

provisional translation

Vision for Offshore Wind Power Industry (1st)

December 15, 2020

**Public-Private Council on Enhancement of
Industrial Competitiveness for Offshore Wind
Power Generation**

1 . Vision background

Offshore wind power is a power source that can be introduced on a large scale, while at the same time significantly reducing the burden on the public through reduced costs and having major ripple effects on the economy. As the most anticipated of all renewable energy sources, it will need to be introduced to its maximum extent for the world to achieve carbon neutrality by 2050.

In order to establish offshore wind power as the main power source in Japan as the country steadily works to achieve this target under the “Act on Promoting the Utilization of Sea Areas for the Development of Marine Renewable Energy Power Generation Facilities” (hereinafter referred to as the “Act on Promoting Utilization of Sea Areas for Renewable Energy Generation”), which came into effect in April 2019 with the aim of expanding the introduction of offshore wind power generation, it is important to strengthen the competitiveness of the offshore wind power Industry and make earnest efforts to reduce costs.

For this reason, the Government of Japan (hereinafter referred to as “GOJ”) and the Industry established the “Public-Private Council on Enhancement of Industrial Competitiveness for Offshore Wind Power Generation” (hereinafter referred to as the “Council”) in July 2019 to realize a mutually “virtuous” cycle to promote unified efforts by the public and private sectors to expand the introduction of offshore wind power generation through the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, strengthen the competitiveness of related industries, and develop domestic industrial clusters and infrastructure necessary to achieve this end. In addition, more in-depth studies were carried out by "working groups" established under the Council in September of this year.

This Vision summarizes a defined direction for mid- to long-term GOJ and the Industry targets, the targeted to-be state, and initiatives to achieve targets based on the results of these studies. GOJ will continue joint public-private sector discussions, successively undertake initiatives to realize this Vision, and review it as required.

2 . Basic approach to strengthening competitiveness of the offshore wind power industry

Given the feasibility of large-scale introduction and cost reductions as well as the anticipated economic ripple effects, offshore wind power generation holds the key to making renewable energy a main source of power. With a project scale of several tens of billions of yen and the number of pieces of equipment and parts totaling in the tens of thousands, the economic ripple effect on related industries will be significant.

The global offshore wind power market is currently enjoying steady growth, and analyses by international organizations project the introduction of 562 gigawatts (GW) of offshore wind power generation capacity worldwide by 2040, about 24 times higher than that of 2018¹.

Europe, in particular, has led the way in terms of introduction of large-scale offshore wind power generation capacity since the 1990s, forming a supply chain for wind turbine manufacturing across the region, while leveraging natural conditions in the form of stable westerly winds and shallow sea beds as well as social conditions such as industrial infrastructure for North Sea oil fields and port infrastructure that had long been in place. In such regions, cost reductions have been made over the past decade through the enlargement of wind turbines and investment in mass wind turbine production while at the same time reducing transportation costs by building factories close to demand areas. Against this backdrop, there have been cases where companies have won bids to supply wind power at less than 10 yen/kWh or at market price (unsubsidized).

Meanwhile, the Asian offshore wind power market is expected to grow rapidly going forward, with Asia projected to account for 41% of the global market in 2030². This has spurred European and U.S. wind turbine manufacturers to enter the Asian market in earnest, while competition to attract industry players has begun across the region.

Even in Japan, public tenders (four sites, approx. 1.5GW) based on the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation started this fiscal year, and efforts mainly by power producers to win projects have been ramping up across the supply chain. On the other hand, wind turbines are currently imported from overseas due to the absence of manufacturing sites in Japan, and the reality is that both the potential of domestic parts manufacturers with technical capabilities built up through their experience in onshore wind power and manufacturing sites in Japan are not being fully utilized.

