INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update May 2018: China

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1. New Initiatives on Hydrogen and Fuel Cell

1.1 National Level

On February 12, 2018, China's Ministry of Finance (MOF), Ministry of Industry and Information Technology (MIIT), Ministry of Science and Technology (MOST) and the National Development and Reform Commission (NDRC) released a notification on the adjustment of policy regarding government subsidies for new energy vehicles. Only vehicles on the "Recommended List of New Energy Vehicles Promotion and Application" can apply for government subsidies. The subsidy for fuel cell vehicle is not changed. (http://xxgk.miit.gov.cn/gdnps/wjfbContent.jsp?id=6064786)

On February 11, 2018, an interdisciplinary, cross-industry, interagency national alliance, the National Alliance of Hydrogen and Fuel Cell was founded in Beijing. China Energy Group was elected to be the first president unit. (http://www.xinhuanet.com/energy/2018-02/11/c_1122402144.htm)

1.2 Local Level

In January 2018, the Wuhan Municipal Government (Hubei Province) released its first development plan on hydrogen industry. From 2018 to 2020, Wuhan is set to build 5-20 hydrogen refuelling stations (HRSs) and deploy 2,000-3,000 vehicles, including fuel cell buses and logistics vehicles. It also expects to attract more than 100 enterprises related to the fuel cell vehicles (FCVs) industry, with the annual economic output reaching 10 billion yuan (US$1.6 billion). By 2025, the development plan expects 30-100 HRSs will be built and 10,000-30,000 FCVs will be on the streets. The annual economic output will reach 100 billion RMB (US$16 billion). (http://www.gov.cn/xinwen/2018-01/21/content_5259104.htm).

On February 9, 2018, the Shanghai Municipal Government released the "Implementation measures on encouraging the purchase and use of new energy vehicles". The measures increase the subsidies for FCVs and decrease the subsidies for plug-in hybrid vehicles (PHEVs). (http://www.shanghai.gov.cn/nw2/nw2314/nw2319/nw12344/u26aw55046.html).

On March 13, 2018, the Suzhou Municipal Government (Jiangsu Province) released a guidance document on the development of the hydrogen industry. It proposed to build 10 HRSs and launch 800 FCVs, with the annual economic output reaching 10 billion yuan (US$1.6 billion). By 2025, 40 HRSs will be built and 10,000 FCVs will be on the streets. The annual economic output should reach 50 billion RMB (US$ 8 billion). (http://www.fgw.suzhou.gov.cn/szfgw_new/InfoDetail/?InfoID=8d25cb14-1443-400f-9c5d-18af186ab20a&CategoryNum=025001).

2. Hydrogen and Fuel Cell R&D Update

2.1 Fundamental Research

On March 16, 2018, Shanghai Jiaotong University (Shanghai) announced that a research group from School of Materials Science and Engineering obtained important progress on the corrosion research of electro-catalyst for fuel cells. The results revealed the deactivation mechanism of catalysts. They can help better engineer high stability catalysts. The results were published in “Nanoscale Kinetics of Asymmetrical Corrosion in Core-shell Nanoparticles” on “Nature Communications” (DOI: 10.1038/s41467-018-03372-z).

2.2 Engineering Research

On January 23, 2018, Tongji University (Shanghai) announced that a national 863 project named “Development and demonstration of a 70 MPa HRS based on renewable energy system/hydrogen storage” successfully passed the acceptance of projects organized by the Ministry of Science and Technology (MOST). The group lead by Prof. Cunman Zhang established the first wind-solar hybrid power generation coupled with a 70MPa HRS (Tong-Xin HRS) in Dalian, China, realizing the independent development of key equipment for the 70 MPa HRS in China, thereby filling the domestic gap.

Fig. 1 Photo of Tong-Xin HRS

On March 13, 2018, Dalian Institute of Chemical Physics, Chinese Academy of Sciences (Dalian, Liaoning Province) announced that a vehicle fuel cell stack module developed by its shareholding company, SUNRISE POWER, broke through the 5,000 hours durability challenge, which was a first in China. At the same time, the module also achieved low temperature start-up of the stack at -10°C and storage at - 40°C.

3. Demonstration and Deployments Update

3.1 Demonstration

On January 10, 2018, six SAIC Roewe 950 FCVs started service during the 2018 China Electric Vehicles 100 VIP Conference. This demonstration operation is part of the UNDP/GEF III project.

On January 19, 2018, Shanghai Chemical Industry Park and SAIC Motor Group held a signing ceremony for their strategic cooperation framework agreement. The first batch of 20 SAIC MAXUS FCV80 vehicles began commercial operation in the Shanghai Chemical Zone.

3.2 Deployments

On March 27, 2018, the ground-breaking ceremony for the first domestic hydrogen/gasoline refuelling station was held in Yunfu High-Tech Industrial Development Zone, Guangdong Province, China. The HRS part is planned to satisfy a maximum of approximately 250 logistics vehicles and 100 buses per day. The gasoline station part is set to provide refuelling services for 700 cars per day. In addition, the co-station can also meet the needs of charging services for 300 small passenger car per day.

