



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update July 2020: Italy

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

In the last 4 years important achievements have been made for the hydrogen sector in Italy.

A first important milestone has been accomplished in 2016 when Italy with the legislative [decree 16 December 2016, n. 257](#) committed to build the infrastructure for alternative fuels, of which hydrogen is a part. This follows the development of the National Strategic Plan on Hydrogen Mobility included in Annex III "National Strategic Framework, Section b, Supply of Hydrogen for road transport" developed with the support of the Italian Hydrogen and Fuel Cells Association (H2IT) with 40 members to date.

The [National Plan for Hydrogen Mobility](#) has been integrated by the Ministry of Economic Development into the National Strategic Framework for alternative fuels, as part of Italy's required Plan for Alternative Fuels Infrastructure, following EU Directive 2014/94/EU. The Plan suggests Italy deploy an **adequate number of refuelling stations** to allow the circulation of fuel cell powered vehicles on the territory **by December 31, 2025**. The Plan includes a series of scenarios related to the **number of cars and refuelling stations**, and relative quantities of hydrogen to produce, estimating costs, and incentives. The National Strategic Plan should be updated every 3 years, but, importantly, **an implementation plan is still required**.

H2IT updated the scenarios of the National Plan for Hydrogen Mobility in 2019, and the final report is public available. <https://www.h2it.it/wp-content/uploads/2019/12/Piano-Nazionale-Mobilita-Idrogeno-integrale-2019-FINALE.pdf>

Article 5 of Legislative Decree 16 December 2016, n. 257 ordered the update of the technical regulation of fire prevention issued in 2006 (technologically outdated, but still applicable at the time). Intensive work between the Ministry of the Interior, the Central Directorate for Prevention and Technical Safety of the Fire Department, and the Hydrogen Working Group of 'Assogastecnici' led to the publication of the [Decree 23 October 2018](#) "*Technical regulation of fire prevention for the design, construction and operation of hydrogen refuelling stations for mobility*".

This technical regulation will facilitate

- allowing the delivery of hydrogen at a **pressure of 700 bar** as required by the technical characteristics of the cars currently on the market;
- allowing the use of the **engineering approach** for the assessment of the installations on a case by case basis, guaranteeing the safety of the work and of the refuelling activity of the station;
- aligning Italy to other European countries, allowing the application of internationally recognized technical standards;
- allowing to partially overcome the economic and social limits deriving from the regulations in force up till then.



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The Italian Government published the [National Energy and Climate Plan](#) in January 2020 (NECP) and sent the final text to the European Commission according to the Governance of the Energy Union and Climate Action. The Plan sets out measures to ensure the creation of a secure, sustainable and competitive energy system in order to achieve sustainable growth, promote fundamental role of research and innovation in the cleantech sector and reach the 2030 environmental targets at the European level. The targets for Renewable Energy Sources (RES) are very significant and assume to cover more than 55% of the demand in the electricity field, 33% of the demand in the thermal sector and more than 21% in the transport sector, for an overall target of 30% of the gross energy consumption.

The NECP recognizes the strategic role of hydrogen in reducing CO₂ emissions and improving the energy system flexibility. In the mobility sector, hydrogen is expected to contribute around 1% of the 2030 RES-Transport target, through direct use or the introduction of methane in the network also for transport use. Development of power-to-gas long-term storage systems, enabling the large-scale integration of the electricity produced from renewable energy (PV, wind) into the energy system is also expected in the next decade.

One of the five dimensions of the NECP proposal is represented by the research, innovation and competitiveness's pillar. The dimension includes and refers to the national participation to Mission Innovation which is committed to double public funds for R&D for clean energy from €222M in 2013 to €444M in 2021. Italy has joined the MI IC#8 on Hydrogen and took part actively to the Mission innovation "Hydrogen Valleys" workshop organized in Antwerp on March 2019 presenting its national "Hydrogen Valley" located in Bolzano, South Tyrol.

Italy has also joined the Hydrogen Initiative, launched by the European Commission in September 2018 in Linz, Austria, in order to maximise the great potentials of sustainable hydrogen technology for the decarbonisation of multiple sectors, the energy system and for the long-term energy security of the EU.

In June 2019, the Italian Ministry of Economic Development set up The Hydrogen Table gathering the main national industrial players in the value chain to encourage the development of hydrogen-related projects. 35 companies and research bodies participated to the first meeting. Subsequently, three subgroups were created to examine specific technical needs. A total of 53 companies and research bodies participated at this stage. The three working groups were organized on 3 main thematic: "Production, storage and power to gas", "Transport" and "Regulation".

This initiative aims to define the priorities, the guidelines and to make a competitiveness assessment on the Italian hydrogen sector and to promote the development of hydrogen-related projects that can have positive impacts from the technological, economic and social point of views. In 2020 other important companies requested direct involvement and numerous projects were presented.

2. Hydrogen and Fuel Cell R&D Update

Hydrogen R&D activities are currently funded at the national level under the Fund for Research on the electrical system financed by a component of the electricity tariff. Significant research is being carried out in Italy, mainly through mobilising European funds from the FCH 2 JU (€98M funding per year from the FCH JU supporting over 140 projects and 100 beneficiaries in 13 years spanning the two framework programmes). National programmes are currently funding 5 projects worth €8.5M. Also, there is a lot of internal R&D



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taking place in universities, ranging from innovative materials to new fuel cell architectures to monitoring and diagnostic algorithms and system integration.