In light of this, it is important to make full-scale efforts to introduce offshore wind power in Japan from both an energy policy and industrial policy perspective while reducing costs by cultivating Japan's offshore wind power industry and strengthening

¹ IEA “Offshore Wind Outlook 2019” (Sustainable Growth Scenario)

² GWEC “Global Offshore Wind Report 2020”

competitiveness. It is also vital for the public and private sectors to work together to build strategies to capture growth markets in Asia in the future.

The key to achieving this end is the promotion of investment by the Industry, but some players have expressed their hesitation to invest without a clear picture of the wind power market size. For this reason, the public and private sectors will work together to promote initiatives to strengthen the industrial competitiveness of offshore wind power based on the following direction, which constitutes GOJ and the Industry's basic policy for wind power introduction.

1. Firstly, GOJ commits to creating an attractive domestic offshore wind power market to attract domestic and foreign investment.
2. On top of that, GOJ and the Industry will develop a competitive and resilient domestic supply chain by promoting investment through the establishment of business and other infrastructure.
3. In addition, GOJ and the Industry will engage in next-generation technology development and international cooperation with an eye to expanding into Asia and create next-generation industries that can compete on the global stage.

3. Direction of specific initiatives

3-1. Creation of an attractive domestic market

In order to newly establish an offshore wind power supply chain in Japan, it is necessary to first attract investment from both Japan and overseas. The Industry has expressed the view that it is necessary to project the size of the market in order to make investment decisions. Therefore, GOJ will set clear introduction targets as well as promote efforts to realize them so that targets don't just become a "pie in the sky."

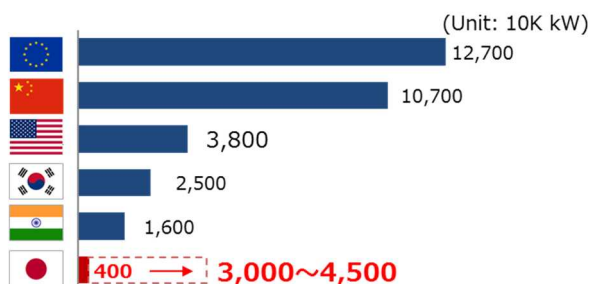
(1) Presentation of introduction targets and areas set by GOJ

GOJ sets offshore wind power generation introduction targets³ as follows.

- GOJ will continue to designate promotion zones to generate approximately 1GW of offshore wind power per year for 10 years, awarding capacity of 10GW by 2030 and 30-45GW, including floating offshore wind, by 2040.

Although the Action Plan of the Growth Strategy (decided December 1, 2020) sets out the goal of "creating large-scale construction-related demand in Japan by 2040 in the form of 30GW of offshore wind power capacity and 30 large-scale thermal power plants," GOJ will raise introduction targets by 2040 in order to attract investment from the Industry⁴ toward achieving carbon neutrality in 2050. However, to realize capacity of 45GW, it is necessary to drastically reduce floating offshore wind costs going forward through technological development and mass production.

