INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update April 2018: Germany

Name	Adam Mutwil (BMVI), Lucia Seissler (NOW)
Contact Information	adam.mutwil@bmvi.bund.de +49 (0)30 18 300 2541 lucia.seissler@now-gmbh.de +49 311 611 625
Covered Period	November 2017 to April 2018

1. New Policy Initiatives on Hydrogen and Fuel Cell

The continuation of the National Innovation Programme Hydrogen and Fuel Cell Technology NIP (Phase I to 2016) until 2026 is in place, embedded in the broader scope of the Government Programme Hydrogen and Fuel Cell Technology 2016-2026. Since many products for different applications have reached market maturity, the NIP is now focusing on both: R&D and market activation, by means of two respective funding guidelines. The newly introduced market activation guideline is a Call-based system and subsidises part of the difference in [capital] cost between the conventional and the fuel cell system.

NOW was also contracted by the Federal Ministry of Transport and Digital Infrastructure (BMVI) to develop the national strategy frameworks, which are required in the context of the European Directive 2014/94/EU on the deployment of alternative fuels infrastructure.

Furthermore, as part of the export initiative of the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU – Bundesministerium für Umwelt, Naturschutz und nukleare Sicherheit), NOW, and the German development agency Gesellschaft für Internationale Zusammenarbeit (GIZ) have agreed to jointly establish a network in emerging and developing countries to promote projects for the climate-friendly use of hydrogen and fuel cell technologies. In the wake of this assignment commissioned by the BMU, NOW is also expanding its partnerships with Japan in the field of power-to-gas technologies.

In addition, with the establishment of the Sino-German Electro-Mobility Innovation and Support Center (SGEC), cooperation between Germany (BMVI) and the People's Republic of China (Ministry of Science and Technology MOST) in the field of hydrogen and fuel cell technology has also become strengthened on an institutional level.

2. Hydrogen and Fuel Cell R&D Update

The NIP is currently focusing on the development of fuel cell stack production to secure value-added segments and jobs for Germany. Another focus is on bringing the production of water electrolysers to an industrial scale, to support the production of sustainable hydrogen for mobility, energy and heat. A study was commissioned to provide guidelines for future activities by NIP for water electrolysis up to 2026. It will provide a view on combining the production value-chain and energy systems needs analysis. Additionally FC material handling vehicles (MHV) in fleet operation are demonstrated in automotive production facilities.

3. Demonstration and Deployments Update

The expansion of the hydrogen refueling station (HRS) network in Germany is progressing. Today, the network already comprises 43 stations, and a further 43 HRS are currently under construction or in the planning stage. By 2019, there are to be 100 HRS available to support the market launch of fuel cell vehicles.

With funding support for cars, buses and trains for public transport, the NIP covers all modes of transport. Since 2016, the number of passenger cars has doubled to around 500, partly thanks to support from the German government's National Innovation Programme Hydrogen and Fuel Cell Technology (NIP II). The number of buses is also increasing: several public transport companies in Germany are purchasing a total of more than 60 fuel cell buses. The local public transport company of Lower Saxony has ordered 14 fuel cell trains for its regional transport services. Further hydrogen trains are planned for routes in the state of Hesse.

In addition, NIP II introduced fuel cell heating systems to the market through the promotion of development projects and field tests, such as CALLUX. Since September 2016, such systems have been funded under the KfW Programme 433, the "Energy-efficient construction and renovation – fuel cell subsidy" (Energieeffizient Bauen und Sanieren – Zuschuss Brennstoffzelle). According to the KfW Annual Report, by the end of 2017, more than 1,900 funding approvals had been granted for fuel cell heating systems.

NIP II also provides support for fuel cell systems for the autonomous energy supply and uninterruptible energy supply of critical or off-grid infrastructures. The Call for funding has €5M, which will enable the funding of approx. 500 to 600 fuel cell-based emergency power systems.

4. Events and Solicitations

In Germany, applications for procurement subsidies for fuel cell systems for the independent energy supply of critical and off-grid infrastructures can be made until 31 May 2018. The Call supports the deployment of fuel cell systems for the back-up or off-grid power supply of, for example, police communication network and traffic control and information applications.

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

The planned budget for the National Programme Hydrogen and Fuel Cell Technology II (measures by the BMVI) amounts to €250M for 2017-2019.

6. Regulations, Codes & Standards Update

Nothing new to report.

INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

Summary Country Update April 2018: Germany

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
Fuel Cell Vehicles[1]	No target	Around 500 (April 2018)	-	Subsidy for purchase for fleets (NIP II 2nd call 2017) incl. construction/installation of refueling infrastructure
FC Bus	No target	16 buses in operation, funding for 51 more secured (April 2018)	Joint procurement in Europe, funded by JIVE, FCH-JU and NIP I and II	Subsidy for purchase (NIP II call 2017) incl. construction/installation of refueling infrastructure
Fuel Cell Trucks[2]	No target	-	-	NIP II for R&D
Forklifts	No target	< 100 units as of April 2018	Industry Network Clean Intralogistics Net (CIN)	NIP II for R&D
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
70 MPa On-Site Production	No target	As of April 2018	H2Mobility	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

70 MPa Delivered	100 by 2020 400 by 2025	43 operational as of April 2018 (48 in progress)	H2Mobility	Subsidy for construction/ installation for publicly accessible stations for road transport (NIP II call 2018)
35 MPa On-Site Production	No target	n.a.	n.a.	Subsidy for construction/ installation incl. on-site electrolyser in connection with FC bus procurement
35 MPa Delivered	No target	n.a.	n.a.	Subsidy for construction/ installation in connection with FC bus procurement
Stationary	**Target Number[3]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Small[4]	No target	1,900 funding approvals as of Dec 2017	-	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.	n.a.	n.a.
Large[6]	No target	n.a.	n.a.	n.a.
District Grid[7]	No target	n.a.	n.a.	n.a.

[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)

Regional Grid[8]	No target	n.a.	-	None
Telecom backup	No target	>200 units as of April 2018	Industry Network Clean Power Net (CPN)	Subsidy for procurement (NIP II call 2018)
H_2 Production	**Target[9]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Fossil Fuels[10]	No target	n.a.	n.a.	n.a.
Water Electrolysis[11] (PEM, Alkaline, SOEC)	No target	n.a.	n.a.	Study on industrialisation of water electrolysis Subsidy for on-site electrolyser at publicly accessible hydrogen refueling stations for road transport
By-product H_2	No target	n.a.	n.a.	n.a.
Energy Storage from Renewables	**Target[12]**	**Current Status**	**Partnership, Strategic Approach**	**Policy Support**
Power to Power[13] Capacity	No target	See below	n.a.	n.a.

[8] 30MW plus (e.g., Grid Storage and Systems Management)
[9] Target can be by quantity (Nm^3, 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

Power to Gas[14] Capacity	No target	>30 projects >20 MW electrolyser capacity installed As of Nov 2017	Strategy Platform Power to Gas	n.a.

[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)