



## INTERNATIONAL PARTNERSHIP FOR HYDROGEN AND FUEL CELLS IN THE ECONOMY

### IPHE Country Update April 2022: China

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

(1) On March 28, 2022, the Ministry of Industry and Information Technology, the National Development and Reform Commission, the Ministry of Science and Technology, the Ministry of Ecology and Environment, the Ministry of Emergency Management, and the National Energy Administration jointly issued the **"Guiding Opinions on Promoting the High-quality Development of the Petrochemical and Chemical Industry during the 14th Five-Year Plan"**. It mentions:

- Accelerate breakthroughs in key technologies such as the large-scale application of "green hydrogen".
- Moderately increase the proportion of hydrogen-rich raw materials. Encourage petrochemical and chemical enterprises to develop and utilize "green hydrogen" in a reasonable and orderly manner according to local conditions, and promote the coupling demonstration of refining, coal chemical industry and "green power", "green hydrogen" and other industries.
- Moderately increase the import of light, low-carbon and hydrogen-rich raw materials.

[http://www.gov.cn/zhengce/zhengceku/2022-04/08/content\\_5683972.htm](http://www.gov.cn/zhengce/zhengceku/2022-04/08/content_5683972.htm) (in Chinese)

(2) On March 23, 2022, the National Development and Reform Commission and the National Energy Administration jointly issued the **"Mid- and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)"**. The major points are listed as follow:

- **The "Plan" clarifies the energy attribute of hydrogen, which is an integral part of the future national energy system.** It will give full play to the clean and low-carbon characteristics of hydrogen energy, and promote the green and low-carbon transformation of energy-consuming terminals such as transportation and industry, as well as high-energy-consuming and high-emission industries. At the same time, it is clear that hydrogen energy is the key direction of strategic emerging industries, and it is a new growth point for building a green and low-carbon industrial system and creating industrial transformation and upgrading.
- **The "Plan" puts forward the basic principles for the development of the hydrogen energy industry:**
  - **First, innovation leads, self-reliance and self-improvement.** Actively promote innovation in technology, products, applications and business models, focus on breaking through the technical bottlenecks of the hydrogen energy industry, and enhance the stability and competitiveness of the industrial chain and supply chain.
  - **Second, safety first, clean and low-carbon.** Strengthen the prevention and control of major risks in the entire hydrogen energy industry chain; build a clean, low-carbon, and low-cost diversified hydrogen production system, focus on the development of renewable energy hydrogen production, and strictly control fossil energy hydrogen production.
  - **Third, market-oriented and government-led.** Give play to the decisive role of the market in resource allocation, and explore the commercialization path of hydrogen



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energy utilization; better play the role of the government and guide the standardized development of the industry.

- **Fourth, apply it prudently and demonstrate first.** Overall consideration should be given to hydrogen energy supply capacity, industrial base, market space and technological innovation level, and to actively and orderly carry out hydrogen energy technology innovation and industrial application demonstrations to avoid blind layout and swarming in some places.
- **The "Plan" puts forward the goals of each stage of the development of the hydrogen energy industry:** by 2025, the core technology and manufacturing process will be basically mastered, the number of fuel cell vehicles will be about 50,000, a number of hydrogen refueling stations will be deployed, and the hydrogen production from renewable energy will reach 100,000 - 200,000 tons/year, and carbon dioxide emission reduction of 1-2 million tons/year. By 2030, a relatively complete hydrogen energy industry technology innovation system, clean energy hydrogen production and supply system will be formed, which will strongly support the realization of the carbon peaking goal. By 2035, a diversified application ecology of hydrogen energy will be formed, and the proportion of hydrogen production from renewable energy in terminal energy consumption will increase significantly.
- **The "Plan" deploys important measures to promote the high-quality development of the hydrogen energy industry:**
  - **The first is to systematically build an innovation system for the hydrogen energy industry.** Focus on key areas and key links, strive to build an industrial innovation support platform, continue to improve core technical capabilities, and promote the construction of professional talent teams.
  - **The second is to coordinate the construction of hydrogen energy infrastructure.** Deploy hydrogen production facilities according to local conditions, and steadily build a storage and transportation system and hydrogen refueling network.
  - **The third is to promote the diversified application of hydrogen energy in an orderly manner,** including transportation, industry and other fields, and explore the formation of a commercial development path.
  - **The fourth is to establish and improve the hydrogen energy policy and institutional guarantee system, improve the hydrogen energy industry standards, and strengthen the safety supervision of the whole chain.**