**IEA-forecasted offshore wind power introduction
based on government targets in each country (2040)**

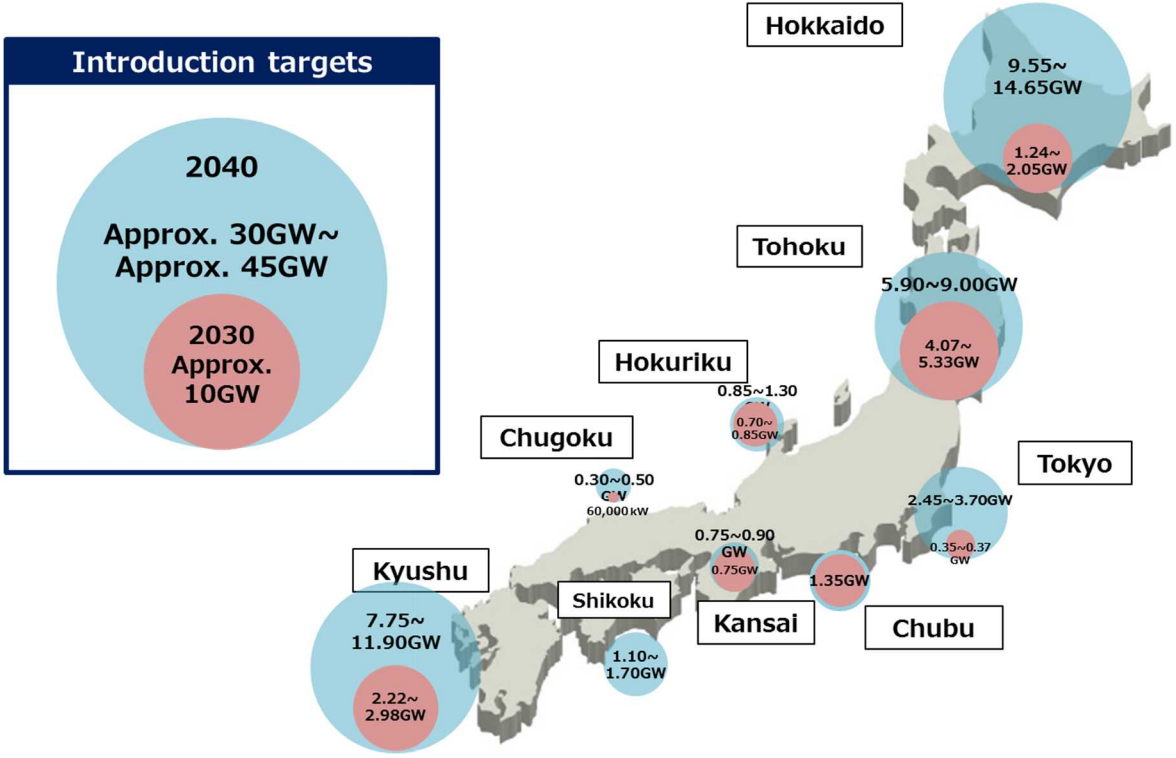


(Source) IEA Offshore Wind Outlook 2019 (Public Policy Scenario)

³Authorized capacity under the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities ("Renewable Energy Special Measures Act").

⁴ There was an opinion from the Industry that "the wind power market size required for investment decisions will be 1GW per year for 10 years, and 30-45 GW by 2040" at the 1st Council .

In addition, since it is necessary to anticipate specific areas for offshore wind power introduction when considering the development of infrastructure such as power grids and ports and harbors, GOJ and the Industry created the following map based on a defined perspective to show the areas around Japan where offshore wind power generation capacity will be introduced⁵.



⁵Figures for 2030 are based on projects that are undergoing environmental assessment (as of end of October 2020, including some projects for which environmental assessment has been completed). Figures for 2040 are based on LCOE (Levelized Cost of Energy) and other data from the NEDO Report on the Support Project for the Development of Floating Wind Farms (Study of Offshore Wind Power Generation Costs), reviews by experts, and the status of environmental assessments by power producers. In preparing this map, the potential of floating wind power farms was not factored in.

(2) Initiatives toward the realization of introduction targets

To ensure that the above offshore wind power capacity introduction targets don't just become a "pie in the sky," it is necessary to accelerate project development in each area and to systematically establish infrastructure in the form of power grids and ports and harbors required for the offshore wind power generation business.

A) Introduction of GOJ-led push-type project scheme (Japan version of a centralized model)

In order to achieve offshore wind power capacity introduction targets, continuous development of wind farm projects is dispensable. When undertaking projects, it is also necessary to simultaneously carry out wind condition and geological surveys, environmental assessments, regional coordination, and grid-related measures.

The Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, which came into effect last year, establishes a framework for carrying out these measures, including public tenders to select entities to conduct offshore wind power projects in four promotion zones and the establishment of a council for regional coordination. On the other hand, grid operators continue to carry out early-stage basic surveys and secure power grids, and it has been pointed out that in some regions, work carried out by multiple operators has led to inefficiencies. Since development risk is high, GOJ needs to take more of a lead in project development, with reference to precedents in Europe.

