

# **Japan's Vision and Actions toward Hydrogen Economy**

**November 2022**

**Hydrogen and Fuel Cells Strategy Office  
Agency for Natural Resources and Energy**

**METI, JAPAN**

# Japan's Strategies & Policies towards Hydrogen Economy

- Japan is the first country to formulate National Hydrogen Strategy.
- Prime Minister set 2050 carbon neutral declaration, and Japan positioned hydrogen as one of the priority areas in the Green Growth Strategy in 2020.
- Japan is trying to expand the amount of hydrogen introduction and reduce hydrogen cost through the Green Innovation fund projects and other measures.

## Situation and status of strategy formulation

**2017**  
National Hydrogen Strategy

**2020**  
PM's 2050 CN Declaration  
Green Growth Strategy

**2021**  
Green Innovation Fund  
Revised Strategic Energy Plan

## Targets

### Supply & Demand volume:

Current (Approx. 2Mt) → 2030 (Approx. 3Mt) → 2050 (Approx. 20Mt)

### Hydrogen cost:

Current (JPY100/Nm3) → 2030 (JPY30/Nm3) → 2050 (Less than JPY20/Nm3)

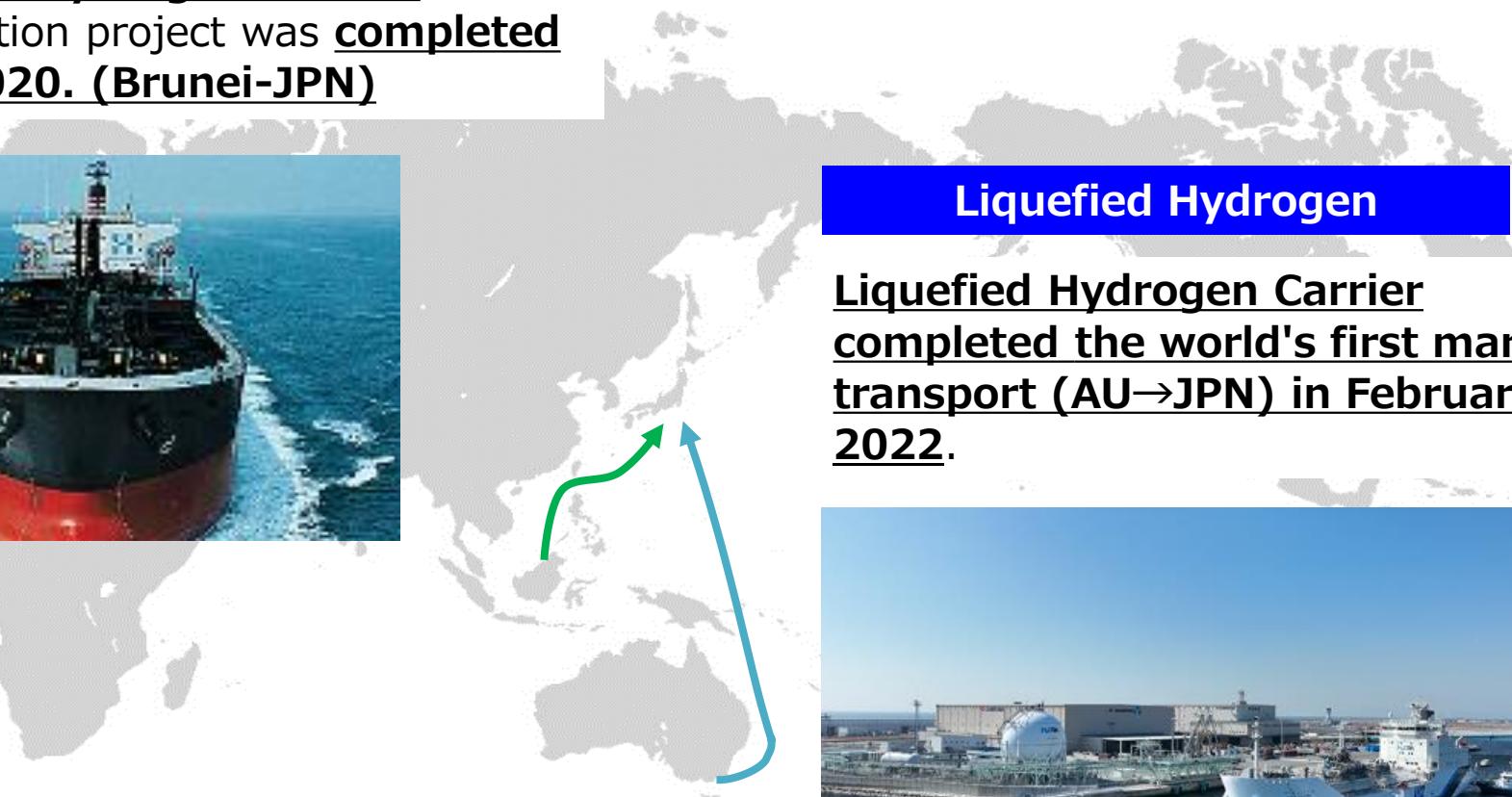
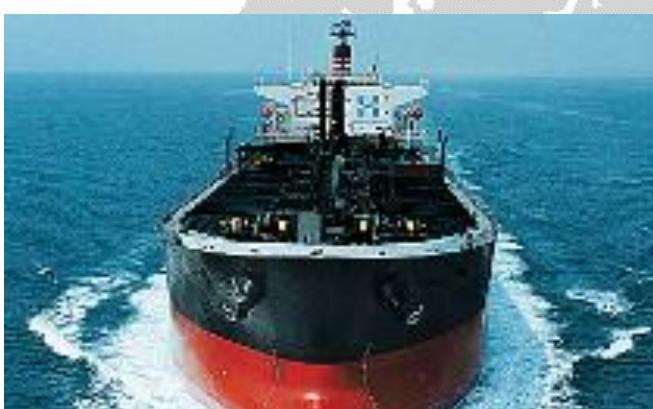
# Hydrogen Supply and Demand (Rough Roadmap)

