



December 2022

Japan Energy Newsletter

**Japan Electric Power
Information Center, U.S.A.**

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1 Japan Joins the Global Offshore Wind Alliance

On November 15, 2022, Japan participated in the 27th Conference of the Parties to the United Nations Framework Convention on Climate Change (COP27) in Sharm el-Sheikh, Egypt. During the conference, Japan announced that it has been participating in the Global Offshore Wind Alliance (GOWA), a public-private offshore wind energy platform led by Denmark, since September this year.¹

Participating countries share their technical knowledge, discuss policies for the promotion of offshore wind power generation, and work to accelerate deployment by strengthening their cooperation with each other. GOWA aims to increase the global offshore wind capacity from an average of about 57 GW annually (as of 2021) to 380 GW by 2030.² Japan's goal is to introduce 30 to 45 GW of offshore wind power by 2040.

1.1 Overview of the GOWA

Offshore wind power generation has considerable potential to address energy security and climate change challenges. An estimated 2,000 GW of installed offshore wind capacity will be required to limit the rise in temperatures globally and achieve net zero by 2050. However, the global installed capacity was only 57 GW in 2021. The GOWA was founded as a green leader in September 2022 during the Citizen Sustainability Summit hosted by the Government of Denmark. The GOWA's founding members were the International Renewable Energy Agency (IRENA), the Global Wind Energy Council (GWEC), and the Government of Denmark.³

The alliance aims to sharply increase offshore wind power on a large scale at a competitive cost to realize carbon neutrality and limit warming to 1.5 degrees Celsius. Since its launch, the alliance has invited new partners from the public and private sectors to join.⁴ So far, nine countries, including Belgium, Colombia, Germany, Ireland, Japan, the Netherlands, Norway, the UK, and the U.S., have joined GOWA. Participating countries have agreed to work together to introduce offshore wind power generation to new markets and expand its presence in existing markets.⁵

1.2 Japan's Contributions to Develop Offshore Wind Power Generation

Meanwhile, there has been growing momentum to develop offshore wind energy sources in Japan. The 2nd Global Offshore Wind Summit, an international event, was held by the Japan Wind Power Association (JWPA) and its partners, the GWEC and Akita's Prefectural Government Office, from November 9-11 in Akita City, Akita Prefecture. The summit was supported by Japanese agencies, including the Ministry of Land, Infrastructure, Transport and Tourism (MLIT), the Ministry of Economy, Trade

¹ https://www.mofa.go.jp/mofaj/ic/ch/page1_001420.html

² <https://www.denkishimbun.com/archives/242490>

³ <https://citizensustainabilitysummit.org/collections/sustainability/products/session-4-soft-launch-of-global-offshore-wind>

⁴ <https://gwec.net/new-global-alliance-taps-into-offshore-wind-enormous-potential/>

⁵ <https://www.irena.org/News/pressreleases/2022/Nov/Nine-new-countries-sign-up-for-Global-Offshore-Wind-Alliance-at-COP27>

and Industry (METI), the Ministry of the Environment (MOE), and the Ministry of Foreign Affairs (MOFA).

Construction work on offshore wind farms is currently underway at two ports in Akita Prefecture, and there are also multiple wind farm promotion zones off the coast.⁶ The summit consisted of a series of workshops and discussion panels, and involved world-leading offshore wind power companies and relevant municipal governments. Several companies and foreign embassies in Japan set up exhibition booths at the summit to provide opportunities for business engagement.⁷

Japan plans to build and utilize offshore wind power plants with an expected capacity of 5.7 GW, equivalent to six nuclear power plants, by Fiscal Year (FY) 2030. In December 2021, the Government of Japan announced four new Offshore Wind Development Promoting Zones with an expected capacity of 1.7 GW. Two areas are off the coast of Akita Prefecture, one is off the coast of Chiba Prefecture, and one is off the coast of Nagasaki Prefecture. The zones will be regulated through the Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities.⁸ In addition, at the end of September 2022, the following four areas were selected as new Offshore Wind Development Promoting Zones:

