

Commercialization Trends in Hydrogen and Ammonia

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1. Introduction

Japan enacted the Hydrogen Society Promotion Act in 2024. Under this Act, the Japanese government will provide price gap support, a form of Contract for Difference (CfD) support, as well as hub development support. It has already selected several projects to receive these forms of support.

In addition, the Japanese government holds the Long-Term Decarbonized Capacity Auction (LTDA) every year as another support program for the decarbonization of the power sector. Starting with the fourth round of the LTDA, the Japanese government will conduct a pre-qualification procedure for hydrogen- and ammonia-fired power generation, including mono-

firing and co-firing projects, as decarbonized power sources. Therefore, applicants will be required to meet specified requirements regarding the hydrogen and ammonia fuel they plan to procure in order to pass this pre-qualification procedure.

This newsletter provides an overview of the selected projects under the Hydrogen Society Promotion Act and summarizes the outline of this pre-qualification procedure for the fourth round of the LTDA, along with guidance for LTDA applicants.

2. Selected Projects under the Hydrogen Society Promotion Act

2.1. CfD Support

The Japanese government will provide CfD-type support for 15 years to selected projects, which will also be required to continue operating for an additional 10 years after the support period. To date, seven projects have been selected, including four domestic projects and three overseas projects.

Business Operators	Project Outline
Toyota Tsusho Corporation Eurus Energy Holdings Corporation Iwatani Corporation Aichi Steel Corporation	Domestic project. Electricity generated by onshore wind power is procured and used at Aichi Steel Corporation's Chita Works to produce low-carbon hydrogen through electrolysis. The hydrogen produced is then used by Aichi Steel Corporation to manufacture specialty steel.
Resonac Corporation Nippon Shokubai Co., Ltd.	Domestic project. Resonac Corporation gasifies waste plastics and waste clothing at its Kawasaki Plant and uses the resulting hydrogen as feedstock to produce low-carbon ammonia. Resonac is also the main end user, using the ammonia to produce and sell ammonia derivatives for textile raw materials, as part of its efforts to promote textile circularity.
JERA Co., Inc. Toyota Industries Corporation AGC Inc. NGK Corporation Aisin Fukui Co., Ltd. Chubu Electric Power Miraiz Co., Inc	Overseas project. Low-carbon ammonia produced by JERA Co., Inc. in Louisiana, U.S. will be supplied to Japan. Most of it will be used for ammonia co-firing at JERA's Hekinan Thermal Power Plant, while the remainder will be used as fuel for industrial furnaces at Toyota Industries Corporation, AGC Inc., NGK Corporation, and Aisin Fukui Co., Ltd., among other applications.
Mitsui & Co., Ltd. Hokkaido Electric Power Co., Inc. Mitsubishi UBE Cement Corporation Tosoh Corporation	Overseas project. Low-carbon ammonia produced by Mitsui & Co., Ltd. in Louisiana, U.S. will be supplied to Japan. Most of it will be used for ammonia co-firing at Hokkaido Electric Power's Tomatoh-Atsuma Thermal Power Plant, while the remainder will be used as fuel for industrial furnaces at Mitsubishi UBE Cement Corporation and as feedstock for Tosoh Corporation, among other applications.

Yamanashi Hydrogen Company, Inc. Suntory Holdings Limited Tomoe Shokai Co., Ltd.	Domestic project. Low-carbon hydrogen will be produced by water electrolysis on land adjacent to the Suntory Natural Mineral Water Minami Alps Hakushu Plant. The hydrogen produced will be used mainly as a heat source in the sterilization process at the plant and will also be supplied to the surrounding area through Tomoe Shokai Co., Ltd.
Yamanashi Hydrogen Company, Inc. Himeji Rika Co., Ltd. Tomoe Shokai Co., Ltd.	Domestic project. Low-carbon hydrogen will be produced by water electrolysis at Himeji Rika's Tamura Plant and the Fukushima Hydrogen Energy Research Field. The hydrogen produced will be used as a heat source in the processing of quartz glass manufactured by Himeji Rika Co., Ltd., and will also be supplied to the surrounding area through Tomoe Shokai Co., Ltd.
IHI Corporation Mitsubishi Gas Chemical Company, Inc. Hokkaido Electric Power Co., Inc. Nitten Co., Ltd. Kobelco Power Kobe Co., Ltd. Sumitomo Chemical Co., Ltd. UBE Corporation	Overseas project. IHI Corporation will produce low-carbon ammonia in Odisha, India, using low-carbon hydrogen obtained through water electrolysis powered by renewable energy, and will supply it to Japan. The supplied low-carbon ammonia will be used for ammonia co-firing at coal-fired power plants and as feedstock for chemical products, among other applications.