	Short term (-2025)	Mid term (-2030)	Long term (-2050)
Actual·Target Volume / Sources	Approx. 2 mil ton	Up to 3 mil ton	Approx. 20 mil ton
Supply side			
<b>Existing Source</b> (Byproduct, etc.)	Major supply source	Transition to Clean Hydrogen (Utilization of CCUS, etc.)	
<b>Import</b> (Blue, Green, etc.)	Demonstration phase	Establishment of global hydrogen supply chain on commercial basis	Expansion of scale through diversification
<b>New Domestic Supply Source</b> (Electrolysis, etc.)	Demonstration phase	Transition to commercial phase	Expansion of scale (incl. introduction of new technologies)
	Short term (-2025)	Mid term (-2030)	Long term (-2050)
Actual·Target Volume / Sectors	Approx. 2 mil ton	Up to 3 mil ton	Approx. 20 mil ton
Demand side			
<b>Transportation</b>	FCV, FC Bus + Introduction of FC Trucks	+ FC Ships etc.	+ Aircraft etc.
<b>Power Generation</b>	Stationary fuel-cells, Small gas turbines etc.	Commercialization of large size power generation	+ Using as the flexibility of power system
<b>Industrial Sector</b>	R&D, Demonstration phase (steel and chemical production process etc.)		H2 reductant steelmaking, green chemical etc.
<b>Heat Demand</b> (industrial/commercial /residential)	Demonstration phase / Commercialization in limited areas		Expansion of scale (through cost reduction and infrastructure development)

# International Hydrogen Supply Chain

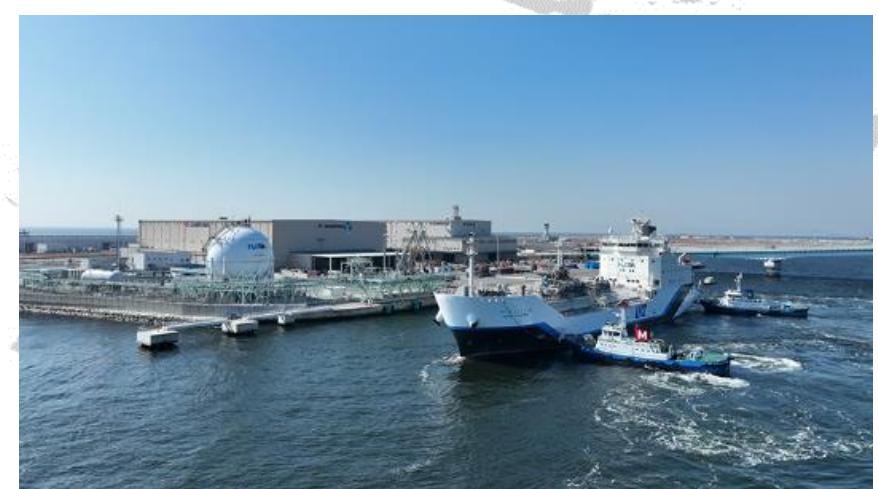
## MCH (Methylcyclohexane)