[http://www.gov.cn/xinwen/2022-03/24/content\\_5680975.htm](http://www.gov.cn/xinwen/2022-03/24/content_5680975.htm) (in Chinese)

(3) On March 22, 2022, the National Development and Reform Commission and the National Energy Administration jointly issued the "**14th Five-Year Plan for Modern Energy System**". Hydrogen energy is mentioned several times in the whole plan. It mentions:

- New energy storage and hydrogen energy are expected to develop on a large scale and drive fundamental changes in the form of the energy system.
- Safe and efficient energy storage and hydrogen energy technology innovation capabilities are significantly improved.
- Establish and improve construction standards for electrochemical energy storage and hydrogen energy, strengthen key supervision, improve product intrinsic safety and emergency response capabilities.
- Strengthen the research on cutting-edge technologies such as energy storage and hydrogen energy. Deploy a batch of hydrogen energy projects in a moderately advanced stage, focus on conquering core technologies such as renewable energy hydrogen production, hydrogen energy storage and transportation, application, and fuel cells, strive to achieve breakthroughs in key technologies in the entire hydrogen energy industry



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chain, and promote the development and demonstration applications of hydrogen energy technology.

- Key technology research and diversified demonstration applications on high-efficiency renewable energy hydrogen production, storage and transportation, application, and fuel cells. Demonstration and application of hydrogen energy in scenarios such as renewable energy consumption and power grid peak regulation. Demonstration of interconnection and interoperability of heterogeneous energy sources such as hydrogen energy, electric energy, and thermal energy.
- Strengthen pragmatic cooperation with relevant countries in advanced energy technologies and solutions, focusing on hydrogen energy and other advanced technologies.

[https://www.ndrc.gov.cn/xwdt/tzgg/202203/t20220322\\_1320017.html?code=&state=123](https://www.ndrc.gov.cn/xwdt/tzgg/202203/t20220322_1320017.html?code=&state=123) (in Chinese)

**(4)** On March 18, 2022, the Ministry of Industry and Information Technology issued the "**Key Points of Automotive Standardization in 2022**". It mentions:

- Revise the post-collision safety requirements for fuel cell electric vehicles. Comprehensively promote the research on vehicle standards such as fuel cell electric vehicle energy consumption and driving range, low-temperature starting performance, dynamic performance test methods, and other key system component standards such as fuel cell engine performance test methods and on-board hydrogen system technical conditions, and support fuel cell electric vehicles. R&D, application and demonstration operation of key technologies.
- Strengthen the coordination of the formulation of global technical regulations. Lead the planning and development of key regulatory projects such as hydrogen fuel cell vehicle safety.
- Focus on promoting the establishment of international standards such as low-temperature cold start and maximum speed of fuel cell vehicles.

[https://www.miit.gov.cn/jgsj/zbys/gzdt/art/2022/art\\_a88fe3f3b5834c098e989de11ce21fe8.html](https://www.miit.gov.cn/jgsj/zbys/gzdt/art/2022/art_a88fe3f3b5834c098e989de11ce21fe8.html) (in Chinese)

**(5)** On March 3, 2022, the Ministry of Science and Technology, the Ministry of Education, the Ministry of Industry and Information Technology, the Ministry of Natural Resources, the Ministry of Ecology and Environment, The State-owned Assets Supervision and Administration Commission of the State Council, the Chinese Academy of Sciences, the Chinese Academy of Engineering and the China Association for Science and Technology jointly issued "**14th Five-Year Implementation Plan for East-West Science and Technology Cooperation**". It mentions:

- Technology supports key industries in Ningxia Hui Autonomous Region to improve quality and efficiency. Jointly build R&D pilot test and achievement transformation platforms in the fields of photovoltaic manufacturing, hydrogen energy production, energy storage, energy saving and carbon reduction, etc.
- Science and technology promote the green transformation of energy resources in Inner Mongolia Autonomous Region. Jointly carry out the development of large-scale energy storage, hydrogen energy, smart grid and other clean energy technologies and the transformation and application of achievements.

