



INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update November 2020: Germany

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

The German Federal Government passed the National Hydrogen Strategy in June 2020 as comprehensive and wholistic approach that has been developed by joined efforts of four ministries: the Federal Ministry for Economic Affairs and Energy (BMWi), the Federal Ministry of Transport and Digital Infrastructure (BMVI), the Federal Ministry of Education and Research (BMBF) and the Federal Ministry for Economic Cooperation and Development (BMZ).

The National Hydrogen Strategy consists of 38 concrete measures both including existing programs such as the National Innovation Program Hydrogen and Fuel Cell Technology as well as setting up new initiatives such as the research initiative hydrogen 2030 that covers measures from R&D to procurement and the regulatory framework. The strategy has a budget of €7billion for national measures and €2billion for international measures up to 2024. In order to implement and monitor the progress of the strategy, a dedicated governance, e.g., on the way to achieve the target of 5GW electrolyser capacity until 2030, is being set up with a clear timeframe for a first evaluation in 2023.

The national strategic framework is related to the implementation of European directives, particular the recast renewable energy directive (RED II) where the ambitious national implementation is estimated to create the possibility of up to 2 GW electrolyser capacity. Furthermore, a call for interest for the Important projects of common European interest (IPCEI) is underway and will be launched in December 2020. The IPCEIs strive to establish a complete European value chain by linking national projects across borders and thereby form an initial backbone of a European hydrogen economy.

2. Hydrogen and Fuel Cell R&D Update

The Federal Ministry of Transport and Digital Infrastructure continues to support strategic projects such as the pre-normative research on gas quality for refueling stations, the next generation of aviation powertrains for an airplane with up to 4 people (Go4Hy2) and the development of light duty applications (HYLIGHTCOM), several projects on the development of FC trucks (both within the national innovation program – NIP and the Mobility and Fuels Strategy). To complete these R&D efforts along the value chain with MANTYS the development of automated stack production processes for more than 100,000 stacks per year was started 2020.

3. Demonstration, Deployments, and Workforce Developments Update

The NIP is funding market deployment of fuel cell technologies in the transportation sector. This includes passenger cars, busses, trains and other mobile applications with fuel cell technologies. By October, 951 fuel cell vehicles had been registered in Germany. For those FCEVs, 87 hydrogen refueling stations are available.



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As of September of 2020, more than 4,045 fuel cell heating systems for domestic buildings up to 5 kW have been granted public funding. In total, 14,300 fuel cell systems for heating are in place in Germany. For backup power systems in addition to the installed more than 300 fuel cell systems and the previous 505 granted systems of the NIP procurement call, a third procurement call was launched in autumn of 2020. In autumn 2020 several dedicated procurement calls have been published that gained significant interest. Among them was a funding call for garbage trucks that was oversubscribed with applications for €130million representing more than 160 trucks, a funding call for critical infrastructure that received applications for €6million and more than 600 systems as well as procurement calls for electrolysis and intralogistics that were heavily oversubscribed.

4. Events and Solicitations

Nothing specific to report.

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

The second phase of the National Innovation Program for Fuel Cell and Hydrogen Technology, in place since 2016, relies on two funding mechanisms. One mechanism addresses R&D projects, directly linked to FCH topics. Several projects were approved with most providing support for market uptake by decreasing costs and increasing product lifetime. Single components as well as complete systems and production chains are considered within the approved projects. A brief overview of all projects of 2019 is given in the annual report of the NOW GmbH.

The other funding mechanism within the NIP is to support investment deploying FCH technologies. For example, the purchase of about 150 cars received funding support as mentioned above. Many of the fueling stations now in operation were funded by the NIP that also includes, in some cases, support for the production of hydrogen by water electrolysis.

In context of the National Hydrogen Strategy, a number of programs received substantial funds dedicated to hydrogen such as the program for decarbonization of energy intensive industries and synthetic fuels / Power-to-Liquids deployment both to be implemented nationally and internationally. However, the associated funding guidelines are being prepared and in the process of being notified by the European Commission.