MCH as the hydrogen carrier in the demonstration project was completed in June 2020. (Brunei-JPN)



## Liquefied Hydrogen

Liquefied Hydrogen Carrier completed the world's first maritime transport (AU→JPN) in February 2022.



# Domestic Hydrogen Production: Electrolyser

- Demonstration project in Fukushima using large-scale electrolyser already in operation in 2020 (10MW).
- Currently, a larger demonstration project<sup>※</sup> is underway to further increase size, improve operation and reduce costs.

※Fund: up to 0.7 billion USD

Alkaline electrolyser plant in Fukushima



PEM electrolyser plant in Yamanashi



Source: Toshiba Energy Systems & Solutions Corporation

Source: Yamanashi Pref

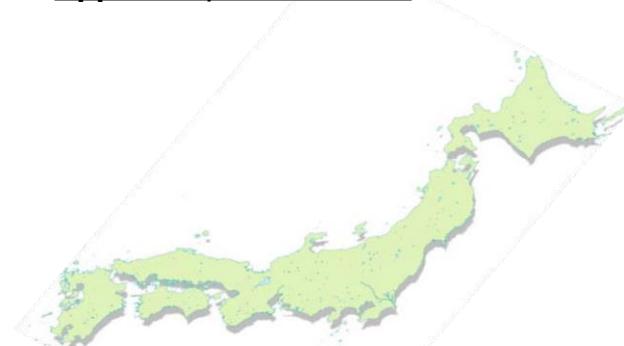
# Hydrogen Use in Transportation Sector

- Currently approx. 7,400 FCVs and 162 hydrogen refueling stations (HRS) are installed (as of September 2022).
- FC Truck and FC Train are under demonstration.

FCV and HRS



Approx. 7,400 vehicles



Hydrogen refueling station: 162 locations

FC truck



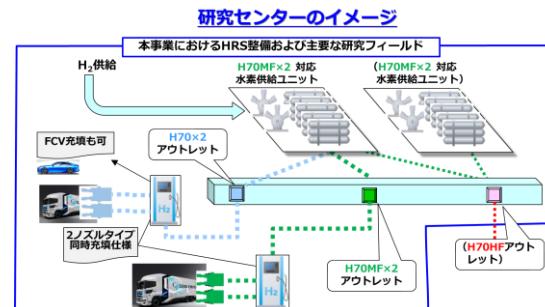
Fukushima Prefecture and TOYOTA are preparing to start FC truck demonstration project including refueling timing management.

Developing high-speed refueling protocol for Heavy Duty Vehicles.

FC train



East Japan Railway Company (JR East) has started Fuel cell train demonstration operation at their commercial line.