[http://www.most.gov.cn/xxgk/xinxifenlei/fdzdgnr/fqzc/gfxwj/gfxwj2022/202203/t20220304\\_179644.html](http://www.most.gov.cn/xxgk/xinxifenlei/fdzdgnr/fqzc/gfxwj/gfxwj2022/202203/t20220304_179644.html) (in Chinese)

**(6)** On February 17, 2022, the Standardization Administration issued "**Key points of national standardization work in 2022**". It mentions:

- Develop urgent need standards in new energy vehicles and other fields.



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Intensify efforts to develop standards in fields such as hydrogen energy.

<http://www.sac.gov.cn/sxxgk/zcwj/202202/P020220217365230098593.pdf> (in Chinese)

(7) On February 10, 2022, the National Development and Reform Commission and the National Energy Administration jointly issued “**Opinions on Improving the Institutional Mechanism and Policy Measures for Energy Green and Low-Carbon Transformation**”. It mentions:

- Promote large-capacity electrified public transportation and clean energy transportation vehicles such as hydrogen energy, improve the layout and service facilities of hydrogen refueling stations, etc., and reduce the energy cost of clean energy in the transportation sector.
- Explore high-efficiency hydrogen transportation methods such as hydrogen-mixed transportation in gas pipelines, pure hydrogen pipeline transportation, and liquid hydrogen transportation. Encourage traditional oil stations and gas stations to build oil, gas, electricity, and hydrogen integrated transportation and energy service stations.
- Explore the establishment of a hydrogen energy production, supply, storage and marketing system.
- Relying on cooperation platforms such as China-Arab League, China-AU, China-ASEAN, China-Central and Eastern Europe, and the Asia-Pacific Economic Cooperation (APEC) Sustainable Energy Center, continue to support the cooperative training of technical talents related to clean and low-carbon energy such as renewable energy, electricity, nuclear power, and hydrogen energy, and carry out capacity building, policy, planning, standard docking, and talent exchange.
- Accelerate the research, formulation and revision of technical standards and safety standards in the fields of hydrogen energy and others.

[https://www.ndrc.gov.cn/xxgk/zcfb/tz/202202/t20220210\\_1314511\\_ext.html](https://www.ndrc.gov.cn/xxgk/zcfb/tz/202202/t20220210_1314511_ext.html) (in Chinese)

(8) On January 29, 2022, the National Development and Reform Commission and the National Energy Administration jointly issued the “**14th Five-Year New Energy Storage Development Implementation Plan**”. It mentions:

- By 2025, breakthroughs will be made in long-term-scale energy storage technologies such as hydrogen energy storage.
- Carry out research on key core technologies, equipment and integrated optimization design such as hydrogen (ammonia) energy storage.
- Carry out pilot demonstrations of classification of different technical routes. Expand the application fields of hydrogen (ammonia) energy storage, etc., carry out pilot demonstrations such as hydrogen (ammonia) energy storage relying on renewable energy to produce hydrogen (ammonia).
- Promote pilot demonstrations of new energy storage technologies on multiple time scales. Focus on pilot demonstration of day-to-week and week-to-quarter time scale energy storage technologies, as well as longer-term energy storage technologies such as hydrogen production and ammonia production from renewable energy, to meet the needs of multi-time scale applications.
- Innovative development of new energy storage in Zhangjiakou Renewable Energy Demonstration Zone. Explore energy storage development models that integrate sources, networks, load storage, and multi-energy complementarity, such as wind-solar hydrogen storage, wind-solar-fired storage, etc.
- Explore the use of renewable energy to produce hydrogen, and support large-scale new energy delivery.
- Expand the application of various energy storage forms. Combined with the resource conditions of various regions and the demand for different forms of energy, promote the construction of new energy storage projects such as hydrogen energy storage, etc..



