

Japan's Offshore Wind Revolution: Powering a Sustainable Future

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Japan, a nation renowned for its technological prowess and innovation, is making waves in the global renewable energy sector. With its extensive coastline and ambitious climate goals, the country is emerging as a powerhouse in offshore wind energy within the region. This article delves into the latest developments, challenges, and future prospects of Japan's burgeoning offshore wind market.

Strategic Vision for a Greener Japan

Japan's commitment to renewable energy is not just a fleeting trend but a cornerstone of its national energy strategy. The government has set forth ambitious targets that underscore its dedication to a sustainable future:

- A staggering 30-45 GW of offshore wind power capacity by 2040
- Increasing the share of renewable energy in the national energy mix from 20.2% in 2021 to 36-38% by 2030
- Boosting wind power's contribution to 5% of the energy mix by 2030

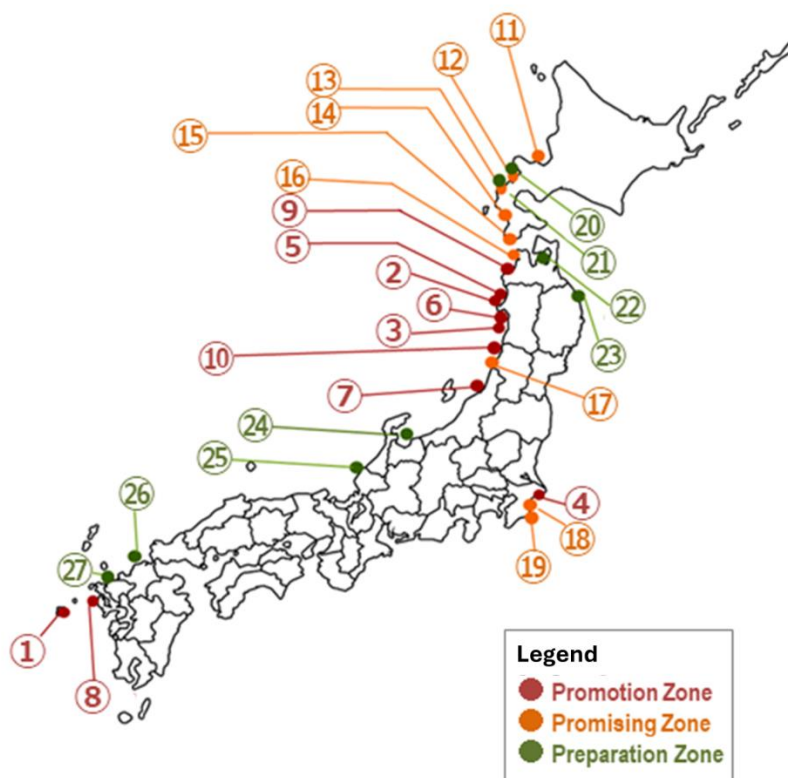
These targets are not mere numbers; they represent Japan's resolute march towards carbon neutrality by 2050. The offshore wind sector is poised to play a pivotal role in this green revolution, offering a clean, abundant, and increasingly cost-effective energy source.

Regulatory Tailwinds

To transform its offshore wind ambitions into reality, Japan has crafted a robust regulatory framework. The Marine Renewable Energy Act of 2019¹ stands as a testament to this commitment, providing developers with the stability needed for long-term investments by allowing them to occupy sea areas for up to three decades.

The Japanese government continues to be proactive in its approach. It is currently developing plans to expand offshore wind projects into Japan's Exclusive Economic Zone (EEZ). This strategic initiative has the potential to substantially increase the country's wind energy resources and solidify Japan's status as a prominent player in the offshore wind sector.

