International Partnership for Hydrogen and Fuel Cells in the Economy

Japan Update

40th IPHE Steering Committee Meeting

4 – 5 October 2023

Washington DC, United States

Announcements / New Initiatives *Japan*

Policies/Initiatives

May

- **"Green Transformation Promotion Act " enacted**
  - **Identify "green" industry areas to invest (hydrogen, renewables, battery, grid, energy efficiency, ….)**
  - **Aim to induce public – private investment.**
  - **"GX Promotion Bond" in the size of JPY20 tril (circa. USD150bn) in 10 years to be issued**

June

- **"Basic Hydrogen Strategy" updated**
  - **First update since originally issued in 2018**
  - **2040 volume target**
  - **Basic concept of support schemes**

Highlight of the 2023 Strategy

Overview

- To introduce hydrogen having well regard to the **S+3E** principles (**S**afety, **E**nergy security, **E**conomic efficiency, **E**nvironmental compatibility) and industry competitiveness.
- The scope of strategy includes hydrogen and its derivatives such as ammonia, synthetic methane, synthetic fuels, etc., taking into consideration of the challenges and timelines surrounding these products.

Basic Strategy

Expanding Supply

(a) A new volume target at **12 Mt/p.a. by 2040**.
(b) Leading to low-carbon hydrogen by introducing:
① **carbon intensity-based criteria**, not "colour" based;
② guiding regulatory requirements.
(c) Promote domestic production and supply chain. Target share of electrolysers (domestic and overseas) that involve **Japanese element (including parts and materials) by 2030 is set around at 15GW**.
(d) Strengthen relationships with exporting countries, develop transportation technologies and expand financing capabilities.

Creating Demand

(a) **Power generation**
A wide range of use in power sector, including co-firing and single-firing.
(b) **Fuel cells**
Deploy FC stack technology in a variety of applications such as commercial vehicles, rolling stocks, vessels, heavy-duties, agri machinery as well as use for decarbonising ports and airports.
(c) **Industrial use**
Heat use such as boilers and other equipment in the hard-to-abate factories. Develop technologies to utilise as raw material in the fields of steel and chemicals.
(d) **Home use**
Promote high performance and low-cost residential FC.

To introduce various support schemes with a view to setting up large-scale, resilient supply chains:
a. Producer support scheme (price gap subsidy)
b. Cluster development support

Others:
①Promote regional use and consumption and engage local governments ②Assist innovative R&D
③Cross-border cooperation for standardisation and other activities ④Raise public awareness and acceptance

Highlight (continued)

For a competitive hydrogen industry

- Leverage Japan's strength in the technology in order to compete in the global market.
- Aim to achieve ①decarbonization ②energy security ③economic growth, at the same time.

	Production	Transport	Use
Current	・Competitive in electrolysis membranes, catalysts, next generation electrolysis systems. ・Leading large-scale demonstration electrolyser projects, but less competitive in forming and installing large-scale projects. ・Licenses for ammonia production are held by limited number of non-Japanese companies.	・Succeeded in the world's first maritime transport of hydrogen by way of LH2 and MCH ・Players as producer are limited. Need to expand domestic production facilities and human resources. ・Need to promote: use of ammonia as a carrier; introduction of carrying vessel; establishing supply infra	・Strong in technology and quality of FC and hydrogen/ammonia power generation technologies. Accelerated introduction of household FC. ・World's first heat use at industrial factory. ・Large demand expected in steel and chemical industry. ・Competitive in carbon recycling.
Direction	・Consider government support to expand production facilities for electrolysis and materials. ・Form large-scale projects in Japan and/or in abroad. ・Develop innovative technologies so as to reduce the use of rare metals. ・Development and demonstration of efficient ammonia synthesis technology in Japan.	・Support schemes: price gap subsidy and cluster development support ・Establish supply base for carrying vessel ・Standardization of quality of hydrogen and its derivatives	・Focus on support to introduce FC in commercial vehicles and machinery and equipment at ports and airports ・Establish co-firing and single-firing technology in power generation and market them globally. ・Establish technologies of hydrogen reduction steelmaking, decarbonized chemical products and market them globally. ・Utilize fuel use in marine and industrial fields

Safety Issues

- Develop a hydrogen safety strategy for large-scale hydrogen use, rationalize and refine the relevant laws and regulations to cover the whole supply chain.

①Obtain scientific data to support the hydrogen safety ②Sharing data and knowledge in the common areas
③Develop a seamless security environment by applying technical standards in a uniformed way
④Use of third-party organizations (e.g. an organisation with concentrated knowledge and experience)
⑤Human resources development and cooperation with universities (including recurrent education)

Announcements / New Initiatives *Japan*

Funding

High-efficiency boiler subsidy, JPY 30 billion

Followed by the 2023FY supplementary budget, 2024FY budgetary request is supposed to support the introduction of high-efficiency boiler, due to addressing the hot water supply accounts for a large portion of household energy consumption.

