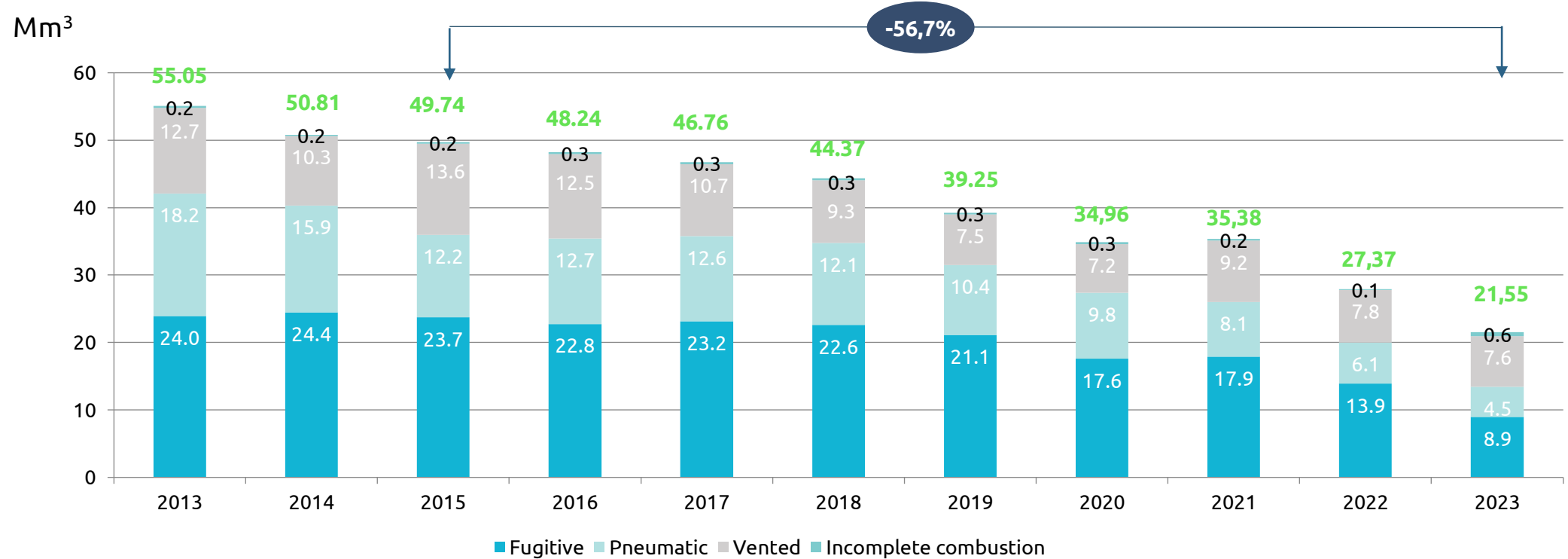


in  
operation  
2030

## Status

- **South<sub>2</sub> Corridor successfully awarded PCI status on 28/11/23**
- Result will be adopted into a delegated act in coming weeks
- Intention to apply for **PMI** (Tunisia-Italy) at next available window <sup>4</sup>

# SNAM natural gas emissions (transmission system, UGSs and LNG)



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**FUGITIVE EMISSIONS:** leak due to tightness failure (e.g, from flanges, connections, valves, open-ended lines)



**VENTED EMISSIONS:** Gas released into the atmosphere intentionally from processes or activities that are designed to do it, or unintentionally when equipment malfunctions or operations are not normal.



**PNEUMATIC EMISSIONS:** resulting from gas operated devices such as controllers, positioners, actuators



**INCOMPLETE COMBUSTION EMISSIONS:** Unburned methane in the exhaust gases from natural gas combustion devices, such as turbines, engines, boilers

# On our way to assess H<sub>2</sub> safety...

JRC TECHNICAL REPORT

Hydrogen emissions from a hydrogen economy and their potential global warming impact



**CLEAN HYDROGEN PARTNERSHIP:**  
Apply for funding now

**Clean Hydrogen JU AWP23**

Call: HORIZON-JTI-CLEANH2-2023-1

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

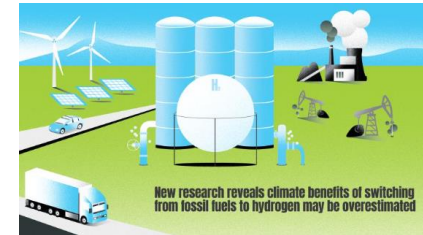


EDF Energy Transition

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NEW STUDY: Hydrogen could have a much bigger climate impact than most estimates ▶▶▶



2022

2023

2024

*"STUDY: Emissions of Hydrogen Could Undermine Its Climate Benefits; Warming Effects Are Two to Six Times Higher Than Previously Thought"*



NHyRA Project KoM





# pre-Normative Research on Hydrogen Releases Assessment

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Co-funded by  
the European Union



# 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

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INSTYTUT NAFTY I GAZU  
- Państwowy Instytut Badawczy