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[http://zfxqk.nea.gov.cn/2022-01/29/c\\_1310523208.htm](http://zfxqk.nea.gov.cn/2022-01/29/c_1310523208.htm) (in Chinese)

(9) On January 21, 2022, the Ministry of Transport issued the "**14th Five-Year Development Plan for Green Transportation**". It mentions:

- Encourage the pilot application of hydrogen fuel cell vehicles.
- Actively explore the application of oil-electric hybrid, hydrogen fuel, ammonia fuel and methanol-powered ships.
- Support the application research of hydrogen fuel powered vehicles and ships, etc.
- In terms of energy saving and carbon reduction, formulate and revise standards such as technical requirements for new energy and fuel cell operating vehicles.

[http://www.gov.cn/zhengce/zhengceku/2022-01/21/content\\_5669662.htm](http://www.gov.cn/zhengce/zhengceku/2022-01/21/content_5669662.htm) (in Chinese)

(10) On January 21, 2022, the National Development and Reform Commission, the Ministry of Industry and Information Technology, the Ministry of Housing and Urban-Rural Development, the Ministry of Commerce, the State Administration for Market Regulation, the National Government Offices Administration, and the Directly Affiliated Agency Administration of the Communist Party of China, jointly issued the "**Implementation Plan for Promoting Green Consumption**". It mentions:

- Strengthen the construction of supporting infrastructure such as charging and swapping, new energy storage, hydrogen refueling, etc.
- Demonstration applications of fuel cell vehicles shall be carried out in an orderly manner.

[http://www.gov.cn/zhengce/zhengceku/2022-01/21/content\\_5669785.htm](http://www.gov.cn/zhengce/zhengceku/2022-01/21/content_5669785.htm) (in Chinese)

(11) On December 31, 2021, the Ministry of Industry and Information Technology, the Ministry of Housing and Urban-Rural Development, the Ministry of Transport, the Ministry of Agriculture and the National Energy Administration jointly issued the "**Smart Photovoltaic Industry Innovation and Development Action Plan (2021-2025)**". It mentions:

- Support the construction of pilot demonstration projects such as smart photovoltaic hydrogen production, accelerate the research on hydrogen production system and photovoltaic coupling technology.
- Support the construction of a number of photovoltaic energy storage, photovoltaic hydrogen production, photovoltaic DC and other system verification platforms, and strengthen horizontal and vertical integration in multiple fields.

[http://www.gov.cn/zhengce/zhengceku/2022-01/05/content\\_5666484.htm](http://www.gov.cn/zhengce/zhengceku/2022-01/05/content_5666484.htm) (in Chinese)

(12) On December 30, 2021, the State-owned Assets Supervision and Administration Commission of the State Council compiled and issued the "**Guiding Opinions on Promoting the High-quality Development of Central Enterprises and Doing a Good Job in Carbon Neutralization**". It mentions:

- Encourage traditional gas stations and gas stations to build oil, gas, electricity, and hydrogen integrated transportation and energy service stations.
- Steadily build a hydrogen energy industry system, improve the integrated layout of hydrogen energy production, storage, transmission and use, and actively deploy industrial chain demonstration projects in combination with typical energy use scenarios in industry, transportation and other fields.
- In depth carry out research on key technologies such as green hydrogen energy. Strengthen the demonstration, verification and large-scale application of green hydrogen energy.

<http://www.sasac.gov.cn/n2588035/n16549643/n16549900/n16550143/c22499825/content.html> (in Chinese)



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(13) On December 28, 2021, the Ministry of Finance, the Ministry of Industry and Information Technology, the Ministry of Science and Technology, the National Development and Reform Commission, and the National Energy Administration jointly issued the "**Notice on Starting a New Batch of Demonstration Application Work for Fuel Cell Vehicles**". Henan Province and Hebei Province were approved to be the fuel cell vehicle demonstration city clusters, after Beijing-Tianjin-Hebei, Shanghai, and Guangdong.

(14) On December 14, 2021, the National Railway Administration issued the "**14th Five-Year Plan for Railway Science and Technology Innovation**". It mentions:

- Develop multi-source power systems for trains, deepen research on innovative traction power supply technologies such as energy storage equipment and fuel cells, and promote the development of power sources to hybrid power and low-carbon power.

