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H2MA

The evolution of CLEAN HYDROGEN

Perspectives from production to use in mobility and industry

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Italy's National Hydrogen Strategy

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Contents and remarks

From the guidelines to the strategy

The Strategy goes beyond the previous text published in 2020, also known as "*The guidelines for hydrogen development in Italy*" which had been the foundation for the early national hydrogen policies

National Hydrogen Strategy: table of contents

February 2024
1st WG meeting

March 2024
Contribution gathering

May 2024
2nd WG meeting

June 2024
Contribution gathering

September - October 2024
Data analysis and consolidation

November 2024
Publication

2025
Implementation and monitoring

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4. Hydrogen supply
5. Transport and infrastructures
6. Strategic activities, policies and support measures
7. Research and innovation

Statement: role of H2 in the decarbonization path

Italy recognizes **hydrogen as one of the key components** for achieving the decarbonization objectives in line with the commitments assumed in the integrated National Energy and Climate Plan (NECP) for 2030 and in Net Zero for 2050

Remarks

- Regarding Italy's path for the consumption decarbonization, in full compliance with the **principle of technological neutrality**, Italy intends to adopt an approach based on the combination of a mix of different available instruments, so to ensure the development of a resilient energy system, capable of meeting demand in the face of variable and intermittent sources, with the capacity to transport large quantities of energy over long distances and at competitive costs.
- The Strategy describes the possible **role of hydrogen in the decarbonization path**, also in relation to the potential of other complementary or competing instruments for the reduction of GHG.
- The H2 Strategy has taken into account **the peculiarities and technological options of each sector of potential use of hydrogen**, moving towards a context of deep decarbonization**.**

Demands

National demand of hydrogen

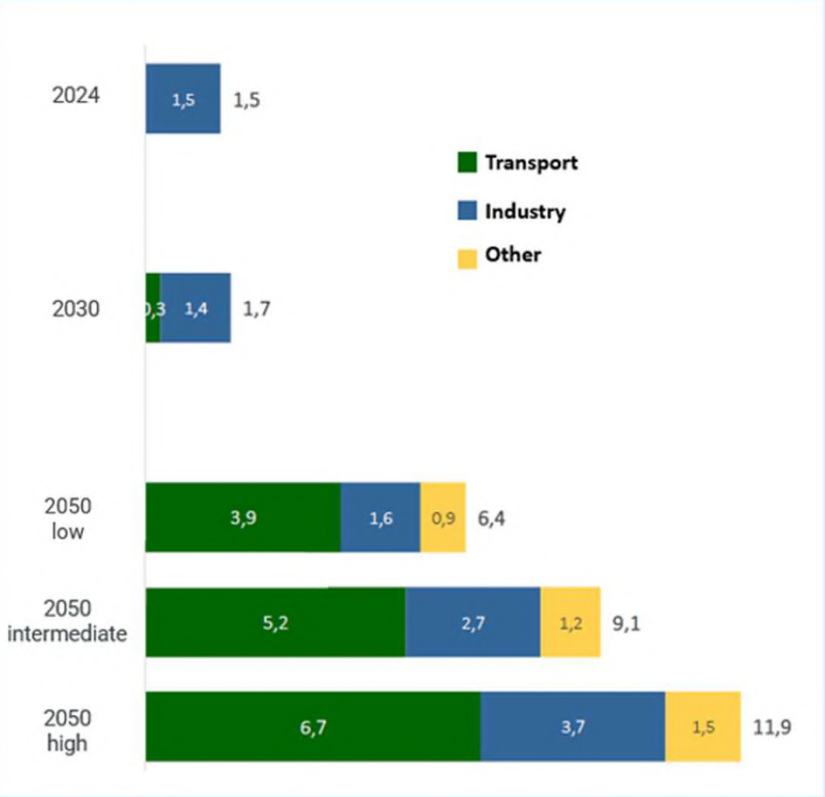
Currently. Italy's H2 consumption ≈ 1.5Mtoe/y, used almost only (99%) in the industrial sector, mainly for refining and chemicals (ammonia and fertilizers)

2030. Demand is expected to increase to 1.7 Mtoe/y, with about half of it met by green hydrogen (0.72 Mtoe/y).

2050. By 2050, due to a greater diffusion of technologies for the use of hydrogen in the industrial and transport sectors, the strategy estimates a possible consumption in the range between 6-12 Mtoe/y.

