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Japanese offshore wind market overview

Japan has a long history in maritime construction and technological innovation. The nation strives to reach net zero by 2050 and increase its energy independence through domestic energy resources, such as solar, hydropower, wind and nuclear energy

Boasting the sixth longest coastline in the world (29,751km) and the eighth largest exclusive economic zone (4.47 million km²), the nation is a natural contender for offshore wind deployment, particularly floating wind due to their narrow continental shelf and steep slope (waters too deep for conventional fixed-bottom foundations).

Global first

It's no surprise then that Japan was one of the first countries in the world to venture into floating wind. In 2015, when the world's largest turbine on a fixed foundation was 7MW, the Fukushima consortium installed a 7MW turbine on a semi-submersible floater (Fukushima Shimpuu).

Local and international developers continue to express interest in the market, which has an immense amount of technical potential – the World Bank estimates a theoretical capacity of 1,897GW of offshore wind (1,775GW floating; 122GW fixed-bottom). To date, 342MW of offshore wind (19MW floating; 323MW fixed-bottom) has been installed in Japan, with a further 255MW currently in construction (17MW floating wind; 238MW fixed-bottom).

Regulatory frameworks

Japan currently has two governing frameworks for the development of offshore wind farms (excluding demonstration projects). The 'Act of Promoting Utilisation of Sea Areas in Development of Power

Generation Facilities' of 2018 governs territorial sea areas, while the 'Port and Harbour Act' of 2016 governs projects within port areas.

Territorial seas

Under the 2018 act on marine renewable energy, the government selects sites to put to tender, also awarding offtake in the same process. To date, 27 sites have been announced (table below).

In the table, 'MW' refers to the minimum expected offshore wind capacity at the specific site; 'dist. (km)' measures the proposed

windfarm area's minimum distance from shore; and 'depth (m)' refers to the maximum water depth where foundations will be installed.

Tender sites are organised into rounds, with four sites typically put to auction each round. The first Round of auctions (Round 1) concluded in December 2021 with three-fixed bottom sites (1.7GW; now proposed to be 1.9GW based on 14MW turbines) awarded to Mitsubishi-led consortia and one floating wind site (17MW) awarded in June 2021 to the sole bidder for the Goto site, a consortium led by TODA Corporation.

ROUND	FOUNDATION & SITE	STATUS/DESIGNATION	STATUS DATE	PREFECTURE	MW	DIST. (KM)	DEPTH (M)	INSTALLATION YEAR
1	Goto	Awarded	Jun-21	Nagasaki	17	5	140	2022
1	Choshi	Awarded	Dec-21	Chiba	391	2	50	2027
1	Yurihonjo	Awarded	Dec-21	Akita	819	2	50	2029
1	Noshiro, Mitane, Oga	Awarded	Dec-21	Akita	479	1	50	2027
2	Happo-Noshiro	Auction closed	Jun-23	Akita	356	1	50	2029
2	Oga, Katagami, Akita	Auction closed	Jun-23	Akita	334	1	50	2030
2	Enoshima Saikai	Auction closed	Jun-23	Nagasaki	424	2	50	2030
2	Murakami and Tainai	Auction closed	Jun-23	Niigata	700	1	50	2030
3	Aomori South	Promotion	Sep-23	Aomori	600	1	50	After 2030
3	Yuza Town	Promotion	Sep-23	Yamagata	450	1	50	After 2030
3	Isumi	Promising	Sep-21	Chiba	410	2	50	After 2030
3	Aomori North	Promising	Jul-20	Aomori	300	1	50	After 2030
TBC	Gan-u and Minami-Shiribeshi	Promising	May-23	Hokkaido	560	TBC	50	After 2030
TBC	Hiyama	Promising	May-23	Hokkaido	910	TBC	50	After 2030
TBC	Ishikari Bay	Promising	May-23	Hokkaido	910	1	50	After 2030
TBC	Shimamaki	Promising	May-23	Hokkaido	440	1	50	After 2030
TBC	Matsumae	Promising	May-23	Hokkaido	250	TBC	50	After 2030
TBC	Kujukuri	Promising	Sep-22	Chiba	400	10	50	After 2030
TBC	Nyuzen Town and Asahi Town	Promising	Sep-22	Toyama	TBC	TBC	50	After 2030
TBC	Sakata	Promising	Oct-23	Yamagata	TBC	TBC	50	After 2030
TBC	Mutsu Bay	Preparation	Jul-19	Aomori	300	1	50	After 2030
TBC	Awara	Preparation	Sep-21	Fukui	TBC	TBC	50	After 2030
TBC	Hibikinada	Preparation	Sep-21	Fukuoka	TBC	TBC	50	After 2030
TBC	Karatsu	Preparation	Sep-21	Saga	TBC	TBC	50	After 2030
TBC	Kuji	Preparation	Sep-21	Iwate	700	TBC	~200	After 2030
TBC	Gan-u and Minami-Shiribeshi	Preparation	Oct-23	Hokkaido	TBC	TBC	~200	After 2030
TBC	Shimamaki	Preparation	Oct-23	Hokkaido	TBC	TBC	~200	After 2030



