

La ricerca sull'idrogeno: progetti di rilevanza nazionale e internazionale



Snam S.p.A. – Decarbonization Unit

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ENERGY INFRASTRUCTURE FOR A SUSTAINABLE FUTURE

Leading pan European gas infrastructure operator, with an approach aiming at the energy transition



energy
to inspire the world



Italian and International assets (pro-quota)

~37,400
km¹

Transport

~20 bcm
capacity²

Storage

~20 bcm/y
capacity³

Regasification

Italian assets

~33,000
km⁴

Transport

~17 bcm
capacity

Storage

~17 bcm/y
capacity⁵

Regasification

New businesses for energy transition

BU
DECARB

H₂ & CCS project
development

greenture

Midstream LNG,
Downstream L-CNG & H₂

bio
enerys

Biomethane

renovit

Energy efficiency



1. Including TAG, Desfa, GCA, Terrega, Interconnector, TAP, Adnoc gas pipes, EMG, Seacorridor pro-quota transport km
2. Including also Terrega pro-quota storage capacity
3. Including also Golar Tundra, BW Singapore and the pro-quota of OLT, Adriatic LNG, Revithoussa and Alexandroupolis
4. o/w 10,000 national & 23,000 regional network
5. Including also Golar Tundra and BW Singapore

Hydrogen has a central role in the european energy context

Hydrogen is one of the main enablers for the **decarbonisation of the energy system**, not only because of its use as a **feedstock**, replacing grey hydrogen, but also as an **energy carrier** in areas where the direct use of electricity is not feasible for technical reasons or economic assessments



RepowerEU⁽¹⁾ has set a target on **renewable hydrogen** in Europe by 2030:

- 10 Mton production
- 10 Mton import



Italian PNIEC⁽²⁾ has estimate **0,251 Mton** of renewable hydrogen Italian **demand** by 2030

Europe is defining important **targets and obligations** on all the actors along the entire H2 value chain, as well as many **financing instruments** to support the development of the market:

- **RED III target RFNBO:** 42% of H2 used in industry and 1% of energy consumed by the transport sector (2030)
- **RefueEU Aviation and FuelEU Maritime:** specific targets on crucial sectors in which H2 might play a relevant role
- **AFIR, CO2 HDV:** targets on the HRS availability across Europe and on emission reduction of specific vehicles
- **ETS, CBAM:** reduction of allowances and obligations on imported freights have a strong impact on H2 production and demand



- **Innovation Fund:**
- **IPECI**
- **National RFF**
- **CHJU program**
- **Horizon EU**
- **Hydrogen Bank**
- ...

DECTES current activities

Decarbonization Programs



Research and Development

Promote and steer R&D activities towards Snam strategies long term needs

TRL<5



Tech Development

Develop technologies with partners to be demonstrated in Snam's infrastructure
Advance low TRL projects

TRL 5-7



Demo Testing

Enable large commercial projects by demonstrating disruptive and innovative technologies
Bring new technologies to market

TRL >7

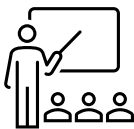
Crossfunctional Programs



Innovation

Corporate accelerator focused on hydrogen technologies to develop prefeasibility studies of common projects

Hyaccelerator



Education & Outreach

Educational projects to scout new talents and support the development of the hydrogen economy

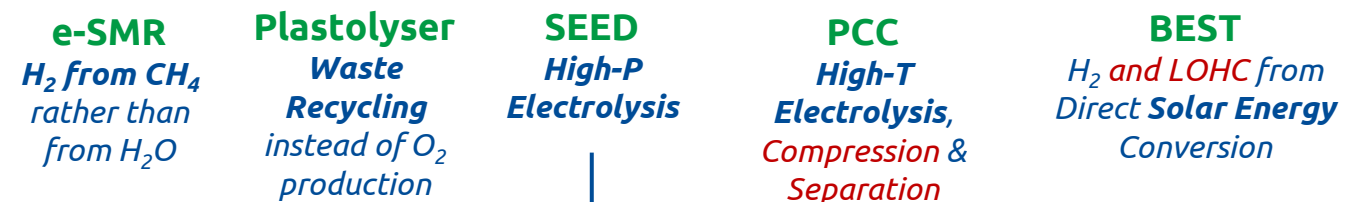


EU funding

Scouting and influence on potential funding for grant to support tech development

Today's Tech Limitations & Opportunities for Snam R&D

Electrolysis OpEx	=	Min. Energy Need	÷	Process Efficiency	×	Energy Cost	
	=	33.3 kWh/kg	÷	60%	×	0.07 €/kWh	= 3.9 €/kg