On the basis of possible evolution of the complementary decarbonization options (*electrification, biomethane/biofuels, CCS, hydrogen, potential nuclear*), **3 scenarios for H2 deployment** have been defined in medium and long-term perspective (up to 2050)

Hydrogen demand scenarios up to 2050 (Mtoe)



Supply

Hydrogen supply : estimation of the potetial investments

To estimate the impact of the diffusion of green hydrogen in terms of investment magnitude in renewable plants and electrolysers, several cases have been studied, taking into account both the different deployment scenarios by 2050 and the different contribution of imports (two reference cases are reported below):

- Reference case 1, prevalence of domestic production: **70% domestic production – 30% imports**
- Reference case 2, prevalence of imports: **20% domestic production – 80% imports**

H2 deployment scenario	National demand	Reference case 1 70% National production 30% Import		Reference case 2 20% National production 80% Import	
		National production	Import	National production	Import
H2 deployment scenario (low - high)	**6 - 12 Mtoe**	**4 - 8 Mtoe**	**2 - 4 Mtoe**	**1 - 2 Mtoe**	**5 - 10 Mtoe**
Required electrolyzer capacity (l.f. 40%)		15-30 GW		4-9 GW	
Investments for electrolysers		**8-16 billion €**		**2-5 billion €**	
RES capacity to power electrolysers		45-90 GW		13-26 GW	
Investments for RES		**35-70 billion €**		**10-20 billion €**	

National production

National production

National Recovery and Resilience Plan

Production of green hydrogen in brownfield sites (Hydrogen valleys)

IPCEI projects

- The current costs associated to the national production of green hydrogen are high, but with prospects of reduction.
- Support measures are needed in the early stages, to ensure investments, know-how and employment

National production

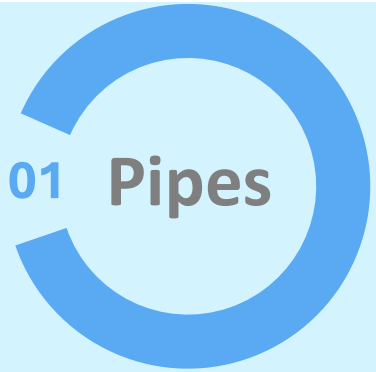
The strategy focuses on the green hydrogen,
also considering
(due to the lower expected production costs)
the potential of blue hydrogen/CCS,
as well as
the potential perspective contribution of the hydrogen
from nuclear source.

Infrastructures

Transport infrastructures

Infrastructures will play a fundamental role in connecting hydrogen production centers with consumption clusters, both at Italian and European level

Transport infrastructures



Infrastructures will play a fundamental role in connecting hydrogen production centers with consumption clusters, both at Italian and European level

- ✓ The development of the Italian Hydrogen Backbone, in addition to allowing the movement of hydrogen from the south to the north of the country, will contribute to the partial coverage of Italian demand through imported hydrogen.
- ✓ The Italian Hydrogen Backbone, part of the larger Southern Hydrogen Corridor, has the potential to make Italy one of the main European hubs for hydrogen imports.

Transport infrastructures

Infrastructures will play a fundamental role in connecting hydrogen production centers with consumption clusters, both at Italian and European level

01 Pipes

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02 Ports

- ✓The ports will be important entry points, integrating domestic production and pipeline transport through the re-conversion of the hydrogen carriers (e.g. green ammonia, green methanol and SAF).
- ✓The ports will facilitate the development of a clean hydrogen supply chain towards large "demand clusters", located close to them.
- ✓The ports have the potential to be drivers for the deployment of low-carbon technologies and fuels in the maritime sector.

Southern Hydrogen Corridor

- The "**Southern Hydrogen Corridor**" is the 3,300km hydrogen pipeline infrastructure that will be **developed by the Italian, Austrian, and German TSOs** (SNAM, TAG, GCA, and Bayernets).
- The Corridor will connect North Africa with Germany, crossing Italy and Austria, in order to **transport pure hydrogen, which will be produced at competitive cost in the Mediterranean Africa Countries using renewable energy**, towards the main consumption areas in Italy and Central Europe.
- The "**Italian H2 Backbone**" is the name of the Italian section of the Corridor (from Sicily to the borders with Austria and Switzerland), which will be largely realized through the repurposing of existing and redundant gas infrastructure and the remaining through new pipelines.
- The infrastructure fulfillment is expected **starting from 2030**.
- SNAM estimates the infrastructure import capacity from North Africa, once the corridor will be fully operational, will reach **4 million ton/year** (40% of 2030 Repower EU import targets).