- Off the coast of Eshima in Saiki City, Nagasaki Prefecture,
- Off the coast of Murakami City and Tainai City, Niigata Prefecture,
- Off the coast of Oga City, Katagami City and Akita City, Akita Prefecture, and
- Off the coast of Happouchou and Noshiro City, Akira Prefecture

There are five more anticipated areas for future zones and 11 more areas that are in the preparatory stage. The total maximum capacity across all 24 areas is estimated to be over 12 GW.⁹

⁶ <https://gows-j.com/>

⁷ <https://gows-j.com/event.html>

⁸ <https://www.nikkei.com/article/DGXZQOUC191HS0Z11C22A0000000/>

⁹ <https://infrabiz.co.jp/3344/>

2 The New Energy and Industrial Technology Development Organization has Launched a Blue Ammonia Production Pilot Project¹⁰

On November 15, 2022, the New Energy and Industrial Technology Development Organization (NEDO), a Japanese public funding organization, announced that it had launched a blue ammonia production pilot project under its Ammonia Fuel Utilization and Production Technologies Development segment. The project aims to develop ammonia fuel, which does not release carbon dioxide (CO₂) into the atmosphere when burned, to advance decarbonization of the power and heat sectors and to help achieve Japan's goal to become carbon neutral by 2050. The project seeks to develop CO₂-free blue ammonia fuel by separating and recovering CO₂ through an ammonia production process using natural gas-based hydrogen.

In October 2020, the Japanese government declared its goal to become carbon neutral by 2050. As part of this goal, the government prioritized using hydrogen and ammonia-based fuels. The 6th Strategic Energy Plan, approved by the Cabinet in October 2021, has set a goal to introduce 30% hydrogen co-firing to gas-fired power plants and 20% ammonia co-firing to coal-fired power plants, as well as the development of 100% hydrogen-fired power plants. The annual demand for hydrogen in Japan is expected to reach a maximum of 3 million tons by 2030, including approximately 0.5 million tons of hydrogen exclusively used for ammonia fuel. The government also aims to increase the share of hydrogen and ammonia power generation in Japan's energy mix to about 1% by Fiscal Year (FY) 2030. NEDO has begun subsidizing and supporting a blue hydrogen production project in Niigata Prefecture.¹¹

2.1 General overview of the project

INPEX, a Japanese oil and gas production company selected by NEDO, will build hydrogen production facilities, ammonia fuel production facilities, and CO₂ capture facilities at the Hirai District of its Higashi-Kashiwazaki Gas Field in Kashiwazaki City, Niigata Prefecture. After the construction is completed, the natural gas produced at INPEX's neighboring Minami-Nagaoka gas field site will be transported to the Hirai District through an existing pipeline. The project aims to produce 700 tons of blue hydrogen per year. Most of the blue hydrogen produced will be used for blue ammonia production (500 tons/year), and the remaining hydrogen will be utilized for power generation. CO₂ generated during hydrogen and ammonia production will be separated, pressurized, and stored underground at the site to prevent its release into the atmosphere.

INPEX and the Japan Organization for Metals and Energy Security (JOGMEC) will jointly conduct research on CO₂ injection into the depleted Higashi-Kashiwazaki gas reservoirs and on enhanced gas recovery (EGR) technology to develop carbon capture, utilization, and storage (CCUS) methods that can inject captured carbon into underground storage. The two organizations have previously worked together to explore various technical