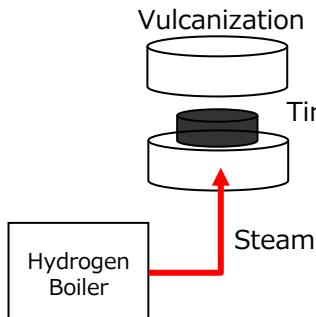
# Fukushima



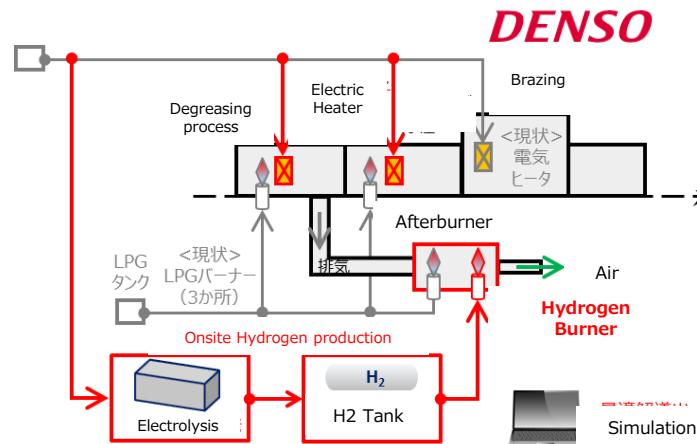
Development of electrolysis with renewable energy at **Fukushima Hydrogen Energy Research Field (FH2R)**



**Sumitomo Rubber Industries** has started demonstrate project for deployment of hydrogen boiler at their factory line.



**DENSO** has started demonstration project for electric heaters and hydrogen burners in their production line



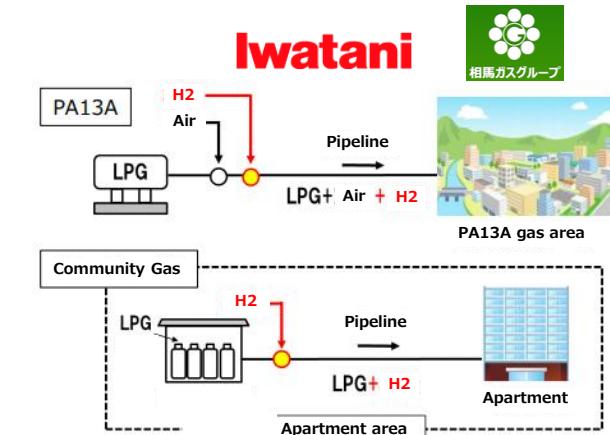
**Fukushima Prefecture and Namie Town** are using hydrogen and fuel-cell for public facilities.



福島県  
Fukushima Prefecture

浪江町

**IWATANI** and **SOMA Gas Group** have started to feasibility study for blending hydrogen into their gas services.





# Yamanashi

Yamanashi prefecture, TORAY and TEPCO Energy Partner established **Yamanashi Hydrogen Company** (YHC) to provide “power to gas” service as output/outcome of demonstration projects.

**Yamanashi prefecture** has developed renewable energy power plant and hydrogen technology many years.



**'TORAY'**  
Innovation by Chemistry

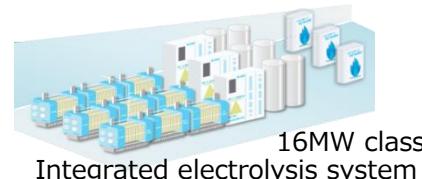
**Hitz**  
Hitachi Zosen

**SIEMENS**  
Energy

株式会社 加地テック  
YACI TECHNOLOGY CORPORATION

**MIURA**

They start to develop **16MW class integrated electrolysis system and hydrogen boiler** in cooperation with **TORAY, Hitachi Zosen, SIEMENS Energy, KAJI Technology, MIURA**.



Electrolysis standard module



Yamanashi Hydrogen Company, Inc.

**Yamanashi University** is doing hydrogen related R&Ds, such as electrode catalyst for high-performance, cost-reduction, etc.

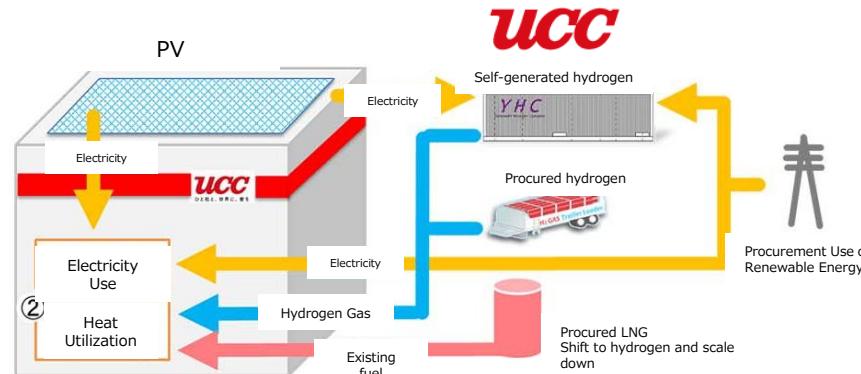


山梨大学  
UNIVERSITY OF YAMANASHI  
地域の核 世界の人材

The Association of Hydrogen Supply and Utilization Technology (HySUT) provides human resource development service for hydrogen fueling station.



