

Japan's Policies Towards a Hydrogen Society

November 2024

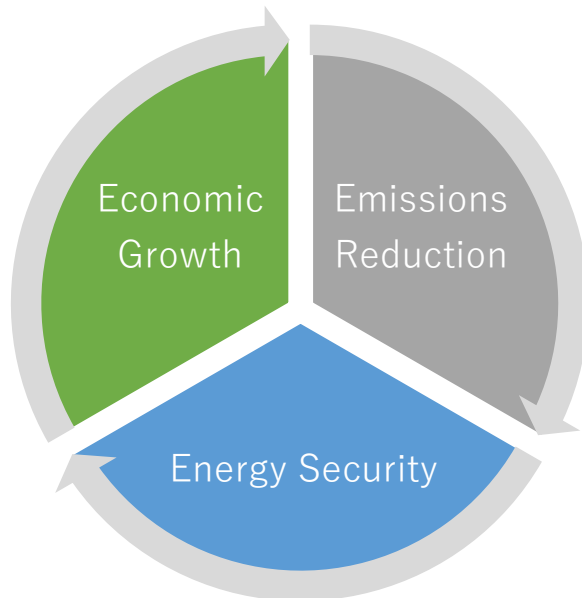
**Hydrogen & Ammonia Division
Agency for Natural Resources and Energy
Ministry of Economy, Trade and Industry**

Towards Carbon Neutrality: Japan's Green Transformation

Triple breakthrough

Japan aims to simultaneously achieve

- Emissions Reduction
- Economic Growth
- Energy Security



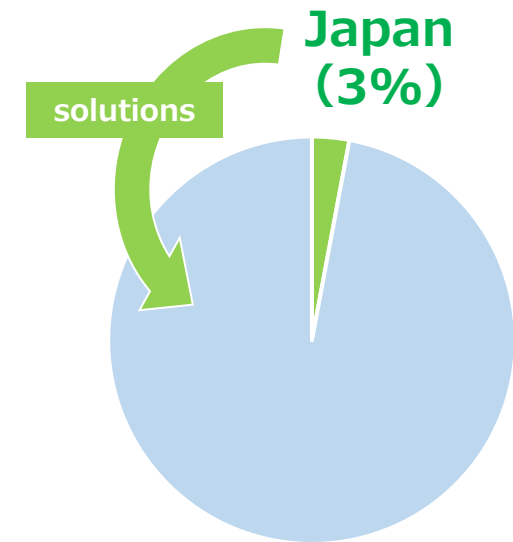
One goal, various pathways

Toward our common goal of achieving net zero, we will make practical energy transitions through various pathways depending on the circumstances of each country.