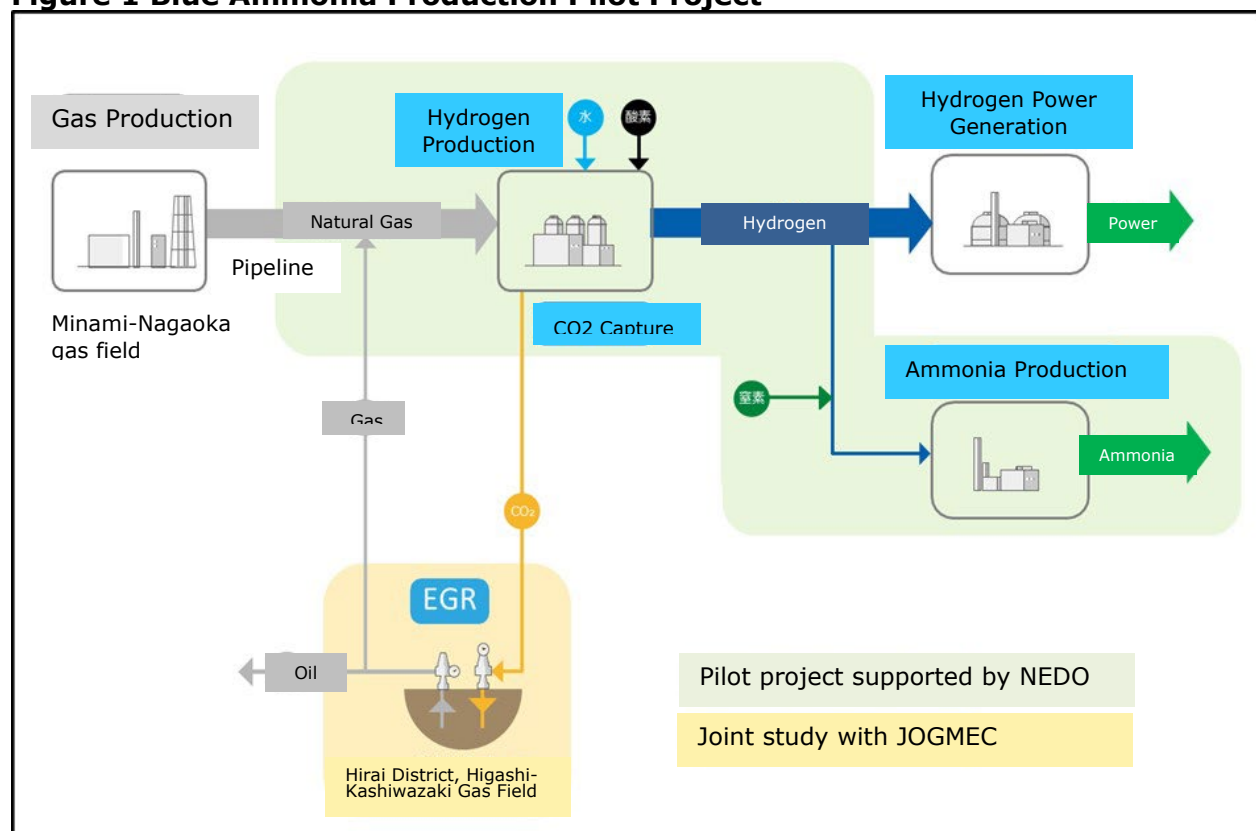
¹⁰ https://www.nedo.go.jp/news/press/AA5_101590.html

¹¹ Blue hydrogen is a method that captures and stores CO₂ generated in the process of reforming natural gas and coal as well as hydrogen production before the CO₂ is released into the atmosphere.

aspects of blue hydrogen and ammonia production as part of their work to develop Japan's hydrogen and ammonia supply chain.

- ✓ Project Name: Technology Development of Ammonia Fuel Utilization and Production / Technology Development of Blue Ammonia Production
- ✓ Duration: FY2022 - FY2025
- ✓ FY2022 Subsidiary: 3.7 million USD (Planned)
- ✓ Subsidiary Recipient: INPEX Co., Ltd.

Figure 1 Blue Ammonia Production Pilot Project



Source: NEDO¹²

The pilot project will operate from FY2022-FY2025. By the end of the project, NEDO and JOGMEC expect to 1) achieve a CO2 recovery rate of 90% or more during the production process while maintaining the same level of efficiency as the Haber-Bosch process; 2) optimize the overall process by reducing the energy consumption by 20% or more, compared to the current production methods; and 3) identify challenges and issues for future large-scale production (at levels of 6,000 tons of ammonia production per day, and a cost of about \$300 per ton).

¹² https://www.nedo.go.jp/news/press/AA5_101590.html

The advanced blue ammonia production method developed by this pilot project, with the creation of ammonia fuel demand in industrial furnaces, is expected to reduce the ammonia fuel production costs in Japan to \$200-340 per ton by 2040.¹³

¹³ <https://www.nedo.go.jp/content/100946607.pdfpdfp.3>

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