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ASIA PACIFIC OFFSHORE WINDFARMS PLAY GROWING ROLE IN ADDRESSING BURGEONING ESG CONCERNS

By Tony Gallagher, CEO, Asia Pacific Region, Guy Carpenter

Environmental Social and Governance factors (ESG) measure how advanced companies have become regarding sustainability. Consumers and investors are increasingly concerned that not only are companies doing well but are also doing good when it comes to the environment, society and corporate governance. This is especially true in the energy sector, as renewable sources of generating electricity continue to attract greater interest.

Offshore wind farms play a major role in the quest to increase the world's use of renewables and reduce its carbon footprint. While these facilities have had a prominent presence in Europe (the UK and Germany especially) for more than a decade, the biggest growth in power generation as well as turbine construction projects resides in the Asia Pacific region. As the nature of risk changes and the awareness of climate change increases, ESG mandates are continuing to gain traction throughout Asia Pacific, with the urge to step up and build resilience to the inexorable risk.

Offshore wind development varies widely throughout Asia Pacific.[1]

- China has a very strong presence, even surpassing Germany as the world's second-largest offshore wind producer by 2019, behind only the UK.

Other countries and territories in the region are at differing levels of offshore wind development.

- Taiwan has a strong pipeline of projects.
- South Korea, Vietnam and Japan have developed significant presences.
- India has the slowest progress in the region.
- Australia also has a lot of potential, but no actual development at this time.

Potential risks and challenges

Offshore wind generation has existed in Europe for 20 years, and government subsidies helped provide a buffer for project development. However, the relative newness and rapid growth in Asia presents certain challenges. Appetite for providing reinsurance coverage has been limited, and addressing these issues is key.

Asian developments have tended to be further out at sea than those in Europe. That makes them more publicly palatable, but construction becomes more expensive, service costs are higher the further out producers go, and wear issues are uncertain for larger-scale projects.

Aggregation risks come into play for these larger undertakings as well–having two or three turbines in a specific area is one thing, but having 100 near each other raises the stakes. For the reinsurance market, this presents an exposure situation that could accumulate with an onshore event, such as an earthquake or typhoon.

As catastrophe models are either being developed or adjusted for wind farms, the reinsurance market will have a better understanding of the frequency and severity of the events, leading to greater capacity being available. However, insurance and reinsurance markets are familiar with these concepts and modeling and managing such aggregations–most recently, we have seen Hurricane Ida affect offshore energy assets as well as exposures onshore.

[1] This information is from the Global Wind Energy Council; Asia Offshore Wind Insurance Opportunities, a report from Marsh JLT Specialty; and Blue Economy Cooperative Research Centre of Australia. More on the individual countries is available in the Appendix at the conclusion of the article.

Weather and other natural disaster potentials differ significantly compared to the frequency and severity expected in Europe, but models and techniques do exist to assess these risks. The most significant difference is the potential for typhoons–or tropical cyclones. The need for partnering with government entities in China–by far the biggest growth area in the region–also presents certain challenges. In the longer term, we would expect the traditional reinsurance market to provide capacity for these wind farms.

In addition, the technology and scale are still relatively new in the region. Specialized vessels need to be used, and supply chain and manufacturing capacity for the turbines are still evolving. Innovation in production has increased the average turbine size in China, adding to uncertainty: from 4 MW in 2018 to 5 MW in 2020, with 7 MW expected by 2025.

Further technological developments by HZ Wind power, a subsidiary of the state-owned China Shipbuilding Industry Corporation, are leading to development of a 210-meter rotor for offshore wind turbines, with a capability of 10 MW. New technology leads to increased risk management as the equipment is installed and tested over time.

Potential risk transfer solutions

China and Taiwan are viewed as high-opportunity markets. While Chinese developments have been driven mostly by domestic investment, Taiwan is attracting more foreign participants. China has an extremely formidable pipeline of projects (about USD 180 billion) until 2025. Taiwan is also strong (about USD 20 billion) over the same period, which is high compared to larger countries. USD 2 billion in premium generation is expected by 2025.

There is high potential for coverage against losses due to delay in start-up, contractor's error, business interruption and marine cover, with sub-sea cables and prospective technical failure of foundations presenting possible issues. The capacity to support these covers is already available in the market, but as the size and complexity of the offshore wind farms grow, the reinsurance market will need to expand to accommodate these exposures.

Parametric solutions could work well. For example, if coverage for a set amount was based on sustained winds in miles per hour affecting an offshore wind facility, that claimant would have confidence in knowing they would receive payment quickly as long as that wind threshold was reached, providing needed capital without having to present the detailed loss information otherwise necessary for a property claim. The other key factor here will be measurement of real-time data.

