



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update April 2023: ITALY

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1. New Initiatives, Programs, and Policies on Hydrogen and Fuel Cells

Following the establishment of the new Italian Government, the Ministry of Ecological Transition (MITE), which was in charge of policies relating to the energy transition including the roll-out of hydrogen, in November 2022 was renamed as "Ministry of the Environment and Energy Security" (MASE); the "Ministry of Economic Development" (MISE) also changed its name to "Ministry of Enterprises and Made in Italy" (MIMIT), maintaining some responsibilities dealing with hydrogen.

In agreement with the EU Strategy, hydrogen has been identified by Italy as a key element to complete the decarbonization of the economy, being the most suitable alternative to replace fossil fuels in "hard-to-abate" (HtA) sectors. Moreover, hydrogen could play an important role in the decarbonization of the transport sector. Therefore, it was recognized that developing the strategic hydrogen value chain becomes essential for green transition process and, at the same time, represents a positive challenge, stimulating new innovative and disruptive projects.

Current policies are supporting the direct use of hydrogen in the industrial sectors of chemistry, refining, steel and other HtA industries. The mobility sector (primarily heavy-duty long-range) is ready to adopt hydrogen thanks to the readiness of Italian stakeholders involved both in the development of hybrid power trains (FC-batteries) and in the implementation of hydrogen production and distribution infrastructures. Injection of hydrogen in the natural gas network is also considered to provide significant potential for storage and distribution of renewable energy thanks to the dual nature of the natural gas grid in Italy: highly capillary as well as pivotal for large-scale trans-Mediterranean and trans-European interconnection. This will emphasise the role of hydrogen in sector coupling as well as increase its indirect use producing electrical and thermal energy across all sectors connected to the gas grid.

2. Hydrogen and Fuel Cell R&D Update

In the framework of the Italian Recovery and Resilience Plan (RRP), research activities on the matter concern: (a) green and clean hydrogen production; (b) innovative technologies for storage, transport and transformation of hydrogen into derivatives and e-fuel; (c) fuel cells for stationary and mobile applications; (d) integrated smart management systems to increase the resilience and reliability of smart hydrogen-based infrastructures. In detail, an Operative Research Plan Project was financed with 110 M€ by the Ministry of Ecological Transition (now Ministry of Environment and Energy Security) in 2022, aiming to boost R&D on hydrogen at low TRL (< 5), involving the main research institutions in the country; moreover, two tenders were published in 2022 to involve industry, research institutions and universities in collaborative projects of



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fundamental research and industrial research/experimental development for a total amount of 50 M€ funds (21 projects were selected).

R&D activities on hydrogen are also supported under the Fund for Research on the electrical system financed – through the Ministry of the Environment and Energy Security – by a component of the electricity tariff.

Research projects at higher TRL (> 6) are carried out in the framework of Mission Innovation: two "Hydrogen demo valleys", at *ENEA Casaccia Research Center* (close to Rome) and *CNR Capo d'Orlando* (Sicily), are currently in the executive design stage; these are multifunctional platforms and technological incubators to accelerate Research & Innovation by providing companies with infrastructures to conduct experiments along the entire hydrogen value chain on a significant scale; additionally, in 2023 the plan of the new activities for Mission Innovation 2.0 on "Renewable and Clean Hydrogen" will be finalized, concerning the Clean Hydrogen Mission and the Hydrogen-Power cross-cutting activities.

Other *ad hoc* projects are funded through the Ministry of Education, University and Research.

R&D and pilot projects led by Italian partners are progressing in collaboration with European partners within the European Clean Hydrogen Joint Undertaking.

3. Demonstration, Deployments, and Workforce Developments Update

Demonstration and First Industrial Deployment (FID) projects related to the hydrogen value chain have strongly been supported by Italy. Main initiatives have recently been funded through the Italian Recovery and Resilience Plan (RRP, Mission 2, Component C2) and the European IPCEI program (Important Project of Common European Interest) on Hydrogen. These measures will provide the necessary public contributions to develop hydrogen-related markets and products, creating new job opportunities and improving industrial competitiveness.

Specifically, calls for projects have been published for the development of hydrogen valleys and the hydrogen use in hard-to-abate industry at National or Regional level under the RRP.

Additionally, under the IPCEI, 12 projects were selected and started in February 2023 under the IPCEI waves named Hy2Tech (hydrogen technologies) and Hy2Use (industrial applications).

In order to boost the deployment of hydrogen technologies, several training and education initiatives have been carried out. For example, a first Summer School on Hydrogen technologies has been organized with several speakers from the academic and industrial sectors, covering all issues related to the hydrogen supply chain, from production to transport and use (the second edition will take place in June 2023 in ENEA Research Center close to Rome).

4. Events and Solicitations

The Italian Ministries in charge and ENEA (the National Agency for New Technologies, Energy and Sustainable Economic Development) are actively participating in various initiatives related to hydrogen at an international level, such as IPHE, Mission Innovation and Technology Collaboration Programs of the International Energy Agency's (IEA TCPs on Hydrogen and Advanced Fuel Cells). These active roles in different partnerships allows to maximize collaboration and synergies between stakeholders, experts and policy makers.



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5. Investments: Government and Collaborative Hydrogen and Fuel Cell Funding

The Italian recovery and resilience plan provides funding allocation to hydrogen for the following activities:

1. **Production sites in the Hydrogen Valleys.** Local production of renewable hydrogen in brownfield sites and use in neighbouring areas, thus creating new Hydrogen Valleys (funding: 500 M€)
2. **Hard to Abate industries.** Progressive decarbonization of hard-to-abate industries (chemical plants; oil refineries; steel sector; cement, paper, ceramic, glass industries), through the transition from natural gas to green hydrogen (funding: 2000 M€)
3. **Research & Development.** R&D on hydrogen in all its phases: production, storage, distribution, end-use and sector coupling with power grids (funding: 160 M€)
4. **Electrolysers and production chain.** Development of the manufacturing capacity of electrolysers in Italy and the related supply chain for the production of clean hydrogen (funding: 450 M€)
5. **Railway mobility.** This investment consists in building and testing refuelling stations for railway, based on hydrogen (funding: 300 M€)
6. **Road transport.** This investment consists in building hydrogen based refuelling stations, in order to test hydrogen for road transportation (funding: 230 M€)

6. Regulations, Codes & Standards, and Safety Update

In June 2022, the Ministerial Decree was issued which allows the injection of hydrogen in the gas network, up to 2% by volume.