2.2. Hub Development Support

The Hub Development program will subsidize part of the capital expenditures required to develop hydrogen hubs. To date, two projects have been selected.

Business Operators	Project Outline
Hokkaido Electric Power Co., Inc. Mitsui & Co., Ltd. IHI Corporation Tomakomai Futo Co., Ltd.	Mitsui & Co., Ltd. plans to supply low-carbon ammonia produced in Louisiana, U.S. to Japan. Hokkaido Electric Power Co., Inc., Mitsui & Co., Ltd., IHI Corporation, and Tomakomai Futo Co., Ltd. will work together to develop and operate a low-carbon ammonia supply hub in the Tomakomai area. Most of the ammonia will be used for co-firing at Hokkaido Electric Power's Tomatoh-Atsuma Power Plant, while the remainder will be used as fuel for industrial furnaces at Mitsubishi UBE Cement Corporation and as feedstock for Tosoh Corporation, among other applications.
JERA Co., Inc. Toyota Industries Corporation AGC Inc. NGK Corporation	JERA Co., Inc. plans to supply low-carbon ammonia produced in Louisiana, U.S. to Japan. JERA will also develop and operate a low-carbon ammonia supply hub in the Hekinan area. Most of the ammonia will be

Aisin Fukui Co., Ltd. Chubu Electric Power Miraiz Co., Inc. Chuden Transportation Service Co., Ltd. Hokusan Co., Ltd.	used for co-firing at JERA's Hekinan Thermal Power Plant, while the remainder will be used as fuel for industrial furnaces at Toyota Industries Corporation, AGC Inc., NGK Corporation, and Aisin Fukui Co., Ltd., among other applications.
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3. Pre-Qualification Procedure for Hydrogen and Ammonia Power Generation in the Long-Term Decarbonized Capacity Auction

3.1. Background

The Long-Term Decarbonized Capacity Auction (LTDA) aims (i) to encourage investment in decarbonized power sources by giving power generators greater certainty regarding investment recovery and (ii) to ensure stable power supply by securing decarbonized generation capacity. Thermal power projects using hydrogen or ammonia for mono-firing or co-firing may be registered in the LTDA as decarbonized power sources.

However, previous rounds of the LTDA did not include any specific requirements for procuring hydrogen or ammonia as fuel. This raised concerns about the need to limit participation to projects that are closely aligned with Japan's policy goals and highly feasible. In response, the Japanese government will introduce a pre-qualification procedure in the fourth round of the auction. As a result, applicants will need to pass this preliminary screening, which will assess the policy alignment and feasibility of their projects, before they can participate in the auction.

3.2. Requirements for Hydrogen and Ammonia in the Pre-Qualification Procedure

Applicants will need to meet the following requirements for hydrogen and ammonia procurement in order to pass the pre-qualification procedure.

Energy Policy
● Safety ➢ The applicant is expected to obtain all necessary permits and licenses under applicable safety laws and regulations. ● Stable Supply ➢ Japanese companies have secured upstream interests and pricing is stable. ➢ The project addresses the geopolitical risks of the country or countries from which low-carbon hydrogen/ammonia is imported. ➢ A resilient and reliable supply chain for low-carbon hydrogen/ammonia that does not depend on any particular country is to be established. ● Environmental Suitability

➤ Low-carbon hydrogen or ammonia is to be procured. ● Economic Efficiency ➤ The applicant uses resources that contribute to decarbonization in a cost-effective and efficient manner. ➤ Japanese companies have secured upstream interests and pricing is stable.
GX Policy
● Strengthening Industrial Competitiveness and Economic Growth ➤ The project contributes to strengthening the international competitiveness of Japanese industry through both the supply and utilization of low-carbon hydrogen and ammonia. ● Decarbonization ➤ The project contributes to reducing domestic carbon dioxide emissions.
Implementation of Business
● The supply and utilization of low-carbon hydrogen and ammonia are highly feasible.

When structuring a project, it is considered necessary to examine mainly the following items:

A. Qualification as low-carbon hydrogen, etc.

The hydrogen and ammonia to be supplied must qualify as “low-carbon hydrogen, etc.” as defined in the Hydrogen Society Promotion Act. Specifically, the carbon intensity of the hydrogen or ammonia supplied under the project should be no more than 3.4 kg CO₂e/kg H₂ or 0.87 kg CO₂e/kg NH₃ (well-to-gate). In calculating carbon intensity, it is assumed that the relevant standards established by the International Organization for Standardization, such as ISO 14067 and ISO 19870-1, will be applied.