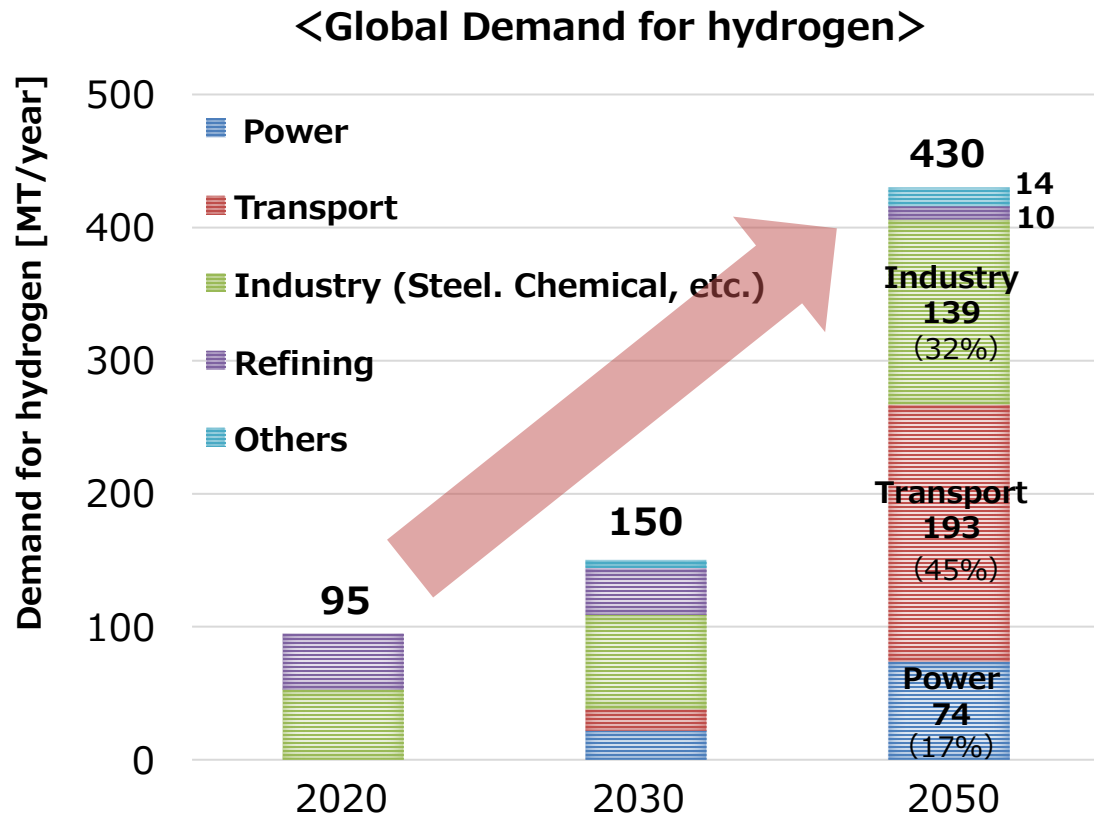
Solution to the world

Japan will decarbonize itself, but also contribute to global decarbonization by providing solutions outside Japan.



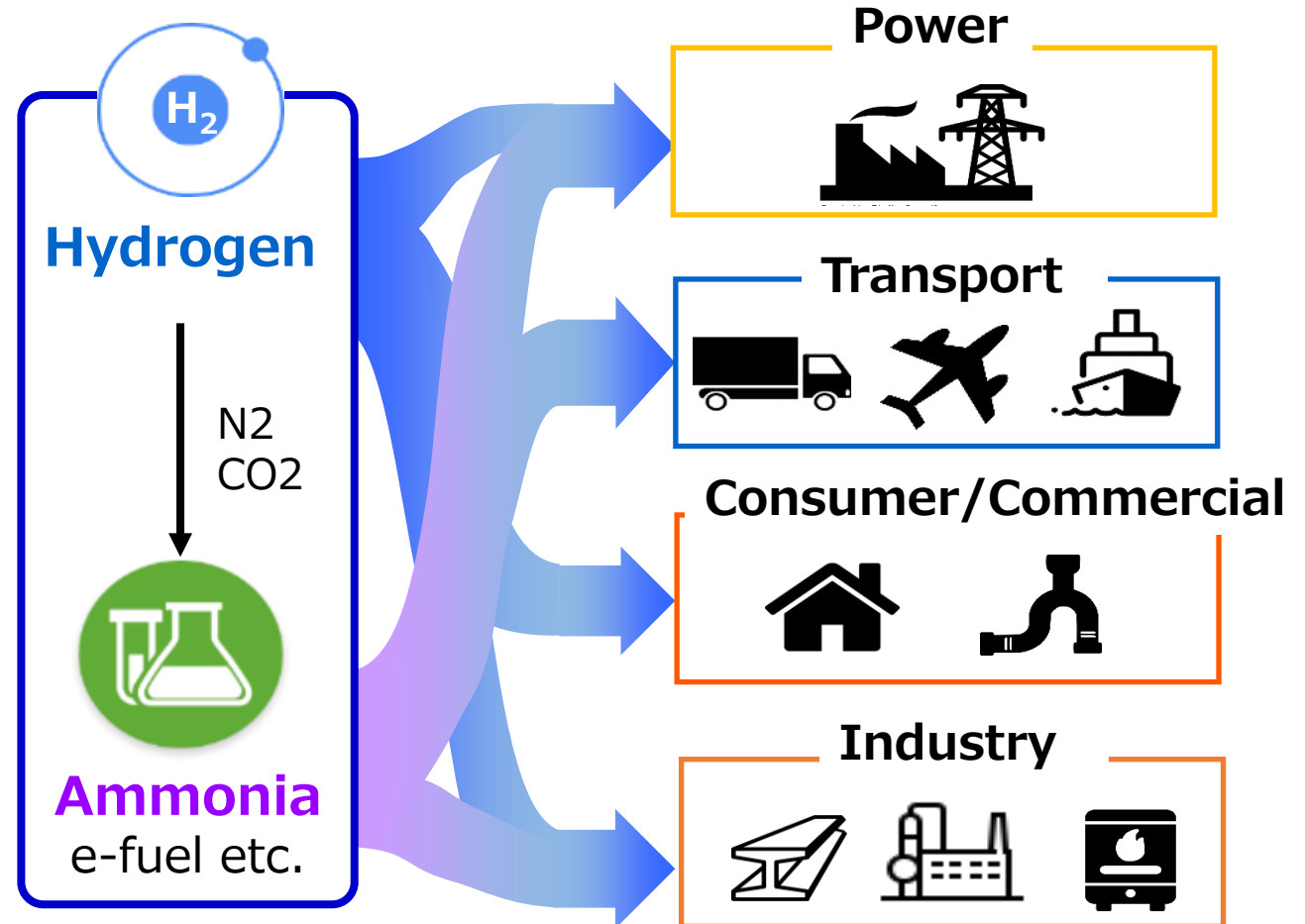
Hydrogen essential for carbon neutrality