¹ "Act on Promoting Utilization of Sea Areas for Development of Power Generation Facilities Using Maritime Renewable Energy Resources" (enforced in April, 2019)



Zone	No.	Sea Area	Foundation	Capacity, MW	Status
"Promotion"	1	Off Goto City, Nagasaki	Floating	17	Operator designated
	2	Off Noshiro/Mitane Town/Oga City, Akita	Fixed	494 (478)	Operator designated (R1)
	3	Off Yurihonjo City, Akita (North/South)	Fixed	845 (819)	Operator designated (R1)
	4	Off Choshi City, Chiba	Fixed	403 (390)	Operator designated (R1)
	5	Off Happo Town/Noshiro City, Akita	Fixed	360 (356)	Operator designated (R2)
	6	Off Oga City/Katagami City/Akita City, Akita	Fixed	315 (336)	Operator designated (R2)
	7	Off Murakami City/Tainai City, Niigata	Fixed	684 (700)	Operator designated (R2)
	8	Off Enoshima Is., Saikai City, Nagasaki	Fixed	420 (424)	Operator designated (R2)
	9	Off Aomori (Japan Sea South)	Fixed	600 (615)	Operator designated (R3)
	10	Off Yuza Town, Yamagata	Fixed	450 (450)	Operator designated (R3)
"Promising"	11	Off Ishikari City, Hokkaido	Fixed	910 - 1140	
	12	Off Gan-wu/S. Shiribeshi, Hokkaido	Fixed	560 - 710	
	13	Off Shimamaki, Hokkaido	Fixed	440 - 560	
	14	Off Hiyama, Hokkaido	Fixed	910 - 1140	
	15	Off Matsumae, Hokkaido	Fixed	250 - 320	
	16	Off Aomori Pref. (Japan Sea North)	Fixed	300	
	17	Off Sakata City, Yamagata	Fixed	500	
	18	Off Kujukuri, Chiba	Fixed	400	
	19	Off Isumi City, Chiba	Fixed	410	
"Preparation"	20	Off Gan-wu/S. Shiribeshi, Hokkaido	Floating		
	21	Off Shimamaki, Hokkaido	Floating		
	22	Off Mutsu Bay, Aomori	Fixed		
	23	Off Kuji City, Iwate	Floating		
	24	Off Eastern part of Toyama Pref.	Fixed/Floating		
	25	Off Awara, Fukui	Fixed		
	26	Off Hibikinada, Fukuoka	Fixed		

Note: Capacity in brackets is reported planned project installed capacity

Exhibit 1: Promotion zone designation under the Marine Renewable Energy Act of 2019 (modified after METI, Aug 2024)

Auction Dynamics: Fostering Competition and Innovation

Japan's offshore wind auction process has been a catalyst for growth and innovation in the sector. Through three rounds of auctions, the country has refined its approach, attracting a diverse array of domestic and international players.

First Round (2021): Setting the Stage

The inaugural tender saw a consortium led by Mitsubishi Corporation, and including Chubu Electric Power, securing all three fixed-bottom projects:

- Noshiro-Mitane-Oga (478 MW)
- Yurihonjo (819 MW)
- Choshi (390 MW)

Japan's Round 1 offshore wind auction was conducted under the Feed-in Tariff (FIT) regime. The evaluation criteria were heavily weighted towards price, with less emphasis on non-price factors. The auction was dominated by a single consortium, Mitsubishi Corporation and Chubu Electric Power, which won all three sites.

Bid prices for the individual projects ranged from JPY 11.99/kWh (Yurihonjo) to 16.49/kWh (Choshi). The winning bids were notably lower than the upper price limit set for each auction. At the time, the low bid prices raised concerns in the market about the consortium's ability to cover project costs.

Second Round (2023): Diversifying the Playing Field

The second round introduced revised auction rules, resulting in a more diverse set of winners:

- Oga-Katagami-Akita, Akita Prefecture (336 MW): JERA, J-Power, Itochu, and Tohoku Electric
- Murakami-Tainai, Niigata Prefecture (700 MW): Mitsui, RWE, and Osaka Gas
- Saikai-Enoshima, Nagasaki Prefecture (424 MW) : Sumitomo and TEPCO Renewable Power
- Happo-Noshiro, Akita Prefecture (356 MW): Japan Renewable Energy (ENEOS subsidiary, renamed as ENEOS Renewable Energy in April 2024), Iberdrola Renewables Japan, and Tohoku Electric Power

The Round 2 offshore wind auction was conducted under the Feed-in Premium (FIP) regime. The results for three areas were announced in December 2023, while the fourth area's result was released in March 2024. The auction attracted multiple bidders for each area, with three to four consortia competing for individual sites.

