

China's clean energy dream

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Since 2005 the generating capacity of China's wind farms has more than doubled each year

Wang Wenqi was mocked as a fantasist when he set out plans to create China's wind power capital in Dabancheng, a small and nondescript town in northwest China's Xinjiang Uygur Autonomous Region.

That was the 1980s. Almost 30 years on, the town, planted between the regional capital, Urumqi, and the Turpan Basin, is a vast expanse of "white forests." More than 300 howling wind turbines stretch for some 80 kilometres, feeding Urumchi with constant clean electricity.

Wang, 80, recalls the early 1980s, when, as director of the Xinjiang Irrigation Works and Hydropower Research Institute, he had to remain steadfast in the face of overwhelming doubt. Some of Wang's colleagues said he was out of his mind, regarding what he was doing was mission impossible, and "something that only creatures on the moon could think of."

Wang was unfazed and in November 1986, he was heading the newly established Xinjiang Wind Energy Institute with two turbines transported from Denmark to a pilot field near Chaiwobao Lake at Dabancheng.

In October 1989, Wang bought another 13 wind turbines from Denmark with a donation of US\$ 3.2 million from the Danish government, and set out to make Dabancheng a landmark in China's wind power industry.

"This project is the seed in a sense," says Yu Wuming, Wang's successor. "In China, almost everyone developing wind power has visited Dabancheng, and almost every place developing wind power has been supervised by Xinjiang engineers."

Dabancheng Wind Farm now generates 500MW. Though not the largest in installed capacity, it is home to most of China's complete range of turbines, from the earliest and smallest 20kW to the latest 3MW turbines, produced by enterprises at home and abroad.

Unlocking the grid

However, no turbines have been installed at Dabancheng for eight years. Though one of the earliest to tap wind power, Xinjiang has failed to raise significantly the proportion of wind power in its total energy mix. The region has been overtaken by latecomers Inner Mongolia, and Jilin, Liaoning and Heilongjiang provinces, which have more local

consumers. "This is exceptional, compared with the wind power boom across the country," says Yu.

Despite official support, the expansion of clean energy is still plagued with problems. Few wind farms are commercially viable, and most rely on government subsidies. The China Electricity Council says more than a quarter of the country's wind turbines were still not connected to the grid at the end of last year.

But the government is moving to rectify this blockage in order to meet far-sighted goals to reduce pollution and expand clean and sustainable energy forms. In early 2005, the government promulgated the Renewable Energy Law, which offered support for wind power projects through electricity tariffs. Since then, the generating capacity of China's wind farms has more than doubled each year. According to the China Wind Energy Association (CWEA), China overtook Germany as the country with the second largest installed wind power capacity, after the United States, last year.

Energy targets

In September 2009, President Hu Jintao pledged at the UN Climate Change Summit in New York to increase the share of non-fossil fuels in primary energy consumption to around 15 per cent by 2020. And in November, Premier Wen Jiabao said in a meeting of the State Council that China would reduce the intensity of carbon dioxide emissions per unit of GDP in 2020 by 40 to 45 per cent, compared with the level of 2005.

Qin Haiyan, secretary general of the CWEA, says the government plans to build seven 10GW-level wind farms by 2020, totaling 90GW, to account for 78 per cent of the country's installed wind power capacity.

Development of other clean energy sources, including solar, bio-mass and nuclear energy, has also accelerated. Zhang Guobao, director of National Energy Bureau (NEB), cites, as an example, the government's approval for a pilot solar-powered town in Turpan basin. In June, China decided to build its first low carbon emission pilot town in the Yujiabao financial quarter of north China's Tianjin City. "Developing clean energy, including wind, solar and nuclear power, will be a new growth point in our economy," says Zhang. "They are the main direction to adjust our energy structure, cope with global climate change, and ensure energy security." ▶

◀ Coal addiction

Since the founding of the People's Republic of China in 1949, China's energy supply has been dominated by coal, followed by oil, natural gas and renewable energies.

China is the world's second largest energy consumer after the United States. In 2009, it consumed 2.146 billion tons of standard oil, averaging 1.61 tons per person, a fifth of the average level of the United States. China is also a leading energy producer, supplying over 90 per cent of its consumed energy.

Although it is developing faster than anywhere else in the world, China's clean energy accounts for only about 8 per cent of its primary energy consumption. Fossil fuels will dominate for a long time to come.

Coal constitutes more than 70 per cent of China's energy mix, far higher than the world average of 29.2 per cent. China's coal consumption per unit of GDP is 15 times that of Japan and 8.7 times that of the United States. The heavy reliance on coal is attributed to its price. Coal-generated electricity generally costs about half the price of wind power, industry officials say.

The use of coal means more carbon dioxide emissions, seriously challenging China's ability to cope with climate change, though its per capita greenhouse gas emissions were only 5.5 tons last year, less than one third those of the United States.

Powering the future

In July, the NEB submitted a draft of the Emerging Energy Industrial Development Programme (2011-2020) to the State Council for approval. It sets out plans for the next decade, including an investment of 5 trillion yuan in new and clean traditional energies.

"This programme is about utilising clean energy sources such as nuclear, wind, solar and bio-mass energy," says Jiang Bing, director of programming and development at the NEB. "It also covers upgrading traditional energy sources, like clean coal, smart grids, distributed power consumption, and vehicle-based new energies," he adds.

"Our priority rests with three types of non-fossil fuels – nuclear; hydropower; and wind, solar and bio-mass energy.

"By 2015," Jiang says, "hydropower and nuclear power will account for almost 9 per cent of primary energy consumption. Wind power, solar energy and bio-mass energy will make up about 2.6 per cent. Natural gas will compose 8.3 per cent. In contrast, coal consumption will drop from the present 70 per cent to about 63 per cent."

On 8 September, the State Council approved the Decision to Speed up Cultivating and Developing Strategic Emerging Industries. It listed seven industrial sectors for policy support, including energy conservation and new energies.

Tao Gang, vice-president of Sinovel, China's largest wind turbine producer, says it, like other businesses in the wind, nuclear, solar and bio-mass energy sectors, will enjoy greater opportunities under the policy. "The State Council has defined the strategic position of clean energy industries," says Tao. "This will ensure long-term stability of policies essential to clean energy businesses."

In Dabangcheng, Wang Wenqi's long-stalled dream is about to be re-energised, when it becomes home to four of the five new wind farms planned for Xinjiang this year. Xinjiang will have 165 units of 1.5MW turbines installed, capable of feeding clean electric power to 625,000 households a year. **F**

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Photo: Zeng Huang / China Features

Wind turbines in Dabancheng City of northwest China's Xinjiang Uygur Autonomous Region