- Global demand for hydrogen and its derivatives (i.e. ammonia, e-methane, and e-fuels) are expected to grow towards carbon neutrality by 2050.
- They are expected to be used in sectors including "hard-to-abate" sectors such as steel and chemicals where conversion is difficult due to few alternative technologies, in the mobility sector, and in power generation.



Ref : IEA「Net-Zero Roadmap」 (2023/9)

※ Calculated based on NZE (Net Zero Achieved in 2050) scenario



Japan's Hydrogen Policies

- First country to formulate a **national hydrogen strategy, in 2017**, which was then revised in 2023.
- Declared **“2050 carbon neutrality” goal in 2020**.
- Hydrogen (and ammonia) positioned as one of the priority areas in **the Green Growth Strategy in 2020**.
- Established the **Green Innovation Fund of approximately ¥2 trillion* in 2021**.
* ¥2 trillion = \$13billion (USD/JPY=150)
- Hydrogen (and ammonia) as **key part of the strategy under the Green Transformation Promotion Act in 2023**.
- Enacted a new **Hydrogen Society Promotion Act in 2024** (enforced on October 23rd).

Milestones

2017
Basic Hydrogen
Strategy

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

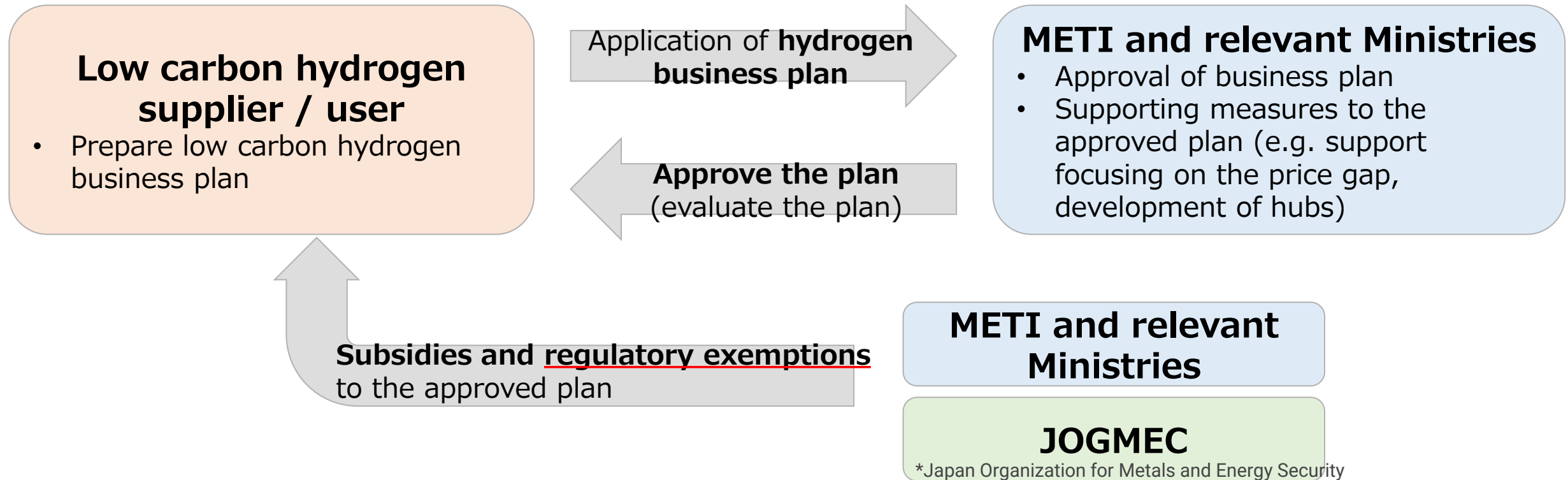
2021
• Green Innovation Fund
• Revised Strategic
Energy Plan