For Oga-Katagami-Akita, Murakami-Tainai, and Happo-Noshiro the winning bid price was JPY 3/kWh, while for Saikai-Enoshima, it was JPY 22.18/kWh. The low level of some of the bids indicates they are relying on securing revenue outside the FIP scheme. These projects will also need to drive aggressive cost reduction.

Commercial operation dates for the projects detailed as part of the bids is planned for 2028 to 2029; an ambitious development timeline for a relatively immature offshore wind market. However, this does align with Japan's goal of having 10 GW of offshore wind capacity by 2030.

Third Round (2024): Consolidating Growth

The most recent auction, concluded in December 2024, awarded two significant projects:

- Sea of Japan (South), Aomori (615 MW): JERA, Green Power Investment, and Tohoku Electric
- Yuza, Yamagata (450 MW): Marubeni, Kansai Electric, BP, Tokyo Gas, and Marutaka

These auctions have not only attracted major players but have also evolved to incorporate lessons learned, emphasizing project execution speed, revising pricing proposal scoring, and transitioning to a feed-in-premium system.

All bidders submitted a price of JPY 3/kWh for both projects. This price point provided the maximum points for the price component of the evaluation. Additionally, all bidders committed to a commercial operation date (COD) of June 30, 2030. This uniformity in proposed timelines further intensified the competition.

With identical pricing and COD proposals, the selection process likely emphasised non-price criteria. Factors such as technical capability, coordination with the local government and fisheries have played crucial roles in determining the winners according to Ministry of Economy, Trade, and Industry. The participation of multiple consortia highlights the trend of companies forming strategic partnerships to enhance their competitive edge. We saw Japanese firms partnering with Western players to leverage expertise and drive growth.

Technological Frontiers: Floating into the Future

Japan's unique geographical challenges, particularly its deep coastal waters, have spurred innovation in floating offshore wind technology. The government is actively championing this cutting-edge approach, with a roadmap for floating offshore wind power expected in 2025.

Several small-scale demonstration projects are already operational, paving the way for future commercial-scale deployments. This focus on floating technology could position Japan as a global leader in this nascent but promising sector of the offshore wind industry.

Turbines of Tomorrow

The Japanese offshore wind market is set to benefit from the latest advancements in turbine technology.

In the most recent auctions, both projects selected Siemens Gamesa as preferred turbine supplier. The projects will likely use Siemens Gamesa's latest offshore wind turbine models, which could include the SG 14.0-222 DD or even more advanced versions. The company's turbines for the Japanese market are tailored to meet local codes and standards regarding typhoons, seismic activities, and operation in various ambient temperatures.

Vestas has confirmed that its V236-15.0 MW turbine will make its Asia-Pacific debut in Japan, announcing an order for 21 turbines for the Oga Katagami Akita Offshore Wind Project. This 15 MW colossus represents a further leap in capacity, promising to enhance project economics and efficiency.

Building the Backbone: Infrastructure and Supply Chain

Recognizing that a robust offshore wind sector requires more than just turbines, Japan is making significant strides in infrastructure and supply chain development:

- **Port Transformation:** Ports like Akita, Noshiro, and Kitakyushu are being reimagined as offshore wind hubs, capable of supporting the construction and maintenance of large-scale projects.
- **Specialized Vessels:** Japanese companies are investing in cutting-edge installation vessels, with new ships slated for delivery in 2025 and 2026
- **Local Supply Chain:** Efforts are underway to cultivate domestic capabilities in critical areas such as foundation manufacturing, cable production, and electrical components.