6. Regulations, Codes & Standards, and Safety Update

With approval of the Renewable Energy Directive at the European Level, discussions are now underway on its integration into the national framework. It will be important to generate incentives for integration of advanced fuels into the fuel mix including hydrogen as an advanced fuel in upstream processing. This might lead to large-scale deployments estimated to reach up to 2 GW electrolyser capacity in refineries. The current proposal is under discussion in the Federal Government and may be adapted to incentivize the use of green hydrogen in the transport sector.

Furthermore, there are efforts to exempt electricity used for the production of hydrogen from the EEG (Erneuerbare-Energien-Gesetz) levy as part of the revision of the German Renewable Energy Act that shall be adopted by the end of 2020. The EEG levy makes up a significant part of the price for electricity, an exemption can therefore decrease the costs for producing hydrogen from water electrolysis.



Summary Country Update November 2020: Germany

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles ¹	No target	317 new (Oct. 2020) total of 951		Subsidy for purchase for fleets (NIP II 3 rd Call) incl. construction of refueling infrastructure
FC Bus	No target	79 (Oct. 2020)	Joint procurement in Europe, funded by JIVE, FCH-JU and NIP I and II	Subsidy for purchase (NIP II call 2018) incl. construction/installation of refueling infrastructure
Fuel Cell Trucks ²	No target	n.a.	n.a.	R&D activities of NIP and mobility and fuels strategy for 3 projects on development of FC Trucks Additionally, the NIP published a procurement call for garbage trucks in October 2020
Forklifts	No target	162 (Oct. 2020)	Industry Network Clean Intralogistics Net (CIN)	NIP market activation, additional procurement call in October 2020
H ₂ Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
70 MPa On-Site Production	No target	n.a.	H2 Mobility	Subsidy for construction/ installation for publicly accessible stations for road transport (NIP II Call 2018) incl. on-site electrolyser

¹ Includes Fuel Cell Electric Vehicles with Range Extenders

² As above



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70 MPa Delivered	100 by 2020 400 by 2025	87 (Nov. 2020 19 in preparation and admission)	H2 Mobility	Subsidy for construction/ installation for publicly accessible stations for road transport (NIP II Call 2018) incl. on-site electrolyser
35 MPa On-Site Production	No target	n.a.		
35 MPa Delivered	No target	n.a.		
Stationary	Target Number ³	Current Status	Partnerships, Strategic Approach	Support Mechanism
Small ⁴	No target	14,300 (Sept. 2020) including 4,045 funding approvals		KfW programme 433 of the Ministry of Economy and Energy (BMWi), a combination of fix rate and performance-related subsidies
Medium ⁵	No target	n.a.		
Large ⁶	No target	n.a.		
District Grid ⁷	No target	n.a.		
Regional Grid ⁸	No target	n.a.		
Telecom backup	No target	>300 units + 500 funding approvals and		Subsidy for procurement (NIP II Call)

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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		add. funding call just closed		
H ₂ Production	Target ⁹	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fossil Fuels ¹⁰	No target	30 million Nm ³ /d		No target
Water Electrolysis ¹¹ (PEM, Alkaline, SOEC)	5 GW by 2030 Additional 5 GW by 2035-2040	62 projects with >300 MW _{el} electrolyzer capacity installed (March 2020) Procurement call just closed	National Hydrogen strategy names 5 GW target by 2030	Subsidy for procurement (NIP II call) specifically for mobility applications minimum size 250 kW _{el} 7 th energy research program by BMWi (applications for >300 MW _{el} within Real life laboratories) HyLand Initiative by BMVI supports regional H ₂ production
By-product H ₂	No target	4 million Nm ³ /d	By-product H ₂	No target
Energy Storage from Renewables	Target ¹²	Current Status	Partnership, Strategic Approach	Support Mechanism
Installed Electrolyser Capacity	No target			
Power to Power ¹³ Capacity	No target			

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



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Power to Gas ¹⁴ Capacity	No target	62 projects with >300 MW _{el} electrolyzer capacity installed		
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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)