2023
• GX Promotion Act
• Basic Hydrogen
Strategy updated

2024
**Hydrogen Society
Promotion Act**

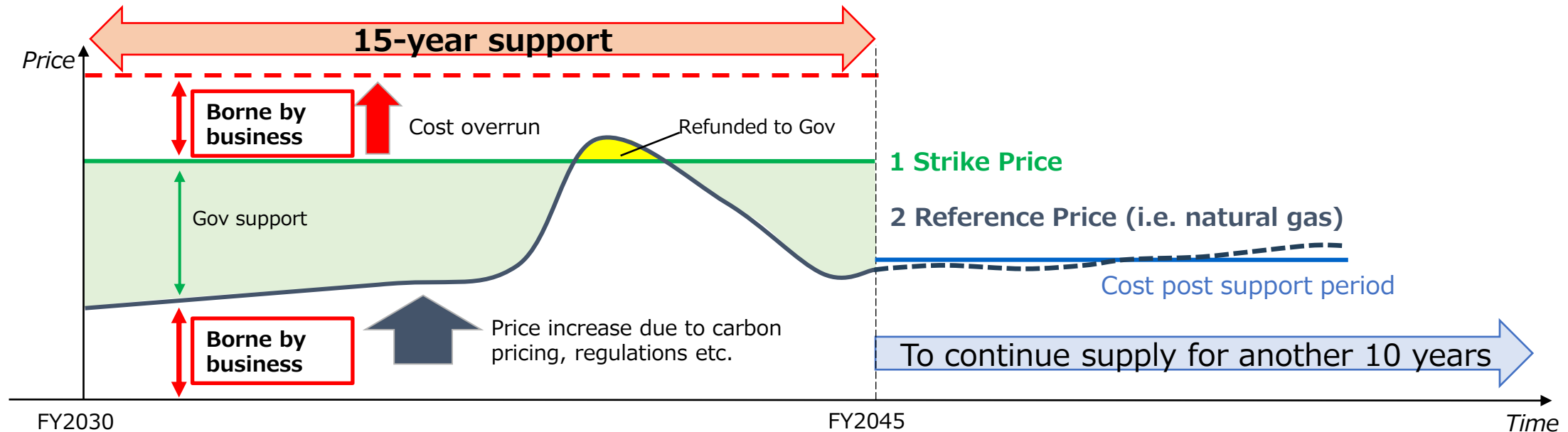
Hydrogen Society Promotion Act (Passed on May 17th, 2024)

- The government will provide supporting measures to the approved hydrogen business plans to promote supply and utilization of low carbon hydrogen and its derivatives.



①Support Focusing on the Price Gap

- The government plans to provide a **15-year support** to suppliers who aim to develop a **commercial-scale supply chain** of **low-carbon hydrogen and its derivatives** (which meets Japan's primary energy policy and GX policy).