B. Investment in upstream interests

In procuring hydrogen and ammonia, investment in upstream interests is required. However, at the pre-qualification stage, it is not necessarily expected that the investment will already have been made or that an investment agreement will already have been executed; it is sufficient if there is a reasonable prospect of such investment being made.

C. Contribution to strengthening the international competitiveness of Japanese industry

With respect to contribution to strengthening the international competitiveness of Japanese industry, at least one key facility in each of the low-carbon hydrogen supply and utilization businesses must be manufactured, constructed, or otherwise provided by a company that contributes to strengthening the international competitiveness of Japanese industry.

D. Certainty of the low-carbon hydrogen supply and utilization businesses

As for the certainty of the low-carbon hydrogen supply and utilization businesses, the project is expected to demonstrate the likelihood of obtaining the necessary permits and approvals, securing equipment, land, transportation means, storage facilities, and other infrastructure, arranging financing, and establishing a concrete schedule for starting supply or utilization. For the low-carbon hydrogen supply business, there must also be a reasonable prospect that binding low-carbon sale and purchase agreements will be concluded between the power generator and the low-carbon hydrogen supplier, as well as between the low-carbon hydrogen supplier and the upstream hydrogen production entity.

3.3. Pre-Qualification Schedule

The pre-qualification schedule is as follows:

- Preliminary consultation period: From Wednesday, July 1, 2026
- Application period begins: Saturday, August 1, 2026
- Application deadline: Monday, August 31, 2026, 6:00 p.m.
- Expected notification date: Monday, November 30, 2026

3.4. Practical Considerations for Project Participants

A. Participation in upstream projects

As noted above, because investment in upstream interests will be required for the procurement of hydrogen and ammonia, it will not be sufficient simply to enter into a sale and purchase agreement with the hydrogen or ammonia producer. Rather, companies are expected to consider taking a more proactive approach to securing upstream interests.

Even though, at the pre-qualification stage, a mere prospect of investment is considered sufficient, it will be necessary to lay the groundwork for the future, such as by entering into an LOI or MOU among the relevant parties. Applicants should also appropriately organize and advance the steps necessary to realize the investment, including obtaining internal approvals, advancing investment decision-making, and negotiating the execution of the investment agreement.

B. Establishing a monitoring framework for carbon intensity

Since the hydrogen and ammonia to be supplied must meet the prescribed carbon intensity requirements, applicants should first calculate the expected carbon intensity of the hydrogen or ammonia to be supplied under their projects and confirm that the relevant standard is expected to be met. In light of standards such as ISO 19870-1, it will be necessary to examine emissions and emission factors for raw materials and electricity, as well as emissions from the manufacturing process.

In addition, since actual figures after the commencement of commercial operations may differ from the theoretical figures calculated in advance, it is advisable to analyze and assess in advance the extent to which the calculated figures may fluctuate depending on changes in the underlying assumptions and factual circumstances.

C. Ensuring the feasibility of supply chain development

It is desirable for applicants to advance the development of their supply chains as far as possible. As noted above, the pre-qualification procedure will assess whether the procurement of key facilities contributes to strengthening the international competitiveness of Japanese industry, as well as whether there is sufficient certainty regarding the

implementation of the low-carbon hydrogen supply and utilization businesses. Accordingly, applicants will be expected to make progress in building their supply chains and, at the pre-qualification stage, to present where they currently stand and their outlook going forward.

4. Outlook

As described above, progress is being made in the selection of projects eligible for government support under the Hydrogen Society Promotion Act. In addition, the introduction of a pre-qualification procedure for hydrogen and ammonia power generation in the fourth round of the Long-Term Decarbonized Capacity Auction will require project participants to manage the entire supply chain in an integrated manner, including the procurement of hydrogen and ammonia as fuel and the establishment of a framework for monitoring carbon intensity. These developments show steady progress toward the commercialization of hydrogen and ammonia.

In parallel, the Japan Hydrogen Backbone Initiative has recently been launched, and on June 4, 2026, the Ministry of Economy, Trade and Industry hosted the Conference on Realizing the Hydrogen Backbone Initiative. Going forward, it will be worth watching how these public-private efforts develop to support the hydrogen industry.

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