Navigating Challenges, Embracing Opportunities

While the future of Japan's offshore wind sector looks bright, it is not without its challenges:

- **Grid Integration:** Upgrading and expanding Japan's grid infrastructure to accommodate the influx of offshore wind power is a significant hurdle.
- **Environmental and Social Considerations:** Balancing offshore wind development with environmental conservation and existing marine users requires careful planning and stakeholder engagement.
- **Technical Hurdles:** Japan's seismic activity and exposure to typhoons necessitate innovative approaches to offshore wind project design.

However, these challenges are dwarfed by the immense opportunities that offshore wind presents for Japan:

- Potential leadership in floating offshore wind technology, opening new markets and export opportunities
- Enhanced energy security through reduced reliance on imported fossil fuels
- Economic revitalization through job creation and industrial development
- Acceleration of decarbonization goals, positioning Japan as a global climate leader

The Horizon Ahead

As Japan continues to refine its policies, develop its infrastructure, and invest in cutting-edge technology, the nation is charting a course to become a titan in the global offshore wind industry. Key developments to watch include:

- Future auction rounds and potential refinements to the bidding process
- Implementation of legislation to expand development into the EEZ
- Commercialization of floating wind technology
- Maturation and expansion of the domestic offshore wind supply chain

While Japan has set ambitious targets for offshore wind development, achieving these goals will require overcoming significant technical, financial, and regulatory challenges. The nation's ability to address these issues will determine the extent to which offshore wind contributes to its energy mix and climate objectives.

The offshore wind sector in Japan is still in its early stages, and its long-term impact on the country's energy landscape and global climate efforts remains to be seen. Cautious optimism, rather than unbridled enthusiasm, is warranted as Japan navigates the complex path of offshore wind development.

About EPI Group

EPI Group is a leading provider of specialist geoscience, environmental and technical services for a wide range of industries. Established in 1987, our passionate, practical and highly knowledgeable team has been delivering independent, intelligent, and commercial solutions for clients for decades.

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We deliver specialist technical solutions and serve as a collaborative workforce partner. Our services are locally delivered by a team of highly experienced technical experts, problem solvers and value creators, supplemented by a trusted network of associate consultants.

EPI Group specialises in supporting both the hydrocarbon and renewable energy sectors, but our experience also extends to mining and capital infrastructure projects.

Contact our team to discuss how we can support your projects in Japan and elsewhere.

Sources:

[The designation of promotion zones based on the Act on the Utilization of Renewable Energy Sea Areas and the organization of promising areas were organized](#) (METI, Sep 2022)

[Japan's Strategy to Expand Renewable Energy Contributes to the World's Efforts toward Tripling Renewable Energy \(Provisional translation\)](#) (METI, Aug 2024)

[Selection of Offshore Wind Power Generation Operators in Oga City, Katagami City, and Akita City, Akita Prefecture, Murakami City and Tainai City, Niigata Prefecture, and Off Ejima, Saikai City, Nagasaki Prefecture](#) (METI, Dec 2023)

[Selection Results of Offshore Wind Power Producers in Happo Town and Noshiro City, Akita Prefecture](#) (METI, Mar 2024)

[Results of selection of offshore wind power generation companies in the Sea of Japan off the coast of Aomori Prefecture \(south side\) and off Yusa-cho, Yamagata Prefecture](#) (METI, Dec 2024)

[\(Appendix 1\) Evaluation results for "Southern Sea of Japan off the coast of Aomori Prefecture" and "Offshore Yuza Town, Yamagata Prefecture"](#) (METI, Dec 2024)

[Vestas wins 315 MW offshore order in Japan](#) (Vestas, Dec 2024)

About the authors



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Lee has 25 years of experience in the energy industry, covering various executive management, commercial, operational, strategic, and consulting roles. His experience includes working for major investor-owned utilities and in the consultancy sector, holding numerous leadership positions and leading significant renewable energy development projects. Lee joined EPI Group in 2024 as Managing Director of Sustainable Energy Services, responsible for building and optimizing the firm's services and solutions for clients in the renewable energy and carbon net-zero sectors.



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