Southern Hydrogen Corridor

- The Southern H2 Corridor has been included in the **first list of European Project of Common/Mutual Interest** under the renewed TEN-E Regulation, being considered "***strategic for the development of EU energy interconnections and the achievement of the Union's energy and climate objectives***
- In 2023, a **trilateral working group was established with experts from the ministries** of the involved countries (for Italy, MASE), in cooperation with the EU Com, to address the various challenges related to the Corridor implementation and define the framework within which the project can be developed.
- In May 2024, the **Ministers of Energy of Italy, Germany and Austria signed a joint declaration** of support for the project.
- In January 2025, during the Penta-Ministerial Conference on the Corridor held in Rome, attended also by the Commission and Switzerland (as an observer), the political support was further reaffirmed and extended with the signing of **a pentalateral declaration by the governments of Algeria and Tunisia, in addition to the those of Italy, Austria, and Germany**.

Implementing actions

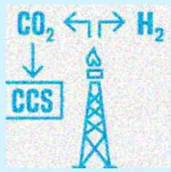
Implementing actions: *demand*

Industry	
Support for the scaling up of pilot projects	Short term
Support to the supply chain for industrial transition	Short term
Support for the purchase of H2 ready equipment to be used in the production processes	Short term
Implementation of competition-based supply mechanisms / support schemes for purchasing	Medium term
Promote the development of a structural demand for renewable and low carbon H2	Medium/long term

Trasport	
Development of port infrastructures	Short term
Intra-airport logistics	Short term
Support for the industrial supply chain for hydrogen technologies related to transport	Short/medium term
Development plan for a network of hydrogen refueling stations in line with the provisions of the AFIR	Medium term
Support for the use of hydrogen in air transport	Medium/long term

Implementing actions : *Production, Import and Infrastructures*

Production	
Enhancement and strengthening of Hydrogen Valleys also in port and airport areas	Short term
Mechanisms of Economic support for the production of renewable hydrogen from non-biological (RFNBO) and biological sources	Short term
Support for the scale-up of production initiatives at national level	Medium term
Promoting initiatives of sector coupling	Medium term
Development of an ecosystem that is favorable to e-fuels	Medium term



Import and Infrastructures	
Definition/use of a "competition based" mechanism for the import of green hydrogen and related derivatives	Short term
Certification system	Short term
Implementation of the Southern Hydrogen Corridor	Short/medium term
Enhancement of the role of ports, converting them into new green energy hubs	Medium/long term
Use of hydrogen in logistics hubs, ports, interports and airports	Medium/long term

Conclusions

Conclusions

- In order to decarbonize the Country, increase energy independence and reduce energy costs, **the need to use hydrogen is confirmed together with other decarbonization instruments** such as promoting energy efficiency, renewables, CCS, biofuels and biomethane, and, in perspective, the potential contribution of nuclear power.
- Hydrogen could be used to decarbonize **final energy consumption especially in transport** (*air and freight transport*) and **the hard-to-abate industry** (*oil refining, steel, chemicals, glass, ceramics*).
- The strategy focuses to the development of **hydrogen from electrolysis powered by renewable sources, but taking also into account other types of hydrogen**, such as blue hydrogen, in order to promote the development of the hydrogen market and contribute to the decarbonization strategy by minimizing the costs.
- **The current costs associated to hydrogen are high, but with prospects of reduction** both in terms of national production and in terms of abroad supply, thanks to the import contribution from North African countries.
- **Support measures are needed in the early stages**, to ensure investments, know-how and employment.
- The introduction of the hydrogen and its derivatives into the energy system can open up **important opportunities for Italy** in the development of a sustainable technological supply chain, to support economic and industrial development as well as the competitiveness of companies involved in the broader decarbonisation process.
- It is appropriate to take the opportunities offered by the **international hydrogen market, both in import and export, by developing medium/long-distance transport infrastructures (pipelines) and ship facilities (ports)**.

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E DELLA SICUREZZA ENERGETICA

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