# NHyRA Stakeholders Advisory Board



Environmental Defense Fund

EURAMET

JRC  
EUROPEAN COMMISSION

GIE  
Gas Infrastructure Europe

eurogas

GRTgaz

BUREAU VERITAS  
1828  
PLANT SAFETY

Politecnico di Torino

Shell

H2IT  
ASSOCIAZIONE ITALIANA IDROGENO

SeaCorridor

Università di Genova

Fost Sense

prometeo

storengy

HRS  
HYDROGEN REFUELING SOLUTIONS

POLITECNICO MILANO 1863

THO TH2

TEREGA  
GAS, ACCELERATING THE FUTURE

gasnam

Interconnector

SERGAZ  
A SeaCorridor Company

PARTICULAR MATERIALS

GAZ system

NREL  
NATIONAL RENEWABLE ENERGY LABORATORY

INRiM  
ISTITUTO NAZIONALE DI RICERCA METROLOGICA

INRETE  
DISTRIBUZIONE ENERGIA

Trans Adriatic Pipeline

GREEN HYSLAND

enagasrenovable

Air Liquide

CIGI  
Comitato Italiano Gas  
Ente Federato all'UNI

Clean Hydrogen Partnership

# Project context



- $H_2$  will 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 and the associated environmental impact.
- A **dedicated normative framework**, including testing methodologies for Hydrogen releases **does not exist**. The  $CH_4$  emissions regulating scheme could be a methodological reference.

# Project objectives

NHyRA will focus on the **assessment of potential H<sub>2</sub> releases along the entire H<sub>2</sub> value chain**. Being the knowledge about the amount of anthropogenic H<sub>2</sub> 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<sub>2</sub> releases from the hydrogen value chains

2. **Development and validation of methodologies** for detecting and quantifying the H<sub>2</sub> releases

3. **H<sub>2</sub> 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<sub>2</sub> releases identified.

# Project activities

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WP1: H<sub>2</sub> release inventory

WP2: Methodology development for H<sub>2</sub> releases quantification

WP3: Methodology validation and field tests assessment

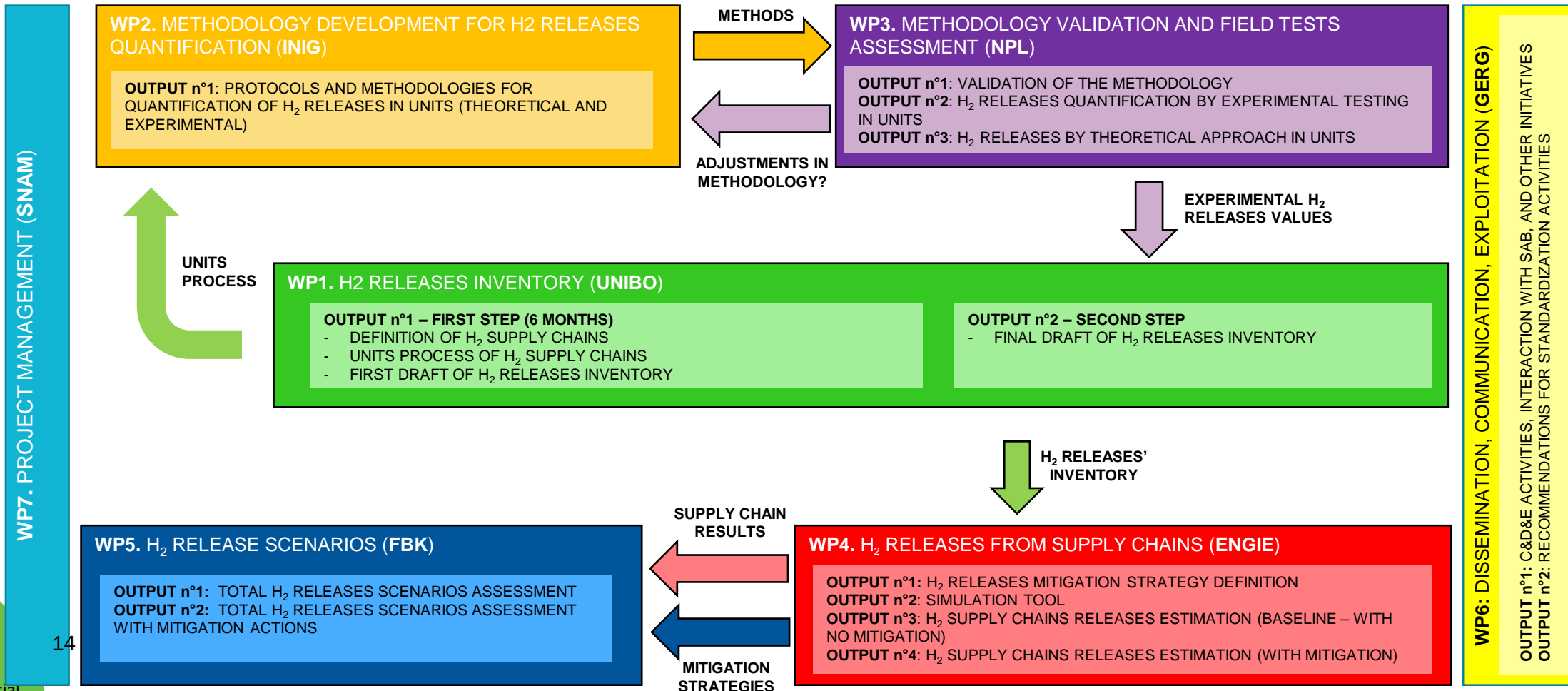
WP4: H<sub>2</sub> release from supply chains

WP5: H<sub>2</sub> release scenarios

WP6: Dissemination & Communication

WP7: Coordination Project management

# Project methodology



## **Q&A Session**

**Thank you!**

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**Clean Hydrogen  
Partnership**



**Co-funded by  
the European Union**