



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update October 2019: Italy

Name	Stephen McPhail
Contact Information	stephen.mcphail@enea.it +39 06 3048 4926
Covered Period	April to October 2019

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

An important achievement in the last 4 years has been the establishment of a national hydrogen and fuel cells association, H2IT, which gathers 15 industries and 10 associations/universities/research organizations.

A “spin-off” of H2IT was created especially to address hydrogen mobility in view of Italy's required Plan for Alternative Fuels Infrastructure, following EU Directive 2014/94/EU. MobilitaH2IT developed a **National Plan for Hydrogen Mobility** (the Plan) (<https://www.h2it.it/documenti/>), which the Ministry of Economic Development has integrated into the National Strategic Framework (the Framework) for Alternative Fuels, published in January 2016. This Framework 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 Framework should be updated every 3 years (revision due in 2019), but, importantly, **an implementation plan is still required. H2IT is working on the update of the mobility plan and on its extension to address all types of mobility types.**

Thanks to the commitment of H2IT, Article 5 of Legislative Decree 257 was ordered to update the technical regulation of fire prevention issued in 2006 (technologically outdated, but still applicable at the time). Subsequently, the 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’, as well as other stakeholders such as Toyota and H2IT, led to the publication (November 5, 2018) of the **“Technical regulation of fire prevention for the design, construction and operation of hydrogen refuelling stations for mobility”**:

- 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 previous regulations.

Currently, H2IT has requested a parliamentary hearing to make its contribution to the **Italian Energy and Climate Plan** (PNIEC), which is under discussion to comply with EU directives.



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

The Ministry of Economic Development (MISE) has launched the “Hydrogen Table”; 31 projects have been submitted and all major (industrial) stakeholders will be convened to discuss their implementation addressing all the value chain: face-to-face meetings are scheduled in November 2019.

SNAM, Italy’s main gas grid Transmission System Operator (TSO), organized a high level global event called ‘Hydrogen Challenge’ on 10 – 11 October, where the Prime Minister and many other important Italian and international representatives spoke about the role of hydrogen in Italy and its opportunities.

2. Hydrogen and Fuel Cell R&D Update

Much research is being carried out in Italy, mainly mobilising European funds from the FCH JU (98M€ funding from the FCH JU over 140 projects and 100 beneficiaries in 13 years spanning the two framework programmes). National programmes are currently funding 5 projects worth 8.5 M€. There is a lot of internal R&D taking place in universities as well, 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

- 3 FC Buses and H2 refuelling station deployed in Sanremo at the end of 2018
- Bolzano planning 15 FC Buses in addition to current 5 (JIVE & MEHRLIN projects – FCH JU)
- ENI announces a partnership with Toyota for HRS in Milano (San Donato Milanese) and in Venice territory
- SNAM (Italian gas TSO) initiates first trials of hydrogen injection in a localized natural gas [grid at 5%](#), to be increased to 10% of H2 in the mixture.
- Power to gas pilots by ENEA and SGI (Società Gasdotti Italia)
- Ongoing demonstration of a 170 kW SOFC plant running on biogas from waste-water treatment near Turin
- New Enapter facility in Pisa to industrially produce electrolyzers

As of yet no explicit deployment actions have been decided, and initiatives are still exploratory and local-scale. The workforce active in H2FC (industry and academia) is around the 1000 order of magnitude.

4. Events and Solicitations

January 2020: Stati Generali Idrogeno e Celle a Combustibile – Annual event of key stakeholders to discuss the situation of the hydrogen sector in Italy, highlighting the initiatives carried out during the year, and identifying the next steps for its development.

9-11 December in Naples the 7th edition of the European Fuel Cell “Piero Lunghi” conference will be held (EFC19), a biannual event gathering around 250-300 scientists and policy representatives from around the world to discuss the rapidly evolving hydrogen and fuel cell panorama. There will be a co-located dedicated Workshop on hydrogen for rail applications.

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

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



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

6. Regulations, Codes & Standards, and Safety Update

As mentioned previously, an important update took place this year regarding the technical regulation of fire prevention, the previous issue of which dated to 2006 and which effectively impeded deployment due to technologically outdated requirements. A large industry-led working group prepared the necessary adaptations and the new **"Technical regulation of fire prevention for the design, construction and operation of hydrogen refuelling stations for mobility"** was published and adopted November 5, 2018.

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.



Summary Country Update October 2019: Italy

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles ¹	1000 by 2020, 25k by 2025	As of 2019, 15	<ul style="list-style-type: none"> • Toyota is keen but waits for HRS to be deployed to offer FCEVs. No implementation plan is currently available to force progress 	<ul style="list-style-type: none"> • Still to be determined
FC Bus	100 by 2020, 1000 by 2025	As of 2019, 10	There is an Italian bus manufacturer that has a FCB on catalogue (Rampini), but main activity is through FCH JU in Bolzano and the north of Italy	<ul style="list-style-type: none"> • Still to be determined
Fuel Cell Trucks ²	NA	none	In Bolzano (REVIVE project) there is a garbage collection truck being deployed	Still to be determined
Forklifts	NA	Around 5	CESAB in their factory near Ferrara have installed an onsite HRS to refuel a small fleet of forklifts	<ul style="list-style-type: none"> • No support policy
H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
70 MPa On-Site Production	No target	As of 2019, none	No implementation plan is currently available to force progress	<ul style="list-style-type: none"> • Still to be determined
70 MPa Delivered	140 by 2025	As of 2019, none	Toyota is keen but waits for HRS to be deployed to offer FCEVs. No	<ul style="list-style-type: none"> • Still to be determined

¹ Includes Fuel Cell Electric Vehicles with Range Extenders

² As above



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

			implementation plan is currently available to force progress	
35 MPa On-Site Production	No specific target	As of 2019, none		• Still to be determined
35 MPa Delivered	60 by 2025	As of 2019, 4		
Stationary	Target Number ³	Current Status	Partnerships, Strategic Approach	Support Mechanism
Small ⁴	No specific target	As of 2019 around 20 units installed		• There are white certificates for micro-CHP that reward efficiency increase
Medium ⁵	No specific target	1 demonstration site		FCH JU
Large ⁶	No target	None		
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)



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

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		
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 in grid launched near	TSO-level initiatives starting to emerge	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)



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

		Salerno (SNAM Gas)		
--	--	--------------------	--	--