



Workers among wind turbines at the Jieyuan Wind Power Company on the outskirts of Yumen, in the northwest of China's Gansu province

Photo: Diego Azubel/EPA

Massive market, massive problems

China's booming wind sector not only poses problems for the grid operators. It has also left many foreign manufacturers behind frustrated. Beijing is ambitious to build up a strong wind industry in the country – including in the offshore sector.

One year ago, China's first offshore wind project East Sea Bridge was connected to the grid near Shanghai with a total capacity of 102 MW. Crossing Donghai Bridge at a total length of about 32 km from mainland Shanghai, the 34 wind turbines supplied by the China-based manufacturer Sinovel with a capacity of 3 MW each appear on the horizon. "It's not without a reason that wind projects are built near the coasts and in exposed locations in

China", says Jochen Ziehmann of 8.2 Consulting AG, an international group experts for renewable energies. "They are meant to be an eye-catcher for people passing by. Wind power enjoys a very positive image."

China has put a strong focus on wind power, which is expected to make a significant contribution to satisfying the country's enormous energy thirst. According to China's Electricity Council, the demand is expected to increase by about 8.5 % until the year 2015. In the past, the Chinese wind sector had already undergone a massive boom. In 2010, the newly installed capacity had increased by about 16 GW – about half of the new installations worldwide for the same year. With a cumulative capacity of 42 GW, China has secured its position as the world's largest wind market. Beijing is ambitious to increase the installed wind capacity up to between 90 and 100 GW

by the year 2015. In order to get there, the Central Government introduced fixed feed-in tariffs in July 2009 with prices ranging between 0.51 and 0.61 Chinese Yuan per kWh (approx. 6 to 7 €-ct), depending on the location.

Coastal regions a driving force

The first offshore wind projects are already under construction along the Chinese coasts. The potential is estimated to reach 200 GW at a depth of 5 to 25 m and to be largest along the southern coast between Zhejiang and Guangdong, although the frequent occurrence of typhoons poses serious challenges. China's offshore industry has its centre further up in the north-east – in Shanghai and the neighbouring Jiangsu and Zhejiang Provinces. In Jiangsu alone, the projects planned in the offshore sector by 2020 arrive at a capacity of up to 7 GW. "The fact that the large urban centres are remote and grid expansion is only slowly making progress explains why the Provinces are a driving force for China's offshore sector", says Kuang-Hua Lin, CEO of Asia-Pacific Management Consulting (APMC). The consultancy based in Düsseldorf, Germany, assists wind developers with their activities on the Chinese market. In total, China's coastal regions have offshore projects in the range of 32.8 GW planned until the year 2020. The Central Government has so far not announced concrete targets for the development of offshore wind in the country, says Lin.



China's first offshore wind project, East Sea Bridge Wind Farm, was completed in 2010 near Shanghai with a total capacity of 102 MW.

Photos (2): Sinovel



A view of East Sea Bridge Wind Farm in heavy fog

Photo: Qilai Shennull/EPA

In the last year, China's National Energy Administration had invited tenders for the construction of four offshore projects in Jiangsu Province arriving at a total capacity of 1 GW. In view of the limited knowledge base in the domestic industry, a local content requirement was not imposed. "The superiority, reliability and availability of foreign products are of particular importance in the offshore wind segment", explains consultant Lin. "When establishing wind parks onshore, the operators can rely on low-cost equipment made in China and simply hire a team of engineers that will keep these systems more or less running at costs of € 200 a month. Offshore wind parks require maintenance-free turbines, as repairs are far too expensive."

Building up a domestic offshore industry

Nevertheless, the offshore boom has benefited first of all the domestic companies. The projects and tenders are organized exclusively by the Central Government. Besides Sinovel, Goldwind and Shanghai Electric, the list of companies that were successful in last year's tenders includes mainly domestic players. What is interesting is that, with Goldwind and Shanghai Electric, two of these manufacturers had not even sold offshore turbines on the market when making their bids. And the final prices of 7 to 8 €-ct per kWh raise the question whether the projects will at all be profitable. In China, all the offshore wind farms so far built are operated by state-owned utilities. "This suggests that the focus of the first offshore projects was on advancing the technological know-how and less on generating profits", says Corinne Abele of Germany Trade and Invest (GTAI), the foreign trade and inward investment agency of the Federal Republic of Germany. As GTAI representative in Beijing, Abele has been following the developments of the Chinese wind sector very closely.

The strategy of the Chinese Central Government is not difficult to decipher. China is ambitious to make use of the increasing demand for renewable energy in the country for the establishment of an independent

domestic industry – with obvious success: while China-based turbine manufacturers used to rely on European licenses in the past, the importance of domestic research and development has meanwhile significantly increased. “China’s wind sector is growing much faster than many had expected”, says Ziehm of 8.2 Consulting. In addition, the projects are often of an enormous size. “We are speaking of several hundred turbines. This poses also challenges for our Condition Monitoring System”, says Ziehm. Similarly, the Chinese onshore sector is entering the next round with further mega projects. China’s National Energy Administration (NEA) has six 10 GW wind farms planned for the regions of Inner Mongolia, Gansu, Xinjiang, Hebei and Jiangsu, which all enjoy exceptional wind speeds. In November 2010, the first phase of the wind power base in Jiuquan, Gansu Province was completed, which incorporates a number of 3,500 turbines arriving at a total of 5.16 GW – although only 1.15 GW were connected to the grid at the time.

One third without grid connection

Government targets continue to be the driving force for the boom in the wind sector. China’s major state-owned utilities are required to produce a minimum of 8 % (5 GW) from renewable sources by the year 2015 – hydropower not included. “The construction of further conventional coal-fired power plants depends on whether or not these targets are met”, says Abele. “The focus is therefore not so much on the lifecycle costs and quality of the equipment, as on stronger capacity building.” This explains why the grid connection has only been of secondary importance in the construction of further wind parks. Experts believe that one third or more of the capacities installed today remain unutilized, as a grid connection cannot be provided. “It can take up to an entire year and sometimes even longer to connect a wind project to the grid. It’s

China’s grid operators are struggling to keep pace. About one third of the installed wind capacity in the country is still without a grid connection.

an unfortunate situation”, says Abele of GTAI. According to the China Electricity Council, a share of only 31.07 GW of the total 42 GW installed was connected to the grid at the end of the year 2010. “On the one hand, the Chinese utilities are required to purchase the electricity produced from wind turbines. But obviously that energy can only be purchased, if the turbines are connected to the grid. Essentially, the situation allows the state-owned energy providers to dodge the costs of wind power”, says Lin of APMC. One of the reasons why these projects are not connected to the grid is the fact that the regions in the north and north-west offering opportunities for wind development are too remote from the urban centres on the east coast where most energy is needed. The grid expansion simply cannot keep pace with the development, which leaves some of the wind parks that obtained a license for such regions without grid access.

Government in charge

China’s Central Government has meanwhile reacted to the problem and made the grid expansion one of its priorities. According to information by the energy consultancy firm Azure International, the State Grid Corporation plans to pour investments in the range of about US\$ 585 billion into the development of “Super Grid” and Smart-Grid technologies between the years 2009 and 2020, which will be used to heavily expand the high-voltage grid. These figures show that the Chinese wind sector is prepared to think big – both in terms of its problems and their solution.

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Further Information:

8.2 Consulting AG: www.8p2.de

Asia-Pacific Management Consulting (APMC): www.apmc.de

Goldwind Science & Technology: www.goldwind.cn

Shanghai Electric: www.shanghai-electric.com/en/

Sinovel: www.sinovel.com

Vestas: www.vestas.com