The biggest challenge remains to be addressing the potential for natural catastrophe. As the technology of turbines evolves, they are expected to be more resilient regarding wind exposure. However, this is largely untested in the quantities and weather conditions that would be encountered by these facilities. The modeling of wind farms is work that has already started and will assist in quantifying the potential loss in any one event.

Guy Carpenter's global analytical platform facilitates our ability to quantify the performance of different solutions across all classes and territories, and measure them against specific business metrics. This methodical consistency helps clients predict portfolio performance with confidence, including assessment of accumulated exposures. Guy Carpenter's G-Cat® models, combined with market models, are being used to quantify the natural hazard exposure to these wind farms to enable reinsurance solutions to support ESG ambitions in Asia.

A potential solution could be to separate the natural catastrophe aspect into government pools supported by reinsurance, segregated from other property risks inherent in offshore windfarm development. There is already extensive natural catastrophe capacity available for on-land exposures in this region.

Reducing uncertainty in this segment continues to be key in the advancement of this industry. As the business grows and technology advances, experience could demonstrate a reduced risk and consequently mean less expense related to this coverage. Guy Carpenter will continue to analyze the evolution of the offshore windfarm market, enabling us to deliver innovative treaty and facultative solutions for all lines of business across the sector.

Table 1: List of countries and territories by cumulative installed offshore wind power capacity (MW)

Rank	COUNTRY/TERRITORY	2016	2017	2018	2019	2020
1	United Kingdom	5,156	6,651	7,963	9,723	10,428
2	China	1,627	2,788	4,588	6,838	9,996
3	Germany	4,108	5,411	6,380	7,493	7,689
4	Netherlands	1,118	1,118	1,118	1,118	2,611
5	Belgium	712	877	1,186	1,556	2,261
6	Denmark	1,271	1,268	1,329	1,703	1,703
7	Sweden	202	202	192	191	192
8	South Korea	35	38	73	73	136
9	Taiwan	0	8	8	128	128
10	Vietnam	99	99	99	99	99
11	Japan	60	65	65	85	85
12	Finland	32	92	87	71	71
13	United States	30	30	30	30	42
14	Ireland	25	25	25	25	25
15	Portugal					25
16	Spain	5	5	5	5	5
17	Norway	2	2	2	2	2
18	France	0	2	2	2	2

Source: Global Wind Energy Council

Table 2: Expected global installed base in 2025 of offshore wind power capacity by region (GW)

Europe	52.8	Asian countries outside of China are expected to boost their share significantly toward 2025 and beyond. Taiwan and Vietnam plan to add substantial volumes in the short to medium term with several high-profile projects in the pipeline, with Taiwan in particular offering opportunities for non-Asian developers and suppliers. Countries such as South Korea and Japan are expected to add to growth in the longer term. China will still lead, but its share of the installed base is forecast to decline from the current 94% to about 70% by 2025.
China	36.8	
Asia other than China	15.2	
Americas	4.4	

Source: Rystad Energy

Appendix: Specifics by Countries and Territories in the Region

China

China is by far the biggest player in the region, encouraged by government policy and generally favorable weather conditions.

- Government incentives include tax exemptions, favorable loans, and subsidies for construction of offshore windfarms.
- Actions also include steps to reduce wastage and address connectivity issues.
- As China moves more toward grid parity, the government has reduced tariffs for offshore wind energy production, affecting the amount of revenue generated by developers. Grid parity is achieved when the cost of generating power through alternative energies, such as solar or wind, has a lower or equal cost than using traditional means, such as fossil fuels.
- Weather is a two-sided coin for China, as wind channels off the coast enhance the efficiency of wind-generated power but the risk of natural catastrophes such as typhoons present damage hazards and reduce the duration of the season during which construction is possible.
- Indeed, 88% of total offshore wind energy is exposed to tropical cyclones, and the economic risks due to these storms in the coastal seas south of Shanghai are expected to be more than 10% to 15% of total investment costs within 20 years. While these locations are susceptible to typhoon losses, they are also usually endowed with richer offshore wind potential.

Taiwan

Taiwan has significant potential for generation, but requirements for local sourcing are an issue, as its supply chain is only developing, putting construction and operation of plants at risk.