On January 11, 2018, 500 licensed fuel cell trucks produced by Dongfeng Special Vehicle started to provide intra-city deliveries of goods in Shanghai.

Fig. 2 The start of demonstration operation of FCVs for 2018 China Electric Vehicles 100 VIP Conference

Fig. 3 SAIC MAXUS FCVs

Fig. 4 Trucks equipped with fuel cell stacks

4. Events and Solicitations

On December 4-9, 2017, the 2nd Hydrogen Energy and Fuel Cell Industry Development Summit and ISO/TC197 Strategic Planning Meeting, the 1st International Hydrogen Energy and Fuel Cell Technology and Product Expo was held in Foshan, Guangdong Province, China. 3,000 delegates attended the Summit and Expo. 11 FCVs, including the Toyota Mirai and SAIC MAXUS FCV80, were exhibited.

On October 23-25th, 2018, the 3rd International Hydrogen Fuel Cell Vehicle Congress will be held in Rugao City, Jiangsu Province, China. This congress is organized by SAE-China and the International Hydrogen Fuel Cell Association. Further information will be provided later.

On December 13, 2017, The China-Korea Business Forum was held in Beijing, China. During the period, the Chinese Automobile Engineering Society signed a cooperation memorandum with the Korean Hydrogen Fusion Alliance (H2KOREA).

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

5 projects were approved by Ministry of Science and Technology (MOST) in 2017. Total subsidies from central finance is 216.67 million RMB (US$34.4 million). Key information is as follows:

No.	Project name	Lead agency	Funding (million RMB) (US$ million)	Duration (year)
1	Research on Fuel Cell Stack Process Modeling, Simulation, State Observation and Life Evaluation Methods	Xi'An Jiaotong University	18.32 (2.9)	4
2	Key Technology Research and Platform Development of High Power Fuel Cell Engine	China FAW Group Co., Ltd	84.67 (13.4)	4
3	Development of High Performance Long-life Fuel Cell Engine System	South China University of Technology	54.04 (8.6)	4
4	R&D of Fast Dynamic Response Fuel Cell Engine for Automotive	China Shipbuilding Industry Corporation No.712 Institute	45.97 (7.3)	4
5	Sino-German Fuel Cell Vehicle International Cooperation (Demonstration and Application)	Tongji University	13.67 (2.2)	4

6. Regulations, Codes & Standards Update

In 2017, 11 regulations about hydrogen fuel cells were published or revised, including:

Regulation	Name	Type
GB/T 33978-2017	Proton exchange membrane fuel cell modules for road vehicles	New
GB/T 33979-2017	Test methods for proton exchange membrane fuel cell power system at sub-zero environment	New
GB/T 20042.1-2017	Proton exchange membrane fuel cell - Part 1:terminology	Revise
GB/T 27748.1-2017	Stationary fuel cell power systems part 1: Safety	Revise
GB/T 27748.1-2017	Stationary fuel cell power system - Part 3: Installation	Revise
GB/T 27748.4-2017	Stationary fuel cell power systems - part 4 performance test methods for small fuel cell power systems	New
GB/T 23751.2-2017	Micro fuel cell power systems - Part 2：Performance test methods	Revise
GB/T 34872-2017	Technical requirements of hydrogen supply system for proton exchange membrane fuel cells	New

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Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Policy Support
Fuel Cell Cars[1]	5,000 by 2020	Approx. 60	FCV Technology Roadmap is released	Subsidy for purchase 0.2 million RMB (US$32,000)
Fuel Cell Buses	No national target	Approx. 150		Subsidy for purchase 0.3-0.5 million RMB (US$48,000-79,000)
Fuel Cell Trucks[2]	No national target	Approx. 500		Subsidy for purchase 0.3-0.5 million RMB (US$48,000-79,000)
Forklifts	No national target	2		No support policy
H_2 Refueling Stations	**Target Number**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
70 MPa On-Site Production	No national target	1		Subsidy for installation of a new hydrogen refueling station with 200kg H_2 capacity, 4 million RMB (US$0.63 million)
70 MPa Delivered	No national target	1		Same to above
35 MPa On-Site Production	No national target	1	Many cities proposed plans for building HRS (mainly 35 MPa HRSs), such as	Same to above

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

			Beijing, Shanghai, Wuhan, Foshan, Suzhou, Rugao, Yancheng, etc.	
35 MPa Delivered	No national target	7		Same to above
Stationary	**Target Number[3]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Small[4]	No target			
Medium[5]	No target			
Large[6]	No target	1		
District Grid[7]	No target			
Regional Grid[8]	No target			
Telecom backup	No target	Approx. 50 units		
H_2 Production	**Target[9]**	**Current Status**	**Partnerships, Strategic Approach**	**Policy Support**
Fossil Fuels[10]	No target			

[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 capabilities can be a target
[10] Hydrogen produced by reforming processes

Water Electrolysis[11] (PEM, Alkaline, SOEC)	No target			
By-product H_2	No target			
Energy Storage from Renewables	**Target[12]**	**Current Status**	**Partnership, Strategic Approach**	**Policy Support**
Power to Power[13] Capacity	No target			
Power to Gas[14] Capacity	No target			

[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)