3. Demonstration, Deployments, and Workforce Developments Update

Among the most notable demonstration projects are the following:

- The Bolzano refuelling station is an example of excellence at the European level: hydrogen is produced by electrolysis completely from renewable sources. To date, 5 hydrogen buses, 10 Hyundai ix35 Fuel Cell cars, 10 Hyundai Nexo, were added to the car park in 2020, and some Toyota Mirai are operating. Another 12 buses have been ordered and will circulate in the area soon.
- 3 FC Buses and H2 refuelling station deployed in Sanremo at the end of 2018.
- SNAM (Italian gas Transmission System Operator) initiates first hydrogen injection in the gas grid.
- Ongoing demonstration of a 170 kW SOFC plant running on biogas from waste-water treatment near Turin.

4. Events and Solicitations

H2IT is organizing a series of webinar dedicated to the hydrogen value chain from production to end uses. <https://www.h2it.it/seminario-a-ingresso-libero-energia-dallidrogeno/>

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

The 5 National projects currently running on H2FC applications mobilise around €8.5M funding.

6. Regulations, Codes & Standards, and Safety Update

As mentioned previously, an important update took place this year regarding the technical regulation of fire prevention, previously dated 2006 and which effectively impeded deployment due to technologically outdated requirements.

Italy is contributing to standardization work going on within IEC TC105 (fuel cells) and ISO TC197 (hydrogen generation) and the European CEN/CENELC TC6 on hydrogen distribution and CEN/TC 234 “Gas Infrastructure”.



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Summary Country Update July 2020: ITALY

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles ¹	25k by 2025	As of June 2020	Partnership between Toyota and ENI for FC cars and HRSs.	•
FC Bus	1000 by 2025	As of June 2020	The main activity is through FCH 2 JU in Bolzano, Sanremo and Milano (CHIC, JIVE, Hy.Vlo.city, MERLIN)	<ul style="list-style-type: none"> • FCH JU projects, LIFE and CEF • Regional support • National fund for new bus fleet for PA
Fuel Cell Trucks ²	NA	NA	In Bolzano (REVIVE project) there is a garbage collection truck being deployed	
Forklifts	NA	NA	Toyota Material Handling in their factory near Ferrara have installed an onsite HRS to refuel a small fleet of forklifts	•
Train	NA	NA	Alstom and Snam: agreement for the development of hydrogen trains in Italy	•
H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
70 MPa Delivered	346 by 2030	1	ENI announces an HRS in Milano (San Donato Milanese) and one near Venice in partnership with Toyota for vehicles. South Tyrol with the LifeAlps project promoted by the European Commission announces the opening of 5 new hydrogen refueling stations by 2028.	<ul style="list-style-type: none"> • e.g., No Subsidy for installation • e.g., Subsidy for operation

¹ Includes Fuel Cell Electric Vehicles with Range Extenders

² As above



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Stationary	Target Number ³	Current Status	Partnerships, Strategic Approach	Support Mechanism
35 MPa Delivered	96 by 2030	3	European projects	<ul style="list-style-type: none"> • FCH JU projects, LIFE and CEF • Regional support • National fund for new bus fleet for PA
Small ⁴	No specific target	As of 2019 around 20 units installed	New production facility for SOFC for Solid Power (Pergine-Trentino)	<ul style="list-style-type: none"> • There are white certificates for micro-CHP that reward efficiency increase • An ecobonus for micro cogenerators, considering fiscal deduction, has been placed for 2018-2019-2020
Medium ⁵	No specific target	1 demonstration site		FCH JU
Large ⁶	No target	None	Development of 100% hydrogen turbine (BHGE & Ansaldo Energia)	
District Grid ⁷	No target	None		
Regional Grid ⁸	No target	None		
Telecom backup	No target	Around 20		

³ Targets can be units installed and/or total installed capacity in the size range indicated

⁴ <5 kW (e.g., Residential Use)

⁵ 5kW – 400 kW (e.g., Distributed Residential Use)

⁶ 0.3MW – 10 MW (e.g., Industrial Use)

⁷ 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

⁸ 30MW plus (e.g., Grid Storage and Systems Management)



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H ₂ Production	Target ⁹	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fossil Fuels ¹⁰	No target	None		
Water Electrolysis ¹¹ (PEM, Alkaline, SOEC)	No target	None	New production facility in Pisa for Enapter (AEM electrolysers)	
By-product H ₂	No target	None		
Energy Storage from Renewables	Target ¹²	Current Status	Partnership, Strategic Approach	Support Mechanism
Power to Power ¹³ Capacity	No target	None		
Power to Gas ¹⁴ Capacity	No target	1 st plant for H ₂ injection (5% and 10%) in grid launched near Salerno (SNAM Gas TSO)	TSO-level initiatives starting to emerge Power-to-gas pilots by ENEA and SGI (Società Gasdotti Italia)	Still to be determined

⁹ Target can be by quantity (Nm³, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

¹⁰ Hydrogen produced by reforming processes

¹¹ Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)

¹² Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity

¹³ Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

¹⁴ Operator has the opportunity to provide the stored energy in the form of hydrogen back to the energy system through multiple channels (e.g., merchant product, enriched natural gas, synthetic methane for transportation, heating, electricity)