- Foreign entities have been attracted to Taiwan's market, with Danish, Japanese and Australian companies establishing partnerships. While these companies will continue to operate independently, these partnerships help them serve customers in Taiwan that require a local presence.
- Conditions are favorable for generation along the Strait of Formosa, with average wind speed of 11 meters per second, or 26.6 miles per hour.
- Regulatory changes are encouraging development. In 2019, the cap on energy procurement increased from 3,600 kWh to 3,750 kWh, encouraging use of 8 MW turbines as opposed to the 4 MW version.
- Tiered tariffs (USD 0.20 per MWh for the first 10 years, followed by USD 0.13 in the next decade) are designed to foster long-term commitment to development projects.
- Partnering with local suppliers helps foreign companies adhere to local sourcing requirements and regulations. However, this can contribute to higher costs for developers.
- As with China, benefits of climactic conditions can also be counteracted by frequency of typhoons and earthquakes.
- Issuance of permits faces delays. Limited commitment to resolving grid-connectivity issues is also a prospective problem. While the Taiwanese government has assured improvements in these areas, there is no commitment or mechanism to compensate developers for losses caused by postponements.

Japan

Japan has been actively exploring offshore wind development to replace suspended nuclear plants and reduce dependence on foreign imports.

- Foreign and domestic companies have received access to the country's territorial waters for up to 30 years. This enables Japan to make better use of its extensive coastline.
- Japanese companies have shown willingness to finance these projects, as have global players.
- As most of Japan's offshore wind potential is located in deep waters, developing technology in floating platforms has become increasingly important. This does increase exposure to environmental, health and safety, and other operational risks.

- Natural catastrophes, such as earthquakes, typhoons and tsunamis, present significant damage potential.
- Different prefectures in Japan have different transmission system operators, leading to uncertainty regarding which entity is responsible for spending toward grid development.
- Japan's fishing interests have opposed offshore projects, based on concerns over marine life and the interests' ability to generate revenue.
- Lengthy environmental assessments are driving concerns among developers.

South Korea

South Korea has ambitious targets to reach 12 GW of offshore generation by 2030. However, the country is not expected to reach this goal.

- Similar to Japan, development of floating platforms for offshore wind farms are in the plans, along with next-generation technology.
- Local power companies, faced with mandates to increase their renewable capabilities to 10% by 2023, are expected to drive greater project commencement.
- Offshore wind production is preferred by the South Korean government, since it is considered more economically efficient.
- The government is also sponsoring loan programs, in which repayment can be deferred for five years.
- Two provinces in South Korea–Jeollabuk-do and Jeollanam-do–have more than 90% of ongoing offshore projects because of their favorable geographic and weather conditions.
- European companies, such as Denmark's Orsted and Norway's Equinor, are developing opportunities in South Korea.
- Parts manufacturing, shipbuilding and offshore plant construction companies are already well established in the country, investing in wind energy to diversify their portfolios.
- Local experience in offshore wind farm development is mixed, however. Challenges exist due to limited local supply of vessels required for offshore wind construction, and a soft, muddy seabed hampers the use of jack-up vessels and building of foundations.
- Similar to some other Asian countries, the local fishing community has objected to the development of offshore wind farms, based on economic concerns. The Ministry of National Defense has raised objections to development of offshore wind energy projects off the southern coast because of the presence of naval bases.
- The risk of natural catastrophes such as typhoons draws concerns, leading developers to invest in equipment to overcome these challenges.
- Delays in maintenance activities, start-up interruptions and casualty risks are additional challenges.

Vietnam

Vietnam has only one operational offshore wind energy project.

- There is significant untapped potential for exploration by foreign companies.
- Large equipment manufacturers help enable supply-chain development for potential projects focused on local requirements.
- Cyclonic conditions and a complex regulatory process along with limited grid connectivity are major hindrances.

India

India has only two states identified as potential homes for offshore wind development.

- The federal government has ambitious targets for generation capability, but has been slow in capturing wind potential.
- Regulatory delays hamper short-term prospects. Pending environmental laws will increase liability for developers.
- Limited infrastructure and supply-chain development also hamper construction and operation of a project.

Australia

Australia has a lot of possibilities for offshore wind projects, but no active infrastructure at this time.

- Australia has high-quality potential for offshore wind projects in a range of locations, but so far has generated limited attention, according to a report from Blue Economy CRC and the Australian government's Department of Industry, Science, Energy and Resources. The report calls for detailed research to assess cost benefits.
- While no offshore projects are currently developed, there are currently more than 10 projects in the proposal stage, with a combined capacity of over 25 GW.
- Across many parts of the coastline, the shelf falls away quickly, meaning there are fewer locations where fixed-bottom offshore wind turbines are viable.
- Technological advancements in floating platforms would lend themselves to greater offshore project development.
- Wind resources are strongest in the southern part of the country, where average wind speeds of over 12 meters per second or 26.8 miles per hour are recorded south of Tasmania.

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