

Unique Offshore Wind Conditions in Asia Set the Bar High for European Firms

The offshore wind sector is abuzz with talk about the burgeoning market in Asian nations like South Korea, Japan, China, and Taiwan. Though a relatively young market, with the uniquely excellent wind conditions and the need for a rapid expansion of their energy capacity, there are tremendous opportunities for international firms to lend expertise, technology, and provide services. Yet the unique conditions in these nations pose new challenges to which European firms will need to adapt in order to succeed.

What's Needed for Offshore Wind Development in China, Japan, Taiwan, and South Korea



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China heads the way with its ambitious goals for the development of renewable energy, including offshore wind development. In fact, China (along with Japan) was one of the first countries outside of Europe to commission an offshore wind farm, in 2010 for 100 MW capacity. They have a target for 6,000 MW or more of offshore wind capacity by 2020, making their country an attractive

market for European firms looking to expand.ⁱ

What's more, China recently became one of the fastest expanding offshore wind markets, having tripled its capacity from 25.8 GW to 75.3 GW between 2009 and 2012.ⁱⁱ Their government incentives and a supportive political

environment for the installation of offshore wind will make it a more welcome market for European firms. Their unique government policies will perhaps pose challenges for outside firms, but not ones that are insurmountable. Yet many national firms have risen and fallen in the past couple of years, opening the door for those manufacturers and contractors to enter to share their expertise on foundation and substation design and installation. The unique environmental conditions of the country will mean some adjustments to designs will be required, of course.

Like China, the Japanese offshore wind market is certainly one of the most unique. Their country has the sixth largest Exclusive Economic Zone (EEZ), with over 20 years of public funding pouring into deep offshore structures. That said, there is still a need for further development of offshore technology in order to exploit their very good wind resources.

In light of the fact that 80 percent of their wind energy resources are located in what is considered to be deep waters, designs specifically created for these challenging conditions will be required.ⁱⁱⁱ As such, the country is focused largely on floating foundations and substation structures. Their recent launch of the Fukushima FORWARD Project is designed specifically for these extremely deep waters. Firms with existing expertise in deep water installations will do well in Japan.

The country recently underwent a change in government, which could result in the reassessment of current targets for offshore wind development, which is said to be somewhere between 5 GW and 6 GW between now and 2020. However, in light of the fact that public opinion in the nation is strongly against nuclear energy and pro wind power, it is unlikely that targets will be vastly reduce.^{iv}

Taiwan is another Asian nation with a lot of offshore wind potential. Surrounded by sea, the country has excellent wind conditions through the Taiwan Strait, which is blessed with geography that channels wind. To

encourage offshore wind development, the country is implementing feed-in tariffs benchmarked to Germany's system.^v

As with most Asian nations looking to expand their offshore wind developments, there are serious concerns about the impact of typhoons and earthquakes for installations in Taiwan. Their approach to minimizing these challenges is to limit developments to Class 1a conditions. They also encourage foundations that are designed to withstand earthquake conditions.^{vi} One of the specific requirements for the deployment of offshore wind turbines in Taiwan is for expertise and research in offshore foundation engineering, geotechnical engineering, offshore substations, and offshore risk assessment for natural disasters.^{vii}

South Korea is also rapidly developing their offshore wind sector. Experts and manufacturers in South Korea recently launched Coordinated Offshore Energy Extraction (COEE) and Floating Wind Turbine Foundations and Bridges to provide implements for wave, wind, tidal, and solar power in offshore environments. The Floating Bridges provide connections between islands and across dams and rivers to simplify the transport, installation, and maintenance of offshore wind farm components. The Floating Foundations, on the other hand, will provide support for offshore wind installations and control cables to the shoreline.^{viii}

Asia Pacific Offshore Wind Foundations and Substations Market Huge Potential for European Firms

As we've seen, many Asian firms have already started to respond to their countries' offshore wind needs, yet there is definitely a need for the experience of European countries in how to optimize offshore structures for the new environments being seen in the Asia Pacific region.^{ix} In particular, the EWEA report, entitled *Deep water – The next step for offshore wind energy*, predicted that deep offshore designs constitute an export opportunity for European firms wanting to move into Asia. Their projections suggested that Japan be the first area for expansion. With swift adaptation of

technologies for the region and large-scale deployment, the report suggested the first full scale wind farm could be up and running by 2017. Further, they point out that of the 40 projects under development or already grid-



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connected, 37 (60 percent of the total) are in Europe, while nine (23 percent of the total) are in Japan.^x

Perhaps the greatest need, given the extremely deep waters in many Asia Pacific countries, is for deep water foundations. Most specifically designs that work in waters 50+ m are required – including jacket, tripod, and floating structures.

Already there have been investments made by European companies in the development of foundations within the Asia Pacific region. For instance, offshore contractor, Seajacks, recently set up a business unit in Japan that will offer services in the Asia sector. The unit will be a 100% subsidiary of the UK-based offshore wind specialist known as Seajacks International (owned by Innovation Network Corporation of Japan and Marubeni Corporation since 2012).^{xi} The firm has already installed 830 MW of wind turbines in the European offshore wind market. Future plans include the installation of 288 MW of wind power at the Meerwind Offshore Wind Power Project in Germany.^{xii}

The hope is that this new Asian business unit will greatly increase the influx of European expertise and technology in the region. As a spokesperson for the company commented: “Increasing offshore wind projects combined with the planned back-up of governmental support ensures Japan is rapidly attracting focus as one of the next major sources of renewable energy.”^{xiii}

Seajacks specializes in self-propelled jack up vessels that are specifically designed for wind turbine installation, as well as foundations and transition

pieces for wind energy development. Their fleet includes three of these vessels, including the Seajacks Leviathan, Seajacks Kraken, and Seajacks Zaratan. They're also in the process of developing two new vessels which will be christened Seajacks Hydra and Seajacks Scylla which will come into service in 2014 and 2015 respectively. ^{xiv}

Seajacks Hydra, being built in Dubai, is designed based on GustoMSC NG2500 specs for offshore wind installation and maintenance in North Sea environments. It incorporates a fully redundant DP2 propulsion system, has living quarters for 90 people, and a 400 T crane. The Seajacks Scylla, on the other hand, is designed on MSC NG14000X specs and includes a 1500 T leg-encircling crane, and 8000 T of available variable load capacity. It can install in ocean depths up to 65 m (highly useful for Asian waters like those in Japan) using 105 m long legs. ^{xv}

Another potentially large player in this space could be Norway given that they were the first to install a large scale floating demonstration project – the Hywind. Their 5 MW to 7 MW project is set to be launched fully in 2016, with the technology ready for export into other regions shortly thereafter. Their spar buoy structures can reach depths of 140 m and will be ideal for many applications in the Asia Pacific market. ^{xvi}

More Room for European Expansion into Asian Offshore Wind Market

Some firms are already well established in the Asian market. The German firm of KBR & GVA has already been building in South Korea. They provided the basic design, proprietary technology, and project support for the installation of the GVA 7500 built at DSME South Korea. ^{xvii} Likewise, GL Group delivered their brand new Pacific Orca vessel in Geoje, South Korea on July 27, 2012. The 161 m vessel is a large WTIS vessel that can carry and install up to 12 wind turbine units of 3.5 MW each in one voyage. It can also install foundations to depths of 60 m with 75 m leg extensions. ^{xviii} That said, there is still plenty of space for other European countries to make a move into this fledgling market.

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