INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update Nov, 2015: China

The IPHE Secretariat requests each IPHE member submit a one-page narrative update on hydrogen and fuel cell (HFC) activities. Please only report actions and developments since the last Country Update and leave Sections blank if there have been no new developments.

Please complete this form and send to secretariat@iphe.net by 19 November 2015.

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1. New Policy Initiatives on Hydrogen and Fuel Cell

Premier Li Keqiang September 29 chaired a State Council executive meeting to determine the support for new energy development measures and small cars. It was decided to improve policy support for new energy vehicles, and to support battery, **fuel cell vehicles** and other research and development, to carry out an intelligent network linking vehicle demonstration pilot.

The State Council issued "Made in China 2025" plan in May 2015, which is a ten-year plan focusing on promoting manufacturing. In October 2015, Ministry of Industry and Information Technology (MIIT) released the "Technology Roadmap of Major Sectors of Made in China 2025" (2015 Edition). This Technology Roadmap covers 10 major sectors including energy saving and new energy vehicles, in which the general demand, target, developing emphasis of Fuel Cell Vehicle and Fuel Cell System are listed as follows.

	2020	2025	2030
Fuel Cell Vehicle	small scale demonstration in the field of public service vehicles in the specific areas	small scale operation in the field of urban private vehicles, public service vehicles	massive application of fuel cell vehicles
	vehicle durability of 150000 km, cruising range of 500 km, hydrogen refueling time of 3 minutes, cold start temperature of -30 ℃, fuel cell stack life of 5000 h	vehicle durability of more than 150000 km, fuel cell stack life of more than 5000 h	equivalent to vehicle performance of the traditional vehicles, possessing the advantages of relative products competitiveness
	optimizing the structure design of fuel cell systems, accelerating the production of the key components, greatly	better than total life cycle cost (TCO) of the traditional power vehicles under current policy	equivalent to total life cycle cost (TCO) of the traditional power vehicles

	reducing the cost of fuel cell systems		
	developing the key materials and components of fuel cells, the Chinese key materials and components reaching to 30%	mastering the manufacturing process of the key materials and components, such as bipolar plates, membrane electrode assemblies, the Chinese key materials and stacks reaching to 50%	fully realizing the Chinese key materials of fuel cells, stacks and so on, the Chinese key materials reaching to 70%
Fuel Cell System	FCS capacity of more than 1000 sets	FCS capacity of more than 100000 sets	FCS meeting the requirements of independent vehicles
	specific volume power of FCS > 2.5 kW/L, cold start temperature < -30 ℃, life-time of 5000 h	specific volume power of FCS > 3 kW/L, life of more than 5000 h	cold start temperature < -40 ℃
	the properties of the key system accessories, such as high speed air compressor, hydrogen circulation system, 70 MPa hydrogen storage bottle, meeting the criteria used for vehicles		system components gradually realizing the Chinese key materials, the system cost of less than RMB 200/kW (an annual output of 500000 scale)

2. Hydrogen and Fuel Cell R&D Update

3. Demonstration and Deployments Update

Transportation:
CRRC Qingdao Sifang Company and Tandshan Railway Vehicle Company, two leading train manufactures in China, signed agreements with Ballard respectively in September and November, to develop fuel cell powered tram in China. An initial deployment of 8 fuel cell powered trams is planned by CRRC Sifang and the City of Foshan on the Gaoming Line starting in 2017.
The City of Foshan also announced a deployment plan of approximately 300 fuel cell buses through 2016 to 2017. Three hydrogen refuelling stations are under plan or design now.

Stationary:
The first fuel cell power plant will be installed in the Liaoning province of China.
It was reported that Dutch fuel cell technology company Nedstack has signed a contract to deliver a 2 MW PEM fuel cell power plant for Ynnovate Sanzheng (Yingkou) Fine Chemicals

Co Ltd in Yingkou, Liaoning Province, China. This chemical facility produces 'waste' hydrogen as a by-product in the chlor-alkali process, which will in future be utilised onsite for the generation of 2 MW of electric power. Nedstack is working with Akzo Nobel Industrial Chemicals and industrial integrator MTSA Technopower in this project, with support from the European Union's Fuel Cells and Hydrogen Joint Undertaking (FCH JU).

Power to Gas：
The first pilot project of Wind to Hydrogen is carried out in Hebei province.
June 2015, Hebei Construction and Investment Group Co., Ltd signed a €6.4 million contract with McPhy Energy, which will supply a 2 MW Electrolyser for the recovery of surplus energy generated by a 200 MW wind farm site currently under construction in the Hebei province of China.

4. Events and Solicitations

The APEC Fuel Cell International Forum will be held on January 18-19, 2016, Beijing. This forum is sponsored by APEC Energy Working Group, APEC New & Renewable Energy Technologies Expert Group and National Energy Administration of China, and organized by Guodian New Energy Technology Research Institute.
The main purpose of the forum is to promote the development of fuel cell technologies. The forum aims to provide a platform for in-depth discussion on the commercialization pathway of fuel cells, and to propose solutions to the technical bottlenecks through constructive communications and interactions among engineers, scientists and government leaders from major global fuel cell industries and world leading research organizations.

Background: The Declaration of the 22nd APEC Leaders Summit in 2014 further reemphasized that APEC economies should "double the fraction of renewables in power generation by 2030 in APEC's energy mix".

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

Ministry of Science and Technology (MOST) launched a R&D program "Fuel cell power system for industrialization" in June, 2015. The total budget is 69.2 million RMB (10.8 million USD), in which government funding is 37.4 million RMB (5.9 million USD).

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Summary Country Update [November, 2015]: [China]

Transportation	Target Number	Current Status	Partnerships,Strategic Approach	Policy Support
Fuel Cell Vehicles[1]	No target		•	• Subsidy for purchase, 0.2M RMB ($31,300)
FC Bus	No target			• Subsidy for purchase, 0.5M RMB ($78,400)
Fuel Cell Trucks[2]	No target			Subsidy for purchase, 0.3M RMB ($47,000)
Forklifts	No target			•
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
70 MPaOn-Site Production	No target	0	•	• Subsidy for installation of a new hydrogen refueling station with 200kg H2 capacity , 4M RMB
70 MPa Delivered	No target	0	•	• Subsidy for installation of a new hydrogen refueling station with 200kg H2 capacity , 4M RMB
35 MPa On-Site Production	No target	1 stations in operation		• Subsidy for installation of a new hydrogen refueling station with 200kg H2 capacity , 4M RMB

[1] Includes Fuel Cell Electric Vehicles with Range Extenders
[2] As above

35 MPa Delivered	No target	2 stations in operation		Subsidy for installation of a new hydrogen refueling station with 200kg H2 capacity , 4M RMB
Stationary	**Target Number[3]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Small[4]				•
Medium[5]				
Large[6]				
District Grid[7]				•
Regional Grid[8]				
Telecom backup				
H_2 Production	**Target[9]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Fossil Fuels[10]			•	
Water Electrolysis[11]				

[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)
[9] Target can be by quantity (Nm^3, kg, t) and by percentage of total production;also, reference to efficiency capabilitiescan be a target
[10] Hydrogen produced by reforming processes
[11] Please indicate if targets relate to a specific technology (PEM, Alkiline, SOEC)

(PEM, Alkaline, SOEC)				
By-productH_2				
Energy Storage from Renewables	**Target[12]**	**Current Status**	**Partnership, Strategic Approach**	**Policy Support**
Power to Power[13] Capacity				
Power to Gas[14] Capacity				

[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 fortransportation, heating, electricity)