INTERNATIONAL PARTNERSHIP FOR
HYDROGEN AND FUEL CELLS IN THE ECONOMY

IPHE Country Update April 2019: China

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

1.1 National level

On February 1st, the National Development and Reform Commission and Ministry of Commerce released “Catalogues on Encouraged Foreign Investment in Industry (draft for comments)”, for soliciting opinions. Following catalogues related to hydrogen and fuel cells were listed.

1) Production, storage, transportation, liquefaction of hydrogen fuel.
2) Manufacture of hydrogen energy preparation, storage and transportation equipment and inspection system.
3) Research and development of key components and key technologies for automobiles, including fuel cell system.
4) Manufacture of key components for clean energy vehicles, including fuel cell low platinum catalyst, composite membrane, membrane electrode assemblies, humidifier control valve, air compressor, hydrogen circulation pump, 70MPa hydrogen bottle, etc.
5) Manufacture of high technology green batteries, including fuel cells.
6) Construction and operation of hydrogen refuelling station.

http://www.gov.cn/xinwen/2019-02/02/content_5363271.htm (in Chinese)

On March 5th, 2019, the National Development and Reform Commission, Ministry of Industry and Information Technology, Ministry of Natural Resources, Ministry of Ecology and Environment, Ministry of Housing and Urban-Rural Development, the People’s Bank of China, and National Energy Administration released "Green Industry Guidance Catalogue (2019 Edition)", including the following catalogues related to hydrogen and fuel cells.

1.4.2 Manufacture of charging, power exchange and hydrogenation facility.
3.1.10 Manufacture of fuel cell equipment.
3.2.9 Construction and operation of facility for hydrogen energy utilization.
5.2.5 Construction and operation of charging, power exchange, hydrogenation and gas filling facilities.

http://www.ndrc.gov.cn/gzdt/201903/t20190305_930083.html (in Chinese)

On March 15th, 2019, the Second Session of the 13th National People's Congress ended. The “Report on the Work of the Government (revised edition)” after the review added the contents of "Promoting the construction of facilities for charging and hydrogenation."
http://www.gov.cn/premier/2019-03/16/content_5374314.htm (in Chinese)

1.2 Local level

On January 9th, 2019, the Zhejiang Provincial Government released “Zhejiang Automobile Industry High-Quality Development Action Plan (2019-2022)”. Its focus is on getting break-throughs on a number of key core technologies (including fuel cell power system platform and vehicle integration) and accelerating the development of the fuel cell vehicle industry supply chain.

On March 5th, 2019, the Hainan Provincial Government released "Hainan Clean Energy Vehicle Development Plan". It proposes to ban the sale of oil-fueled vehicle by 2030. The Plan identifies fuel cell vehicles as an important technical route for future development. http://www.hainan.gov.cn/hainan/szfwj/201903/51856f7e3b3d4fa6b4efc4a0ffdf98e8.shtml (in Chinese)

2. Hydrogen and Fuel Cell R&D Update

On January 31st, 2019, University of Science and Technology of China reported a conventional catalyst enabling complete and 100 per cent selective CO removal over the broad temperature range of 198 to 380 K. The results suggested that in addition to strategies that target oxide-supported precious-metal nanoparticles or isolated metal atoms, the deposition of isolated transition-metal complexes offers new ways of designing highly active metal catalysts. The results were published in the article "Atomically dispersed iron hydroxide anchored on Pt for preferential oxidation of CO in H_2" in "Nature" (DOI: https://doi.org/10.1038/s41586-018-0869-5)

3. Demonstration, Deployments, and Workforce Developments Update

In December 2018, several cities started demonstration operations of fuel cell public transportation buses. Key points of information are as follows:

Date	City	Province	Number	Bus Line
December 21st	Foshan	Guangdong	70	139, 143, 156
December 24th	Zhengzhou	Henan	20	727
December 31st	Yancheng	Jiangsu	10	K11

4. Events and Solicitations

Nothing new to report this period.

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

On March 15th, 2019, the Ministry of Science and Technology of China (MOST) announced 9 projects related to hydrogen and fuel cell, under the program of National Key Research and Development Plan "Renewable energy and hydrogen energy technology" Key Special Projects. The Announcement is open for query until March 19th, 2019. Key points of information are as follows:.

No.	Project name	Lead agency	Funding (million RMB) (US$ million)	Duration (year)
1	Basic research on solar energy full-spectrum photothermal coupling decomposition of water to produce hydrogen	Xi'an Jiaotong University	11.92 (1.77)	4
2	Key basic research on high-density hydrogen storage materials and	South China University of Technology	15.75 (2.34)	3

	energy-efficient hydrogen storage systems			
3	Study on Degradation Mechanism and Life Extension Strategy of High Efficient Solid Oxide Fuel Cells	Tsinghua University	8.86 (1.32)	4
4	Novel fuel cell research based on low cost material system	Wuhan University	9.35 (1.38)	4
5	MW-class solid polymer electrolyte electrolysis water hydrogen production technology	Changchun Institute of Applied Chemistry, Chinese Academy of Sciences	17.59 (2.61)	3
6	Proton exchange membrane fuel cell stack reliability, durability and manufacturing engineering technology	Tongji University	28.62 (4.25)	4
7	Solid oxide fuel cell stack engineering development	Chaozhou Three-Circle (Group) Co.,Ltd.	27.69 (4.11)	4
8	Test technology development and prototype engineering application of 100-kilowatt fuel cell stack and auxiliary system components	China Automotive Engineering Research Institute Co. Ltd.	8.65 (1.29)	3
9	Research and demonstration of key technologies for large-scale wind/light complementary hydrogen production	China Energy Group	26.18 (3.89)	3

6. Regulations, Codes & Standards, and Safety Update

On December 28th, 2018, the State Administration for Market Regulation and the Standardization Administration of the People's Republic of China (SAC) released information listed as follows:

Implementation date	Regulation	Name
Jul. 1st 2019	GB/T 37154-2018	Fuel cell vehicle Vehicle hydrogen emission test method
Jul. 1st 2019	GB/T 37244-2018	Proton exchange membrane fuel cell vehicle fuel hydrogen
Jan. 1st 2020	GB/T 26779-2011	Fuel cell vehicle hydrogenation port "No. 1 Amendment"

Summary Country Update April 2019: China

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles[1]	10,000 by 2020	Approx. 830	FCV Technology Roadmap is released	
FC Car		Approx. 60		Subsidy for purchase 0.2 million RMB (US$32,000)
FC Bus		Approx. 270		Subsidy for purchase 0.3-0.5 million RMB (US$48,000-79,000)
Fuel Cell Trucks[2]		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**	**Support Mechanism**
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

[1] Includes Fuel Cell Electric Vehicles with Range Extenders

[2] As above

35 MPa On-Site Production	No national target	1		Same to above
35 MPa Delivered	No national target	8	Many cities proposed plans for building HRS (mainly 35 MPa HRSs), such as Beijing, Shanghai, Wuhan, Foshan, Suzhou, Rugao, Yancheng, etc.	Same to above
Stationary	**Target Number[3]**	**Current Status**	**Partnerships, Strategic Approach**	**Support Mechanism**
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**	**Support Mechanism**

[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

Fossil Fuels[10]	No target			
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**	**Support Mechanism**
Power to Power[13] Capacity	No target			
Power to Gas[14] Capacity	No target	1 (100kW)		

[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)