Therefore, GOJ together with local governments will be involved from the initial stage in establishing a system to more quickly and efficiently conduct wind and other surveys and secure power grids in a timely manner (Japan version of a centralized model), and will promote project development by launching demonstration projects, which will lead to the continuous designation of offshore wind power promotion zones.

<Key initiatives>

- Establish more efficient approaches to conducting wind surveys and seafloor/oceanographic surveys necessary in project development by carrying out demonstration projects led by GOJ in cooperation with local governments and grid operators. (Research Project for Regional Integrated Development of Offshore Wind Power Generation Capacity)
- Regarding wind surveys undertaken by GOJ following the selection of "promising zones" to date under the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, GOJ will start wind surveys in "areas where preparations have been made to an extent" as soon as possible in consideration of local conditions, while taking the required observation period into account.

- As a means to establishing a rational method for the observation of offshore wind conditions in Japanese waters, verify the accuracy of offshore wind observation methods and promptly prepare a guidebook describing observation methods for each rider.
- Regarding the securing of power grids, which has been a problem in terms of multiple grid operators securing the same grid, introduce a scheme whereby GOJ provisionally secures power grids necessary for project development.
- Based on knowledge gained through the enactment of the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, make necessary operational improvements to expedite project development.

B) Establishment of infrastructure (power grid/port and harbor)

GOJ will systematically promote the establishment of power grids, ports and harbors, and other infrastructure necessary to realize the above offshore wind power capacity introduction targets.

<Key power grid-related initiatives>

- Detail out and announce the first draft of the Power Grid Establishment Master Plan, which will contribute to the realization of introduction targets, by coming spring.
- To harness the potential of offshore wind power, it is important to have a large power transmission network to bring power from suitable locations for offshore wind power generation to high demand areas. To achieve this end, it is important to commence concrete study toward the introduction of HVDC power transmission, including technical issues and costs.

<Key port and harbor-related initiatives>

- In addition to steadily undertaking construction such as strengthening of soil bearing capacity necessary for installation and maintenance of large wind turbines at base ports at four locations throughout Japan, review functions required of Japan's future base ports, considering the schedule for power grid development and designation of promotion zones, as well as the trend toward larger wind turbines.
- In order to revitalize the local economy and create jobs through the establishment and consolidation of offshore wind-related industries, work with port authorities to implement focused measures to attract companies to coastal and other areas across Japan.
- So as to attract a wide range of companies and contribute to the realization of carbon neutrality in Japan as a whole, expedite considerations on hydrogen generation that leverages surplus electricity from offshore wind power generation and the construction of a marine transportation network for transporting hydrogen to various locations in Japan.

3-2. Promotion of investment and formation of supply chain

From the perspective of stable power supply and economic ripple effects, it is important to establish a competitive and resilient supply chain, using the creation of a domestic market by GOJ as a catalyst for investment.

Therefore, the Industry will promote the formation of a resilient supply chain by setting targets for Japan content.

GOJ will strengthen industrial competitiveness by providing incentives for capital investment, promoting business partnerships in Japan and overseas, and improving the business environment through regulatory reforms. At the same time, the Industry, GOJ, and academia will work together to develop the human resources necessary for offshore wind power generation.

(1) Setting of targets by the Industry (Japan content, cost reduction targets)

The Industry sets the following targets⁶ toward the establishment of a competitive and resilient supply chain.

- The Industry will increase Japan content to 60% by 2040. In addition, continue to consider concrete area-specific policies to achieve this target.
- The Industry will reduce cost of fixed-bottom offshore wind turbine-generated power to 8-9 yen/kWh by 2030-2035⁷.

