JAPAN'S HYDROGEN AND AMMONIA POLICIES

- Overview and key developments -

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GR Japan
Government Relations, Expertly Handled

The role of hydrogen and ammonia in Japan's energy policy

- Japan has been a **keen supporter of hydrogen** for some time. In December 2017, it was the first country in the world to release a Basic Hydrogen Strategy (BHS). On 6 June 2023, it adopted an updated BHS.
- **Ammonia** has started **gathering more interest in Japan** in recent years both as a hydrogen carrier and for its potential to be used as fuel in power generation. Reflecting this increased interest, ammonia is now included in the scope of the BHS 2023.
- Historically, Japan has been relatively "colour-blind" in its promotion of hydrogen and ammonia. However, the BHS 2023 acknowledges that, to achieve Japan's decarbonisation goals, it is important to set **"carbon intensity" targets** for hydrogen and ammonia.
- Before large-scale use of hydrogen and ammonia is possible, however, Japan needs to overcome **several major challenges**, which are:
    - High costs of hydrogen and ammonia production
    - Lack of large-scale hydrogen and ammonia supply chain
- Addressing the above challenges, while supporting the Japanese industry domestically and abroad, are key goals of Japan's hydrogen and ammonia policies.

Low-carbon hydrogen and ammonia are viewed as key elements for Japan's energy security and decarbonisation efforts, and an important sector for Japan's economic growth and industrial policy, but key challenges remain for their large-scale deployment.

Key targets and terms in the Basic Hydrogen Strategy 2023

Hydrogen targets

- The BHS 2023 has two key targets for hydrogen:

Targets	By 2030	By 2040	By 2050	Current (as of January 2023)
Increase supply	3 mil. tonnes/year	12 mil. tonnes/year	20 mil. tonnes/year	Approx. 2 mil. tonnes/year
Reduce cost	JPY30/Nm^3 (CIF[1] cost)	Not specified	JPY20/Nm^3 (CIF cost)	Hydrogen station retail price: JPY100/Nm^3

1: CIF = Cost, insurance and freight

Other targets

- In addition, the following targets are also included:

Increase use of Japanese water electrolysis equipment	15GW used globally by 2030
Increase public and private sector investments into hydrogen and ammonia supply chains	15 trillion yen (US$107.5 billion) over 15 years

Defining "low-carbon" hydrogen and ammonia

- The BHS 2023 also formally introduces the terms of "low-carbon hydrogen" and "low-carbon ammonia" and defines them, while leaving the door open to revising the definitions in light of future developments.

Low-carbon hydrogen	"Well-to-gate" (WTG) emissions are **3.4kg-CO_2e/kg-H_2 or less** for 1 kg of hydrogen.
Low-carbon ammonia	"Gate-to-gate" (GTG) emissions **0.84kg-CO_2e/kg-NH_3 or less** for 1 kg of ammonia.

Building an international supply chain

- The Japanese government recognises that **domestic production alone will not be enough** to achieve hydrogen supply targets. A major theme of the BHS 2023 is therefore the need to develop an international hydrogen and ammonia supply chain.

- **Key points points from the BHS 2023 include:**
  - The need to **strengthen relations with countries rich in hydrogen and ammonia resources** through signing memorandums and utilising multilateral international frameworks. The BHS 2023 particularly notes the need to work on this with **North America, the Middle East, Australia, and Asia**. Japan is also interested in **increasing its presence in Europe** through collaborating with partner companies.
  - To achieve the aim of transporting large quantities of hydrogen by 2030, the government will **focus on expanding transportation facilities** and strengthening Japan's international competitiveness.
  - Japan is keen to **engage in international collaboration to promote standardisation** of hydrogen and fuel ammonia related technologies, and to lead the efforts of standardise international hydrogen trade.
  - The government is keen to support **Japanese involvement throughout the whole supply chain**: in production, transportation, local plant construction, as well as the use of Japanese products in hydrogen production areas.

