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# China's Wind Power Industry: Blowing Past Expectations

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At the end of 2007, China's installed base of wind power totaled just over 6 gigawatts (GW), making China the fifth largest producer of wind power, after Germany, the U.S., Spain and India. As a consequence of the rapid build-out of wind power projects in China, in April 2008 the National Development and Reform Commission revised its 11th Five Year Plan Period plan for wind power development from 5 GW to 10 GW by 2010.

By 2015, installed capacity of wind energy will have reached 10 GW or more and by 2020 Gansu is expected to have 20 GW of wind power in the Jiuquan corridor.

More impressively, wind power industry statistics show that by the end of 2008 China's total installed base of wind power production will have already reached 10 GW, two years ahead of the *revised plan*. Some experts are estimating that by 2010, the total installed capacity for wind power generation in China will reach 20 GW and that by 2020 China's installed base of wind power will total 100 GW.

Estimates by experts in wind power development in Inner Mongolia have an even more optimistic assessment; they believe that by 2010 China's total installed base of wind farms will total 27,700 megawatts (MW) and that China will then be the fourth largest producer of wind power in the world. The Inner Mongolia experts further predict that China will become the third largest producer of wind power worldwide by 2015.

From Xinjiang in China's far west to Shanghai, wind power projects are being developed across China. Below are highlights of local efforts to build-out wind power capacity throughout China.

## Inner Mongolia

Of the 230 million kilowatt-hour (kWh) wind potential throughout China, it is estimated that Inner Mongolia has wind resources of approximately 101 million kWh or 40% of the total. There are some 200 companies that already have entered or plan to enter Inner Mongolia's wind power industry.

Through the end of 2005, total installed on-grid wind generating capacity was 170 MW and there is another 962.1 MW of installed wind generating capacity already under construction. By the end of 2010 Inner Mongolia expects to have a total of more than 5 GW of wind projects operating, which will amount to 7.5% of total power generating capacity in the region.

Yet based on the announced projects, it is likely that the total amount of wind power capacity in Inner Mongolia by the end of 2010 will exceed 5 GW. For example the city of Chifeng already has

entered into an agreement with the Datang Company to develop 1 GW of wind power and by the end of 2010 Chifeng city alone is expected to have total installed capacity of 1.5 GW.

### **Gansu Province**

The Hexi (west of the Yellow River) corridor near Jiuquan city, which has been dubbed the "Land-Based Three Gorges," is the locus of development of Gansu Province's substantial wind resources. In this area there is an estimated 10,000 square kilometers of land which can be used for wind power development and the estimated capacity that can be developed there is 40 GW.

Though Gansu Province's long-term wind power development plan calls for the construction of 18 large and mid-sized wind farms with a total installed capacity of 20 GW, through the end of 2007 there were a total of 500 MW of wind farms operating, with another 1 GW in planning. Gansu's plan calls for 3 GW to be added in the last three years of the 11<sup>th</sup> Five Year Plan period, so that by 2010 there will be 4 GW of wind power in operation in Gansu Province. By 2015, installed capacity of wind energy will have reached 10 GW or more and by 2020 Gansu is expected to have 20 GW of wind power in the Jiuquan corridor.

### **Shandong Province**

The province of Shandong is undergoing a boom in wind power development. There are five wind farms that were under construction in 2007, including one each in Rongcheng, Dongying, Zhanhua, Shougang and Weihai. In total these five wind farms are to cost 2.5 billion Yuan and provide a total of almost 300 MW of power generating capacity. Because Shandong Province is a coastal province bordering the East China Sea, provincial officials estimate that the province has upwards of 67 GW of wind power resources; this is equivalent to 3 Three Gorges Projects.

Long term, engineers in Shandong believe that there can be as many as 38 wind farms producing power in Shandong. According to the provincial government's plan, Shandong will have 1 GW of wind power generating capacity by 2010 and 3 GW by 2020.

**Heilongjiang Province** and its capital Harbin also are making strides to develop wind power. Surveys indicate that the wind resources in Harbin alone are equivalent to 10 GW of power and that with existing technology the exploitable wind power in Harbin is ~ 1 to 2 GW. The Mulan Wind Power Plant, which was started up in 2004, has installed capacity of 12 MW.

According to a National Development and Reform Commission plan, **Shanghai** will build a total of 13 land and sea-based wind farms in Nanhui, Qinjian and three islands (Chongming, Changxing and Hengsha). By 2020 Shanghai will have a total of 1 GW of installed wind power generating capacity, which will be sufficient to supply power to 4 million residents. Presently Shanghai has three wind farm projects operating, including the Shanghai New Energy Environmental Protection Engineering Co., Ltd.'s four wind turbines with combined capacity of 34 MW; the Shanghai Wind Power Development Co., Ltd.'s 21 MW wind turbines; and the 13 wind turbines located in Nanhui and Chongming which produce 42 GWh/year combined.

The Ala Mountain Pass region of **Xinjiang Province** is one of that province's best locations for the development of wind power projects. According to plans developed by the provincial government by the end of the 12<sup>th</sup> Five Year Plan period (in 2015) this area will have an installed base of wind farms totaling 1 GW.

Construction has been completed on the first stage of the **Beijing** Guanting Wind Farm project. The thirty-three windmills have a total capacity of 50 MW. Based on average consumption by Beijing residents of 1000 kWh/year, the Beijing Guanting Wind Farm will be able to provide power to approximately 100,000 households. After the second phase of the Beijing Guanting Wind Farm is constructed (by 2010) the project will be generating 100 MW in clean wind power.

**Hainan Province** has drafted a plan to encourage the development of 13 wind farms to be located primarily in the Eastern, Northwestern and Western coastal areas of the province. The anticipated total capacity of wind power to be developed in Hainan through this plan is more than 1.2 GW; of this total Hainan Province anticipates having between 4 and 6 wind farms operating by 2010 with total installed capacity of 250 to 300 MW at a cost of approximately 3 billion Yuan. By 2015 Hainan Province's installed capacity to produce wind power will have grown to 400 MW and by 2020 will grow again to 600 MW.

The Daan city region is the location of some of **Jilin Province's** most plentiful wind resources; with an area of some 1200 square kilometers that region has the potential to develop as much as 6 GW of wind power. If the full potential of the Daan city region's wind resources were exploited, as much as 12 billion kWh of power could be generated from wind power in that region, which also has good infrastructure for the transmission of power generated there.

Because wind power is proving to be a cost competitive source of power for this energy thirsty nation, the Chinese are aggressively ramping up capacity wherever wind resources can be found. As Chinese manufacturing prowess is increasingly put at the disposal of the wind power industry and the cost of wind power further declines, the rate of growth of wind power installations will continue to accelerate.

*Next month RenewableEnergyWorld.com will look at the growth of indigenous Chinese manufacturing capabilities for wind turbines, blades and other components of the wind power industry.*

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