(2) Strengthening of supplier competitiveness

GOJ will evaluate the supply chain in public tenders, provide incentives for capital investment, and promote global business matching toward the creation of a competitive and resilient supply chain.

<Key initiatives>

- When assessing public occupancy plans related to the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, evaluate the formation of a resilient supply chain (domestic or equivalent) from the perspective of securing a stable power supply.
- Provide support measures such as subsidies and tax breaks for capital investment that contribute to the formation of the supply chain (currently being coordinated).

⁶ The timeframe will be based on projects authorized under the Renewable Energy Special Measures Act.

⁷The maximum supply price to be set at the time of public tender shall be set in accordance with the provisions and intent of Renewable Energy Special Measures Act and the Act on Promoting Utilization of Sea Areas for Renewable Energy Generation, with reference to the efforts made by the Industry toward this cost target.

- In addition to GOJ providing support such as the holding of the "Offshore Wind Investment Seminar" at JETRO, the Industry will undertake voluntary initiatives to promote business matching between overseas companies and Japanese firms.
- Develop and promote the use of AI-based wind turbine failure prediction systems to improve the operating rate of offshore wind turbines.

(3) Establishment of business environment

To improve the business environment, the Industry identified 8 regulations that could potentially hinder project promotion. GOJ will conduct a comprehensive assessment of the requested regulatory review items in cooperation with individual ministries.

In addition, the Industry will conduct a comprehensive review of the standards that need to be developed for the introduction of offshore wind power and will work with GOJ to develop highly necessary standards.

A) Comprehensive review of offshore wind power-related regulations

Among the eight main potential project roadblocks for which a review was requested, the Industry will first streamline the safety inspection process with the Ministry of Economy, Trade and Industry (under the Electricity Business Act) and also establish a common screening process with the Ministry of Land, Infrastructure, Transport and Tourism (under the Port and Harbor Act and Ship Safety Act).

<Examples of review precedents>

- Streamlining of construction plan submission-related review based on the Electricity Business Act
 - If the certificate of wind farm registration issued by the accreditation authority is attached to the submitted construction plan, the expert meeting process is not required in principle, except in cases where a design method has not been established.
- Consolidation of multiple reviews
 - Given that offshore wind power generation facilities must be inspected under the Electricity Business Act, the Port and Harbor Act, and the Ship Safety Act, create common screening documents to standardize the evaluation process, improve the efficiency of the review, and reduce the burden on power producers.

<Other main requests from the Industry >

【Screening and development-related】

- Expedite environmental impact assessment procedures in wind power generation projects and review the requirements on project size based on the Environmental Impact Assessment Act.
- Accelerate procedures for temporarily installed observation towers used in wind observation surveys based on the Building Standards Law.

【Production and installation-related】

- Relax criteria and conditions related to the installation of aircraft warning lights on wind power generation facilities based on the Civil Aeronautics Act (relax conditions for installation of aircraft warning lights on the middle section of wind turbine towers and wind turbines temporarily installed at ports, and revise the definition of a group of wind power generators).
- Clearly define requirements for patentability set out by the Minister for Land, Infrastructure, Transport and Tourism related to sabotage regulations (restrictions on foreign-flagged vessels calling at ports) based on Ship Law in order to address the shortage of vessels for construction work and domestic transportation of heavy and long items.
- Clarify the criteria for determining when to suspend work during strong winds in offshore wind power crane operations and relax conditions that prohibit mobile cranes from traveling with suspended loads.

【Removal-related】

- Clarify the criteria for granting permission to leave in place fixed-bottom wind turbines, for which sea areas are in principle required to be restored to their original state once wind turbines are removed based on Law Relating to the Prevention of Marine Pollution and Maritime Disaster.

B) Comprehensive review of necessary standards for the construction of offshore wind power generation facilities

It has been pointed out that domestic JIS standards have not been developed for some components necessary for the construction of offshore wind power generation facilities, such as steel and tower bolts.