[http://www.gov.cn/zhengce/zhengceku/2021-12/24/content\\_5664357.htm](http://www.gov.cn/zhengce/zhengceku/2021-12/24/content_5664357.htm) (in Chinese)

(15) On November 15, 2021, the Ministry of Industry and Information Technology issued the "**14th Five-Year Plan for Industrial Green Development**". It mentions:

- Accelerate hydrogen energy technology innovation and infrastructure construction, and promote the diversified utilization of hydrogen energy.
- Give full play to the demonstration and leading role of central enterprises and large enterprise groups, in major carbon emission industries, as well as green hydrogen and renewable energy applications, new energy storage, carbon capture, utilization and storage, etc., implement a number of major projects with outstanding carbon reduction effects and strong driving force.
- Encourage the application of alternative energy sources such as hydrogen energy in the steel, cement, chemical and other industries.
- Carry out basic research on green hydrogen development and utilization

[http://www.gov.cn/zhengce/zhengceku/2021-12/03/content\\_5655701.htm](http://www.gov.cn/zhengce/zhengceku/2021-12/03/content_5655701.htm) (in Chinese)

(16) On November 2, 2021, the Ministry of Transport issued the "**14th Five-Year Development Plan for Integrated Transportation Services**". It mentions:

- Actively promote the application of new energy and clean energy vehicles and ships in the field of transportation services, increase policy support for operations, traffic, parking, and charging. Accelerate the planning, layout and construction of infrastructure such as hydrogen refueling, etc.

[http://www.gov.cn/zhengce/zhengceku/2021-11/18/content\\_5651656.htm](http://www.gov.cn/zhengce/zhengceku/2021-11/18/content_5651656.htm) (in Chinese)

(17) On November 2, 2021, the "**Opinions of the Central Committee of the Communist Party of China and the State Council on Deepening the Battle of Pollution Prevention and Control**" was released. It mentions:

- Promote the demonstration application of hydrogen fuel cell vehicles.

[http://www.gov.cn/zhengce/2021-11/07/content\\_5649656.htm](http://www.gov.cn/zhengce/2021-11/07/content_5649656.htm) (in Chinese)

## 2. Hydrogen and Fuel Cell R&D Update

(1) On December 2, 2021, the research group from Xiamen University, in cooperation with the group from Peking University Shenzhen Graduate School, revealed the molecular structure of interfacial water using electrochemical *in situ* Raman spectroscopy, and solved how the molecular structure of interfacial water regulates the electrocatalytic reaction, a scientific research problem. It provides a new strategy for improving the electrocatalytic reaction rate and further guiding green hydrogen production. The result was published on "Nature".

<https://www.nature.com/articles/s41586-021-04068-z>



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(2) On November 3, the results of the 2020 National Science and Technology Award have been announced. According to the "Regulations on National Science and Technology Awards", after being reviewed by the National Science and Technology Awards Review Committee, reviewed by the National Science and Technology Awards Committee, reviewed by the Ministry of Science and Technology, and approved by the State Council, 157 projects were awarded the **National Science and Technology Progress Award**. The project "**Key Technologies and Engineering Applications of Hydrogen Scale Purification and High-Pressure Storage Equipment**" won the second prize (totally 137 projects). The hydrogen project was completed by Zhejiang University, Hefei General Machinery Research Institute Co., Ltd., Southwest Institute of Chemical Co., Ltd., China National Institute of Standardization, Hydrosys (Beijing) Technology Co., Ltd., Zhejiang Juhua Equipment Manufacturing Co., Ltd., and Shenyang Gas Cylinder Safety Technology Co., Ltd. [http://www.ncsti.gov.cn/kjdt/xwjj/202111/t20211103\\_50428.html](http://www.ncsti.gov.cn/kjdt/xwjj/202111/t20211103_50428.html) (in Chinese)

### 3. Demonstration, Deployments, and Workforce Developments Update

(1) According to data from the China Association of Automobile Manufacturers, the national fuel cell vehicle production and sales data in 2021 are 1,777 and 1,586, respectively, an increase of 48.2% and 34.7% year-on-year (the production and sales data in 2020 are 1,199 and 1,177). From 2015 to 2021, the cumulative production and sales of fuel cell vehicles nationwide are 9,237 and 8,938, respectively.