**UCC Ueshima Coffee** has started demonstration project for hydrogen heat-use at their factory line in cooperation with Yamanashi prefecture, TEPCO Energy Partner, Toray and TOMOE.



# Bold New Support Measures for Commercialization

- METI established a new subcommittee for hydrogen policy in March.
- The subcommittee examines ways to expand the introduction and **commercialization of hydrogen and ammonia**, focusing on the **price difference with existing fuels** and the state of infrastructure development.
- **PM Kishida** stated in his speech that he would take "**bold support measures**" regarding hydrogen policy.



*"I recognize that the transition to hydrogen-based society will be the key to decarbonization."*

*"I would like to take bold support measures in line with the goal of achieving carbon neutrality in collaboration with the public and private sectors regarding the scale of investment to promptly expand the introduction of hydrogen from both aspects of hydrogen supply and demand."*

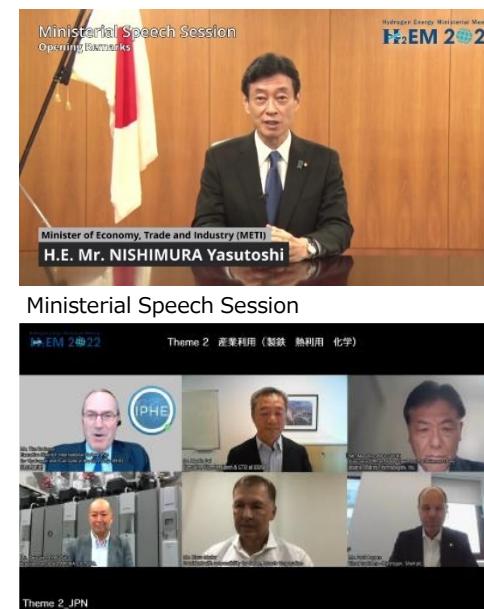
# Hydrogen Energy Ministerial Meeting (HEM)

- Japan held the **5th Hydrogen Energy Ministerial Meeting**, in cooperation with the IEA, as a part of Tokyo GX week, on September 26, 2022.
- As the result of the meeting, the chair released the **chair's summary** for acceleration and enlargement of the Tokyo Statement and the Global Action Agenda, including **additional goals on the amount of renewable and low-carbon hydrogen to be produced by 2030 of at least 90Mt H<sub>2</sub>**.

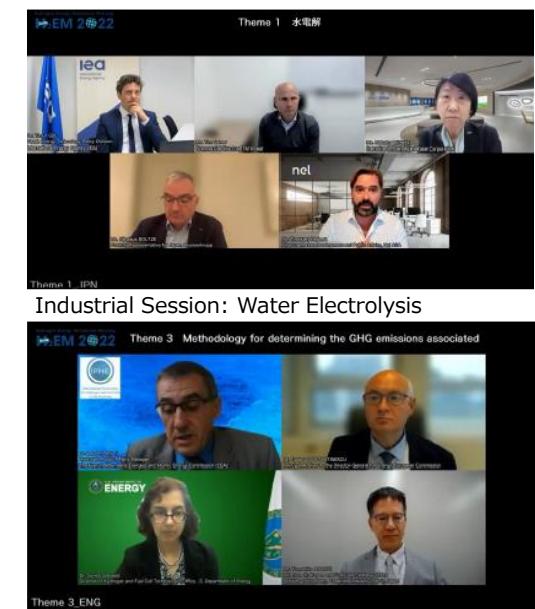
\*Archive videos are available via HEM website: [https://hem-2022.nedo.go.jp/\\_en/archive/](https://hem-2022.nedo.go.jp/_en/archive/)



Ministerial Meeting Session



Industrial Session: Hydrogen Industrial Applications (Steel, Heat and Chemicals)



Industrial Session: Methodology for determining the GHG emissions associated with the production of hydrogen

**Thank you for your kind attention**