- The BHS mentions **three major modes of hydrogen transport** into (and within) Japan: **liquefied hydrogen** (LH2), **methylcyclohexane** (MCH) and **ammonia**. The BHS does not commit to promoting any specific mode, only noting that all three have advantages and disadvantages, that different technologies have different uses, and it is unclear which one will win over the long term.
- The BHS 2023 also notes that **efficient and stable international transport from overseas** to domestic bases and secondary transportation form domestic bases to all parts of Japan are necessary, and ships capable of long-distance and large-scale transportation are essential.

Supporting the development of low-carbon hydrogen and ammonia supply chain

- The Japanese government has been developing a subsidy framework to support the establishment of a low-carbon hydrogen and ammonia supply chain and associated infrastructure. The framework encompasses all stages of the hydrogen and ammonia supply chain and consists of four main elements (See (I) – (IV) below).
- A separate element – an auction (V) – includes hydrogen and ammonia **but is not classified as a subsidy programme**.

(I) Green Innovation (GI) Fund – subsidising various R&D projects, targeting the whole supply chain

- The GI Fund provides **R&D funding for five hydrogen and ammonia-related programmes**: formation of a large-scale hydrogen supply chain; establishment of a fuel ammonia supply chain; hydrogen production by water electrolysis; next-generation ship development; hydrogen utilisation in iron and steelmaking processes. All programmes run from 2021 until 2030.

(II) "Risk money" support – supporting production and storage

- The government agency, the Japan Organisation for Metals and Energy Security (JOGMEC), provides **equity capital** and **liability guarantees** for the production and storage of decarbonised fuels (hydrogen, ammonia and synthetic fuel).

(III) Contract for Difference (CfD) and (IV) Hub Development Support schemes – to launch in summer 2024

- These two schemes will work as a set: CfD targets hydrogen/ammonia production and (in the case of overseas production) maritime import into Japan; the Hub Development targets transportation from the point of production (or arrival to Japan) until it reaches the end user. **Under (III)**, the government will subsidise part or the entirety of the price difference between the price of hydrogen/ammonia and that of counterfactual fuels for a period of 15 years. **Under (IV)**, over the next 10 years the government will select eight locations to be developed as infrastructure "hubs" to receive financial support.

(V) Long-term Decarbonised Power Sources Auction

- The Auction trades future capacity to produce electricity and is designed to **encourage investments** in new "decarbonised" power generation facilities. **Thermal power using hydrogen and ammonia is one of** the eligible power sources. The winning bidders will be contracted for a 20-year capacity payment, to start once the target projects become operational. However, successful bidders are **required to return between 85-95% of the profits** they obtain from the projects.

Supporting the development of a low-carbon hydrogen and ammonia supply chain

- Visual representation of stages of the hydrogen and ammonia supply chain targeted by different programmes.

	R&D	Production	Transportation	Storage	Usage
(I) GI Fund	✓	✓	✓	✓	✓
(II) "Risk money"		✓		✓	
(III) CfD * Launches in summer 2024		✓	✓ *maritime transportation to Japan		
(IV) Hub Development Support * Launches in summer 2024			✓ * transportation within Japan	✓	
(V) Long-term Decarbonised Power Sources Auction					✓