(2) Liu Yafang, deputy director of the Science and Technology Department of the National Energy Administration, revealed at the "China International Economic Exchange Center-United Nations Development Program Hydrogen Energy Industry Summit Forum" that China has built more than 250 hydrogen refueling stations.

(3) From February 4 to 20, 2022, 2022 Beijing Winter Olympics was held in Beijing and Zhangjiakou.

"Green hydrogen" was used as fuel for the Olympics torch for the first time.

During the Beijing Winter Olympics, 1025 hydrogen energy vehicles were demonstrated and operated. In addition, more than 30 hydrogen refueling stations were equipped.

(4) On January 6, 2022, the Shandong Provincial Department of Science and Technology held a press conference to introduce the relevant situation of the "**Hydrogen into 10,000 Homes**" technology demonstration project. Through demonstrations, 29 special policies for the hydrogen energy industry have been issued, 2 national standards, 9 local standards, and 2 group standards for the hydrogen energy industry have been prepared and released, 22 hydrogen refueling stations have been built, 848 fuel cell vehicles have been promoted, more than 30 dedicated fuel cell bus lines have been opened, and the first domestic fuel cell intelligent snow wax car has been developed.

(5) On December 26, 2021, the **Beijing-Tianjin-Hebei fuel cell vehicle demonstration city cluster** was officially launched. The meeting released several files including "Implementation Plan for the Beijing-Tianjin-Hebei Fuel Cell Vehicle Demonstration City Cluster (Abridged)", "Annual Task Plan for the Beijing-Tianjin-Hebei Fuel Cell Vehicle Demonstration City Cluster" and "Working Mechanism for the Beijing-Tianjin-Hebei Fuel Cell Vehicle Demonstration City Cluster", etc..

(6) On December 22, 2021, a large-scale "**hydrogen energy bicycle system**" was officially put into operation in Changzhou City, Jiang Su Province. The system is organically



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integrated with Changzhou's urban public bicycles and shared electric bicycle systems. It can store 0.5 m<sup>3</sup> of hydrogen for a range of 70 km and has a maximum speed of 23 km/h, and the manual hydrogen exchange only takes 5 seconds to be completed.

(7) On December 8, 2021, the **Guangdong fuel cell vehicle demonstration city cluster** was officially launched.

### 4. Events and Solicitations

(1) On April 8, 2022, the "China International Economic Exchange Center-United Nations Development Programme Hydrogen Energy Industry Summit Forum" was held in a combination of online and offline methods. The forum carried out in-depth discussions on the "Mid- and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)" jointly issued by the National Development and Reform Commission and the National Energy Administration, as well as the topic of international cooperation in hydrogen energy. Wan Gang, vice chairman of the 13th National Committee of the Chinese People's Political Consultative Conference and chairman of the China Association for Science and Technology, attended the forum and delivered a keynote speech. UNDP Administrator Achim Steiner, former Japanese Prime Minister Yukio Hatoyama, South Korean Congressman Kim Jinpyo, and Foshan Mayor Bai Tao delivered speeches via video. Zhang Xiaoqiang, executive vice chairman and director of the executive bureau of China International Economic Exchange Center, Beate Trankmann, representative of the United Nations Development Program in China, and relevant responsible comrades of the National Development and Reform Commission and the National Energy Administration delivered speeches on the medium and long-term development of hydrogen energy.

(2) On December 8, 2021, the 2021 UNDP Hydrogen Energy Industry Conference was held in Foshan City, Guangdong Province. Noé van Hulst, chair of IPHE, and Beate Trankmann, representative of the United Nations Development Program in China and other speakers were invited to give a talk.

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

(1) On March 15, 2022, the National Natural Science Foundation of China issued the "Special Project Guide for Basic Research on Ammonia-Hydrogen Fusion Zero-Carbon Power System for Heavy-Duty Vehicles". The special project will carry out multidisciplinary research on the core scientific issues of ammonia-hydrogen fusion fuel for heavy-duty vehicles and its high efficiency and near-zero emissions. The funding period is 5 years, and one project is planned to be funded with a direct cost of 15 million CNY ( $\approx$  2.34 million USD).