Technological Landscape

Decarbonization Platform

Long-term 2026-2030

- CH₄, Bio-CH₄ & LNG
- H₂
 - Production
 - Transport
 - Compression
 - Storage
 - End use
- CO₂
 - Capture
 - Transport
 - Utilization
 - Storage

Short-term 2022-2026

- CH₄, Bio-CH₄ & LNG
 - Pipeline
 - Compression
 - Underground Storage
 - Re-Conversion

R&D

- **XSEED***: High-Pressure H₂ Production
- **BEST**: Solar H₂ Production
- **Plastolyser**: Electro-chemical Waste to H₂
- **HyP3D***: SOEC H₂ Production
- **PCC**: Advanced H₂ Production, Compression & Separation
- **EHC**: Cylindric H₂ Compressor

TECH_DEV

- **Prometeo***: SOEC H₂ Production and Thermal Energy Storage
- **NHyRA***: H₂ leakages assessment from value chain on climate change
- **H2SHIFT***: Test infrastructure for novel H₂ production technologies
- **eSMR**: Electric Steam Methane Reformer
- **HyUsPre***: Underground H₂ Storage
- **JRP**: Innovative experimental procedures to test H₂ embrittlement susceptibility of steels

DEMO&TESTING

- **HyTecHeat***
- **PEM** Fuel Cell for Construction Sites
- **E2P2*** - MCFC for Data Centre
- **End-User** H₂ Test
- **Hy2Market***
- **Multi-HyFuel***
- **Olga*** - H₂ for Airport
- **ThotH2***
- **Shimmer***

***Externally funded**

Total EU-Grant Received: 3.1 M€ (2023)

- Not in the core business today
- i.e., potential new business ops

3-5

5-7

7-9

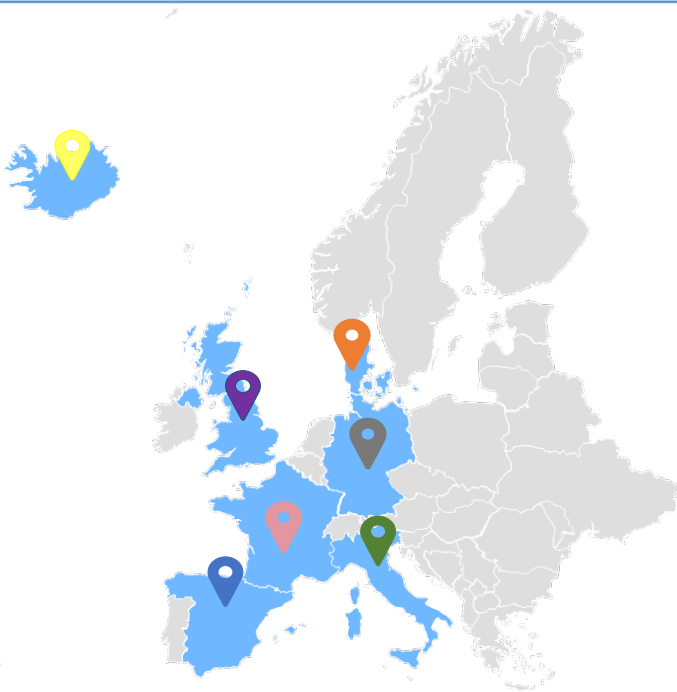
**Technology
Readiness
Level**

6



- **H₂SHIFT** – *Services for Hydrogen Innovation Facilitation and Testing* – aims at creating an Open-Innovation Test-Beds (OITB) with a **Single-Entry Point** that will give access to **H₂ production testing services** (7 test-lines), **technologies upscaling services** (Prototyping for industrial scalability and computational modelling), and **non-technical services** (Techno-economical and environmental assessment, Legal and regulation compliance, Business development)

Partnership



#	Test lines	Leader
TL1	High-temperature electrolysis	IREC ⁹
TL2	Anion Exchange Membrane electrolysis	University of South Wales
TL3	Biogas Reforming	snam
TL4	Bioethanol Reforming	TECNICAS REUNIDAS
TL5	Thermochemical water splitting	Politecnico di Torino
TL6	Photo(electro)catalytic H ₂ production	Politecnico di Torino
TL7	Production of H ₂ in off-shore environment	Youwind Model
TL8	Technology upscaling services	resolvent Modelling Solutions
TL9	Non-technical Services	COLLEGE 1863 ENGINEERS

○ Non H₂
production
testing services

● Advanced Water
Electrolysis

● Bio-Hydrogen

● Direct Solar to
H₂

● Offshore



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T H A N K Y O U