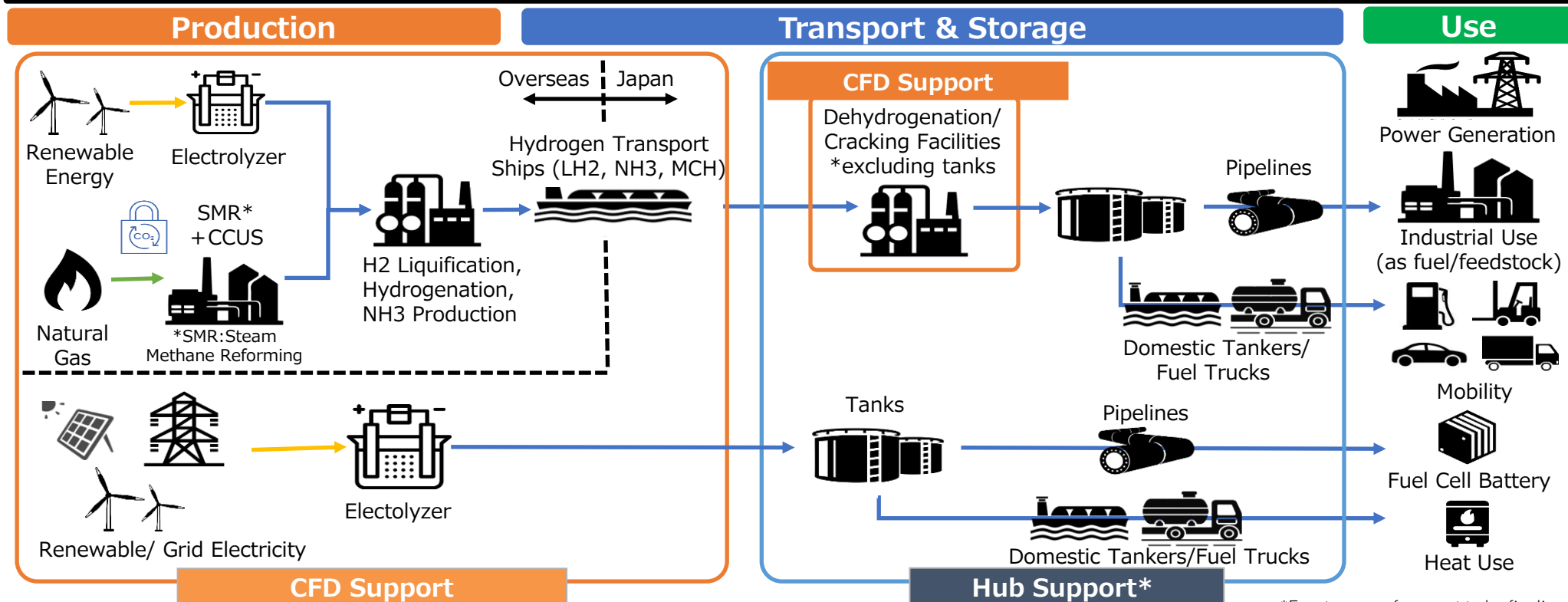
Key requirements

- Supply to be provided in whole or in part to hard-to-abate sectors**, such as steel, chemical and transportation industries
- Start supply by FY2030 and must continue for another 10 years** following the support period

* In the approval process, business plans are to be reviewed holistically from Japan's energy and GX policy perspectives

②Hydrogen Hub Development Program

- The Hydrogen Hub Development Program supports the establishment of infrastructure which leads to large-scale expansion of the use of low-carbon hydrogen and its derivatives and widely benefits a variety of companies, with an aim to stimulate demand creation and the efficient buildout of hydrogen supply chains.
- The Program will subsidize a portion of the CAPEX for developing “facilities necessary to transport low-carbon hydrogen from the receiving terminal to the point of actual use by consumers and used by multiple companies (e.g. shared pipelines and tanks)”.



Development of Hydrogen Supply Chain

- Japanese industrial sector have technical strength such as water electrolysis and membrane in “Production”, large-scale vessels and tanks in “Transportation”, mobility and power generation in “Utilization”.
- Supporting mass-production through the GX Supply Chain Budget since this FY and promoting domestic cutting-edge technologies to develop resilient supply chains through support focusing on the price gap.

Production



Transportation (Store)



Utilization



Core Technologies	<ul style="list-style-type: none"> • Water electrolysis • Membrane 	<ul style="list-style-type: none"> • Transportation (LH2, MCH, etc.) 	<ul style="list-style-type: none"> • Fuel cell system/vehicle/truck • Power generation
Key Players	<p><Water electrolysis> Asahi Kasei, Toyota, Toshiba ESS, Kanadevia, Toray ThyssenKrupp (Germany) Siemens Energy (Germany)</p>	<p><Liquefied hydrogen carrier> Kawasaki Heavy Industries HD KSOE (South Korea) GTT (France)</p>	<p><Fuel cell> Toyota, Honda Daimler (Germany) Hyundai (South Korea)</p> <p><Power generation> Mitsubishi Heavy Industries, IHI Siemens Energy</p>
Strengths (Japan)	Safe and stable operation of water electrolysis and innovative material development	Conducted the world's first demonstration of large-scale hydrogen transportation	Leads technological development of fuel cell and is top class in number of patents

Example of Utilization: Ammonia for Co-firing at Thermal Power Plants

- As Japan's original technology, stable combustion and controlled NOx emission with 20% of ammonia conversion has already been achieved. A demonstration project at the operating commercial power plant (1GW) started this April and was completed this June.
- High ratio (50%-) conversion and ammonia mono-firing technologies will be developed by FY2024 in the test furnace. Large-scale demonstration for the technology will be completed in FY2028 and is expected to start commercial installation in the early 2030's.

MOU was signed for development of global green ammonia value chain and commercial demonstration of ammonia-powered gas turbine



<https://ptsg1cesgentariwb01.azurewebsites.net/ihi-gentari-sign-mou-to-develop-global-green-ammonia-value-chain-and-commercial-demonstration-of-ammonia-powered-gas-turbine/>

International Cooperation

- Rule making, capacity building, sharing objectives and challenges, etc.
- Objective analysis on world's energy outlook (e.g. carbon intensity, cost estimate)



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Location: Kokokuji Temple (Hidaka-gun, Wakayama)