

The fallout from Fukushima

Japan's plans to phase out nuclear power after the 2011 disaster have been a massive boost for solar and offshore wind. But the policy is far from set in stone, writes Dominique Patton in Fukushima

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Offshore wind

Japan's home-grown wind companies are set to bloom in this post-Fukushima era, especially in the emerging offshore market.

The country had just 2.5GW of wind capacity at the end of 2011, and the new FIT has done little to boost the onshore sector, which is hampered by a shortage of suitable land, a lack of transmission capacity to remote areas and a burdensome environmental-impact-assessment law.

Offshore is where the potential lies. Conscious of a shrinking order book among its shipbuilders, Tokyo has given strong backing to major new floating wind projects in recent months, including the 1GW wind farm off the coast of Fukushima.

Here, a consortium of 11 companies is aiming to install the first of three floating turbines next year-supported by ¥12.5bn from the regeneration funds for the tsunami-hit region. If the pilot is successful, the firms could move to a large-scale phase by 2017.

This project alone could turn Onahama port into "the Bremerhaven of Japan", bringing jobs and industry to the area, says Tomofumi Fukuda, deputy general manager at trading house Marubeni, which is coordinating construction.

But the strong local fishing co-operatives are less convinced of the benefits the designated site is one of Japan's prime fishing grounds thanks to the confluence of warm and cold currents. It is especially prized for kare, a kind of flounder caught by trawling the seabed.

Fishing has come to a halt since the Fukushima accident, with no demand for a catch from the surrounding waters. But the 1,300 fishermen from the areas strong cooperatives are worried that a wind farm will prevent any return to their traditional livelihood.

"We're trying to tell them that more fish will come to the turbine floater area," says Fukuda, who has been meeting the cooperatives every week for months. "They are starting to show a possible acceptance of the three-year demonstration phase. Then they can fish around there and see what the impact is. We're getting more confident that we can get consent by February or March."

Even if the project gets the go-ahead, there are fears that Japan will be unable to keep costs down "Many things in Japan are unnecessarily expensive," says Per Christer Lund, director of the Norwegian Environmental Technology Center in Tokyo. "They are very strict on regulations, they use a lot of people, and there is a lack of competition for equipment and services. Utilities have a very cosy relationship with suppliers and that drives up prices."

The highest costs come from the anchors and chains required on the floating structures, says Fukuda. "We think, to make it feasible, we need to minimise the floaters and make the turbines even

bigger. I'm looking at 10MW machines so we can reduce the per-kW costs. Then if we installed 20 floaters, we could build a project of 200MW. That's my [current] target.”

The stakes are high. Japan is vying with neighbour South Korea to make a breakthrough in commercializing floating technology.

For Marubeni too, it's a new chance to grow in its home market. The company exited the domestic wind sector in 2008, after losing money on small projects “Before the earthquake, the domestic power business was very quiet and dominated by ten monopolies. There were no development opportunities for us. Now it's completely different,” says Fukuda.

“It's very important for Fukushima,” says Takeshi Ishihara, a professor at the University of Tokyo, who is leading research efforts on the project.

The facility would demand a number of world firsts, he adds

These include the world's first floating substation and the world's largest dynamic power cable (ie, one that moves in the water)

“Dynamic cables are sometimes used in shipbuilding, but the standard use is 6.6kV,” says Ishihara. “For offshore wind, we need a capacity of ten times this amount.”

Logistics will be a challenge too. Japan has no deep ports, so shipbuilder IHI Marine has shortened the depth of the substation's spar buoy - the underwater base that keeps it afloat - to about 32 metres, less than half that of the Hywind floating turbine off the coast of Norway.

The substation will need to be built in the firm's Yokohama factory and then towed out from the dock in Tokyo Bay, through one of the world's busiest shipping lanes, and can only be installed between June and August, when there are fewer typhoons.

“The swell is very, very big in the Pacific Ocean, even without any wind,” says Ishihara.

If the project makes it past the pilot phase, a different kind of floating structure is likely to be chosen that can be assembled in Onahama port.

“We would need to build 30 floaters for the large-scale wind farm,” Ishihara explains. “That's equivalent to building 30 high-rise buildings in one year.”

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