Potential

Several of the proposed auction sites have the potential for floating wind, with developers submitting environmental impact assessments (EIAs) covering both fixed and floating foundation types, extending to project areas with water depths around 200m. Four out of the 27 sites announced may host floating windfarms: Goto in Nagasaki prefecture (17MW), Kuji in Iwate prefecture (~700MW), Ganu-Minamishiribeshi in Hokkaido prefecture and Shimamaki also in Hokkaido prefecture. Out of those four, only Goto has reached construction, with the remainder expected to open to auction in future rounds.

Round 2, also with four sites (1.8GW), recently closed to bids in June 2023, with award expected in December at the earliest or in early-2024. Round 3 is expected to start in December 2023, with two sites (1.1GW) being designated as 'promotion zones' in September 2023 – the 'promotion' status being the final stage of designation before an auction can commence.

Three-Step designation process

A site passes through up to three designations before it is opened to tender. Prefectures provide information for potential auction sites, a process that may take several years from site selection to auction award. The three designations are as follows:

Preparation – the first designation (preparatory) is for sites that have undergone preliminary surveys and feasibility reviews. Some sites skip this step and are designated as 'promising zones'

Promising – in the second stage (promising), wind and geological

surveys are conducted, a council for local coordination is formed and grid capacity is decided

Promotion – once a site reaches the final stage (promotion), it has undergone all the necessary procedures to open to auction, at which point an auction may begin in the next few months (three to five typically)

Port and harbour areas

The other governing framework for offshore wind, the 'Port and Harbour Law', allows developers to build and operate an offshore wind project within designated port areas for a period of 20 years. To date, more than 600MW across five projects has been leased by port authorities – Akita Port (55MW), Noshiro Port (84MW), Ishikari New Bay Port (112MW), Kitakyushu Port/"Hibikinada" (238MW), and Kashima Port (160MW). The first three projects have been constructed, while the Hibikinada project is expected to begin foundation installation in November.

In line with these developments, Japan has also designated five offshore wind base ports/hubs to support storage, fabrication, transport, installation and O&M activities within the sector. The five base ports are Akita Port, Noshiro Port, Kitakyushu Port, Kashima Port and the newly designated Niigata Port (April 2023).

Exclusive economic zone Beyond the two main frameworks, the government is working on new legislation for offshore wind development in Japan's Exclusive Economic Zone (EEZ), any areas more than 12 nautical miles from shore. How sites in the EEZ will

be selected or how projects will be permitted have not yet been decided – it may be through a competitive auction process similar to projects within territorial seas, it may be through a mechanism as yet undesignated, or something else entirely (a combination of schemes, open-door, etc.)

Opening up the EEZ, would give the country a pipeline of floating wind projects with a route to market and facilitate large-scale floating wind deployment, as developers in the short-to-medium term (~10 years) can only proceed with the fixed-bottom sites that have been announced by the government and the few potential floating wind sites, unless further floating sites are announced or a new mechanism for development is introduced.

There is also mounting pressure from the industry for the government to raise its 2040 targets from the current range of 30-45GW, as at least 30GW could be fixed-bottom.

Conclusion

Japan possesses natural advantages that position it as a prominent player in the global offshore wind industry. The regulatory landscape in Japan is evolving to accommodate the sector, with floating wind attracting more attention. Although the promise of the EEZ remains uncertain, Japan already has distinct frameworks for territorial seas and port areas and has designed a clear designation process for potential tender sites, ensuring that assessments and stakeholder engagement take place for years before a windfarm is built.

Discussions on how to permit floating wind, the inclusion of Niigata Port as a base hub, the steady progression of the auction process and other aspects not discussed (e.g. the Green Innovation Fund and port investment and upgrade plans) underscore Japan's commitment to offshore wind.

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