Stationary Residential Fuel Cells
Subsidy: JPY 150k/unit

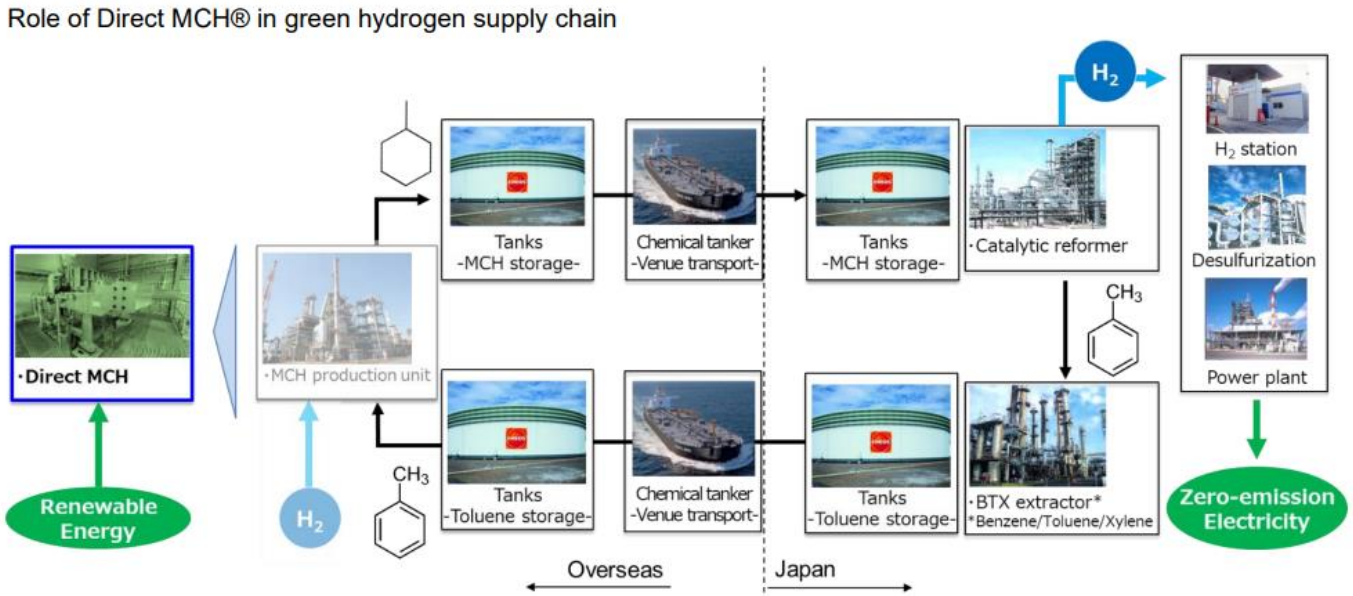
Hybrid Boiler (gas & heat-pump)
Subsidy: JPY 40k/unit

Heat-pump Boiler
Subsidy: JPY 40K/unit

Announcements / New Initiatives *Japan*

New Research & Development, Demonstration and/or Deployment Activities

- **Cross-border supply chain demonstration project by using Direct MCH.**
- **From Brisbane to Yokohama**
- **Green MCH produced (Brisbane) and transported to Japan**
- **Hydrogen extracted from MCH filled into a small fuel cell bus in Yokohama (June 2023).**



Source: ENEOS

G7 Excursion

The liquefied hydrogen carrier “Suiso Frontier” tour held in Hokkaido and Hiroshima.

Photos provided by Kawasaki Heavy Industries

Middle East Excursion

Suiso Frontier tour was also held in Saudi Arabia, UAE and Oman, as part of or follow-on of PM and Minister's visit.

Announcements / New Initiatives *Japan*

Key Collaborations

March

Inaugural Asia Zero Emission Community (AZEC) forum

May

Memorandum of Cooperation (MOC) on the development of hydrogen technologies with Poland executed.

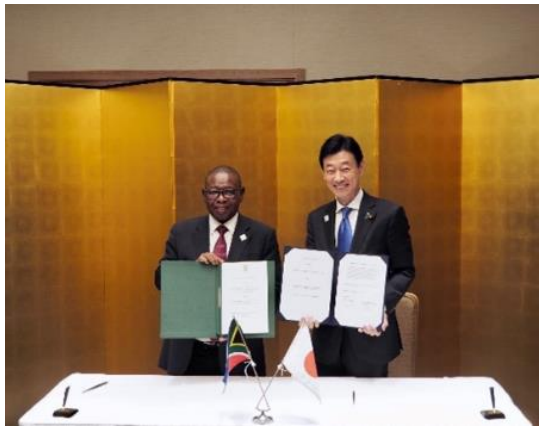
September

Tokyo GX Week (including HEM)

MOC on hydrogen and ammonia with South Africa

Photo from AZEC

MOC with Poland



MOC with South Africa

Japan – Profile October 2023

Status of Deployments

- Fuel Cell Vehicles: 7,851
  as of Jul. 2023
- FC Bus: 134
  as of Apr. 2023
- Forklifts: 417
  as of Mar. 2023
- 70MPa HRS: 179 operational
  as of Aug. 2023
- Stationary residential fuel cells (ENE-FARM): 485,972
  as of Jun. 2023

Leading Government Initiatives

- "Basic Hydrogen Strategy" was updated on 6th June 2023.

Goals or Focus Areas

- Cost (JPY/Nm3 – H2)
  JPY 30 /Nm3 by 2030
  JPY 20 /Nm3 by 2050
- Hydrogen supply & demand
  3 M tones by 2030
  20 M tones by 2050

Deployment Goals

Deployment target by 2030:

- Fuel Cell Vehicles: 800,000
- H_2 Refueling Stations: 1,000
- Fuel Cell Buses: 1,200
- Stationary residential fuel cells: 3 million

Funding – 2024FY budgetary request

- Fuel Cells R&D: JPY 8 billion
- H2 Supply Chain RD&D: JPY 8.6 billion
- H2 Hub demonstration: JPY 6.2 billion
- High-Efficient Boiler Subsidy, including stationary residential fuel cells: JPY 31.4 billion

Green Innovation Fund

- Large-scale H2 supply chain: JPY 300 billion
- Large electrolyzer development: JPY 70 billion

Thank you

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