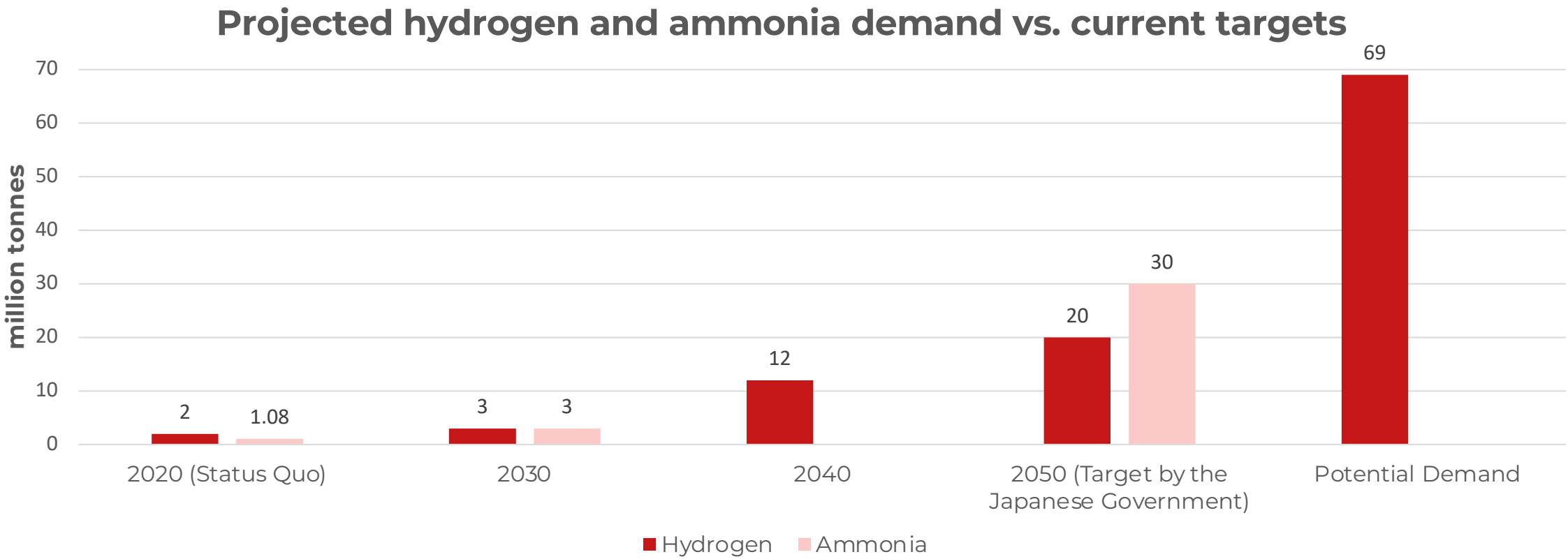
Note 1: The GI Fund is focused on providing R&D funding with projects covering the entire supply chain eligible to apply – this is the reason the GI Fund is marked as covering R&D and all stages of supply chain development..

Note 2: Although CfD and Hub Development Support are two different schemes, they are linked to amplify the effectiveness of the financial support and to provide seamless support throughout various stages in the supply chain. Selection of CfD recipients will prioritise those projects in which hydrogen/ammonia will be supplied to locations that have the potential to become a hub for hydrogen/ammonia consumption.,

Opportunities for overseas companies

- Government estimates indicate that **potential demand** for hydrogen in Japan **far exceeds the current targets**. Meanwhile, Japan's potential **capability to produce** low-carbon hydrogen and ammonia **is insufficient** to meet the government targets, let alone to satisfy the projected demand.

Partnering with overseas companies will be key to achieve Japan's goal of a hydrogen-based society, as domestic production by Japanese companies alone will not be enough. **For non-Japanese companies**, this represents an **opportunity for advocacy and engagement** with the Japanese government on the need for more support .



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Key developments over the next six months

As the Japanese government continues the process of developing a large-scale low-carbon hydrogen and ammonia supply chain, key policy trends and developments over the next six months are:

Deliberation of draft Hydrogen Society Promotion Bill in the Diet

- On 13 February, the Japanese government submitted a draft Hydrogen Society Promotion Bill outlining regulatory measures necessary for the launch of the CfD and Hub Development Support schemes to the lower house of the Japanese Diet. The deliberations of the bill began in the lower house on 12 March. To be enacted, the bill needs to pass both the lower and the upper houses.

Fine-tuning the details of the CfD and Hub Development Support schemes before the summer 2024 launch

- After the bill is enacted, METI will start hammering out further details of the two schemes, providing further clarity on different scheme elements, the project selection process and timeline, etc. This will be done in preparation for the scheme launch in summer 2024. The government will then start selecting projects.

Setting auction rules for the second round of the Long-term Decarbonised Sources Auction

- The first round of the Long-term Decarbonised Sources Auction was held on 23-30 January 2024. The government has now started discussions around determining auction rules for the second round, to be held sometime in later in 2024. On thermal power using hydrogen and ammonia, the government is going to discuss issues such as handling of upstream costs, the bid ceiling price, and ensuring fairness between operators.

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