(2) On March 2, 2022, the Ministry of Industry and Information Technology announced the subsidy funds for the promotion and application of new energy vehicles in 2019-2020. A total of 12 car companies submitted subsidies for 1,140 fuel cell vehicles (1,029 vehicles passed expert review), with a total subsidy amount of 438.24 million CNY ( $\approx$  68.37 million USD).

### 6. Regulations, Codes & Standards, and Safety Update

(1) On November 1, 2021, three national standards for liquid hydrogen were formally implemented.

GB/T40045-2021	Liquid Hydrogen Fuel for Hydrogen Energy Vehicles
GB/T40060-2021	Technical Requirements for Liquid Hydrogen Storage and Transportation



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GB/T40061-2021	Technical Specifications for Liquid Hydrogen Production Systems
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(2) On March 7, 2022, the Maritime Safety Administration issued the “**Interim Regulations on Technology and Inspection of Hydrogen Fuel Cell Powered Vessels (2022)**”.



## Summary Country Update April 2022: China

Transportation	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
Fuel Cell Vehicles <sup>1</sup> (including Car, Bus, and Truck)	50,000 by 2025	As of Dec. 2021 9237 (production) 8938 (sale)	Mid- and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)	Subsidy for purchase <ul style="list-style-type: none"> <li>• 0.2M CNY (28K USD) for car</li> <li>• 0.3M or 0.5M CNY (42K USD or 70K USD) for bus and truck</li> </ul>
Forklifts	No target			• No support policy
H <sub>2</sub> Refueling Stations	Target Number	Current Status	Partnerships, Strategic Approach	Support Mechanism
H <sub>2</sub> Refueling Stations (including 35 MPa and 70 MPa)	No target	As of Apr. 2022 more than 250		Depend on local policy, no more than 5M CNY (0.78M USD)
Stationary	Target Number <sup>2</sup>	Current Status	Partnerships, Strategic Approach	Support Mechanism
Small <sup>3</sup>	No target			
Medium <sup>4</sup>	No target			

<sup>1</sup> Includes Fuel Cell Electric Vehicles with Range Extenders

<sup>2</sup> Targets can be units installed and/or total installed capacity in the size range indicated

<sup>3</sup> <5 kW (e.g., Residential Use)

<sup>4</sup> 5kW – 400 kW (e.g., Distributed Residential Use)



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Large <sup>5</sup>	No target			
District Grid <sup>6</sup>	No target			
Regional Grid <sup>7</sup>	No target			
Telecom backup	No target			
<b>H<sub>2</sub> Production</b>	<b>Target<sup>8</sup></b>	<b>Current Status</b>	<b>Partnerships, Strategic Approach</b>	<b>Support Mechanism</b>
Fossil Fuels <sup>9</sup>	No target			
Water Electrolysis <sup>10</sup> (PEM, Alkaline, SOEC)	0.1~0.2 Mt/y by 2025		Mid- and Long-Term Plan for the Development of Hydrogen Energy Industry (2021-2035)	
By-product H <sub>2</sub>	No target			
<b>Energy Storage from Renewables</b>	<b>Target<sup>11</sup></b>	<b>Current Status</b>	<b>Partnership, Strategic Approach</b>	<b>Support Mechanism</b>

<sup>5</sup> 0.3MW – 10 MW (e.g., Industrial Use)

<sup>6</sup> 1MW – 30 MW (e.g., Grid Stability, Ancillary Services)

<sup>7</sup> 30MW plus (e.g., Grid Storage and Systems Management)

<sup>8</sup> Target can be by quantity (Nm<sup>3</sup>, kg, t) and by percentage of total production; also, reference to efficiency capabilities can be a target

<sup>9</sup> Hydrogen produced by reforming processes

<sup>10</sup> Please indicate if targets relate to a specific technology (PEM, Alkaline, SOEC)

<sup>11</sup> Can be expressed in MW of Installed Capacity to use the electricity from renewable energy generation, and Annual MWh of stored energy capacity



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Installed Electrolyser Capacity	No target			
Power to Power <sup>12</sup> Capacity	No target			
Power to Gas <sup>13</sup> Capacity	No target			

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<sup>12</sup> Operator has an obligation to return the electricity stored through the use of hydrogen back to electricity

<sup>13</sup> 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)