Therefore, the Industry will identify the components that need to be standardized and work with GOJ to standardize them.

<Key initiatives>

- The Industry will conduct a comprehensive review of the components necessary for the establishment of wind power generation facilities going forward (thick steel and tower bolts that can hold up larger wind turbines), and will work with GOJ to reflect these in performance evaluations and tightening of standards.

(4) Offshore wind power talent development program

In order to ensure the long-term and stable penetration of offshore wind power, it is necessary to develop human resources in a wide range of fields, including engineers involved in the manufacture of wind turbines, survey and construction engineers, and maintenance workers⁸.

To achieve this end, the Industry will formulate a program for the development of offshore wind power human resources, which will include taking an inventory of the required skills and concrete measures for acquiring those skills. The program will promote the transfer and redeployment of engineers from different industries in the short term as well as the development of human resources over the mid to long term.

<Key initiatives>

- In Japan, take inventory of skills and labor requirements for offshore wind power generation and explore ways to acquire these skills through collaborative efforts between industry, government and academia.
- The Industry will establish a qualification for maintenance personnel.

⁸ In Europe, over 10,000 people are currently employed in the offshore wind power industry.

3-3. Next-generation technology development and cross-border collaboration with a view to expansion into Asia

While enhancing competitiveness through development of the supply chain, GOJ aims to expand into Asia in the future, where weather and sea conditions are similar, and the market is expected to grow.

To this end, GOJ and the Industry will accelerate the development of floating offshore wind and other future growth technologies and GOJ lay the groundwork for this through international standardization and bilateral dialogue.

(1) Next-generation technology development with a view to expansion into Asia

Looking ahead to future expansion into Asia, it is necessary to accelerate the development of technologies and cultivate Japan's competitiveness to play in the global market, with a focus on floating offshore wind for which demand is expected to grow going forward, while consistently looking ahead toward commercialization. Considering this, GOJ and the Industry will identify the element technologies necessary to strengthen competitiveness and GOJ provide integrated support for technology development and validation over the long term.

<Key initiatives>

- Identify and list up the necessary elemental technologies to strengthen industrial competitiveness of the offshore wind power industry and formulate an "Offshore Wind Power Technology Development Roadmap."
- Establish a fund to promote innovation toward the realization of carbon neutrality by 2050 and secure the commitment of companies to achieving targets. Based on this, provide seamless support for the development and validation of technology over the long term.

(2) Promotion of international cooperation and international standardization

In anticipation of future expansion into the Asian market, GOJ will promote the building of cooperative inter-governmental relationships as well as cooperation among domestic and foreign companies through policy dialogue and international demonstration projects. In addition, GOJ will provide supports to Japanese companies looking to participate in overseas offshore wind power projects in the areas of feasibility studies, demonstration, and finance.

Furthermore, GOJ will work towards international standardization of methods to assess the safety of floating offshore wind. Through these initiatives and other efforts, GOJ will lay the groundwork for overseas deployment of floating offshore wind.

<Key initiatives>

- Engage in bilateral dialogue regarding support for the institutional construction in the partner country and cooperation with third countries in anticipation of future overseas expansion. (EU, Germany, Vietnam, etc.)
- The Industry and GOJ will collaborate on the development of specific projects in terms of joint research and development of large-scale wind turbines by European and U.S. wind turbine manufacturers and Japanese suppliers as well as overseas demonstration projects (NEDO international demonstration projects).
- Promote overseas development by making active use of public financing such as the newly established Nippon Export and Investment Insurance (NEXI) LEAD Initiative (NEXI's Initiative to promote Leading Technologies & Businesses, Environment & Energy, Alliance and Development) and the Japan Bank for International Cooperation (JBIC) Growth Investment Facility, as well as measures for overseas infrastructure development, such as support for feasibility studies.
- Establish safety assessment methods and work towards IEC international standardization to such as simplify floating offshore wind structures that contribute to reducing floating wind structure costs.