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Special report: Chinese energy: 'We call it the Three Gorges of the sky. The dam there taps water, we tap wind': Wind energy output is trumping targets, and competition between operators is fierce, but coal still reigns supreme

BYLINE: Jonathan Watts, Dabancheng

In the vast natural wind tunnel that is Dabancheng, the gales that roar between the snow-capped mountain ridges get so strong that trains have been gusted off railway tracks and lorries overturned.

Such is the ferocity of the elements that police sometimes have to stop the traffic that passes through this arid, six-mile-wide plain on what was once part of the Silk Road. That used to be bad for business in Xinjiang, the most westerly region of China, which formerly depended on the trade route between central Asia and the densely populated cities in the far east.

Today, however, the gales themselves have become big business in Dabancheng. The area is home to one of Asia's biggest wind farms and a pioneer in a Chinese industry that is forecast to lead the world by the end of next year

From the road, 118 giant turbines are visible miles before you reach them. Tourists stop for pictures, hair blowing as they pose near the whirring towers.

It is a spectacular sight: fields of spinning blades harvesting energy and transforming it into electricity for the nearby city of Urumqi. A few years ago, this was the only wind farm of such a size in China. But now, bigger facilities have been built or are under construction in Gansu, Inner Mongolia and Jiangsu. Since 2005, the country's wind generation capacity has increased by more than 100% a year. The government's renewable energy policy aims to procure 15% of the country's energy from non-carbon sources by 2020, twice the proportion of 2005.

Wind power has taken off faster than the government planned. This year, policymakers had to double their wind power prediction for 2010, having reached the old goal of 5 gigawatts three years ahead of schedule. On current trends, it will almost definitely have to be doubled again.

Turning point

"China is witnessing the start of a golden age of wind power development, and the magnitude of growth has caught even policymakers off guard," wrote Junfeng Li, secretary general of the China Renewable Energy Industries Association, in a paper last month. "It is widely believed that wind power will be able to compete with coal generation by as early as 2015. That will be the turning point in China, which by then will be the world's largest energy consumer."

China's environmental woes are well documented. Less understood is how the country is attempting to deal with those problems, particularly through the recent, spectacular growth of the renewable energy market.

Strong state policies, rising coal prices and improved technology have prompted a surge of investment into green energy, particularly wind power.

"**China's wind** energy market is unrecognisable from two years ago, It is huge, huge huge. But it is not realised yet in the outside world," said Steve Sawyer, secretary general of the Global Wind Energy Council. He said China might have already overtaken the US as the planet's biggest turbine manufacturer. Given the ambitious plans for wind farms, it could also install the most new generating capacity by 2010.

"A few years ago wind energy was boutique, something to show off to foreigners to prove how green they are but now it is a very serious part of their energy policy," Sawyer said.

"They can make things happen so quickly in China compared to the west. When they make up their minds, it is incredible how fast things happen."

At the end of last year, China had 6 gigawatts of installed wind power generating capacity, covering 202 projects. Another 445 sites have been targeted for development in the near future - according to data from Azure International a consultancy in Beijing.

The signs of expansion are everywhere. At Dabancheng, new towers are being erected. One of the main operators - Xijiang Tianfang Wind Power - already produces 110,000 kilowatt-hours of electricity and managers say they plan to add 50,000 more by November.

This has already been overtaken by Huitengxile Huadian Wind Farm in Inner Mongolia, which supplies electricity to Beijing. Cows and camels roam between the towers of what started in 1996 as an experimental site, but has now been ramped up to the biggest wind farm in China.

"We call it the Three Gorges of the sky. The hydroelectric dam there taps the water, here we tap the wind," said Li Yanjun, the duty operator "I've been here since the beginning. The turbines are like my children. It took 10 years to reach 64,000 kilowatt-hours because that period was the research phase, but now the government is committed to wind energy so we can grow quickly."

We went inside one of the taller towers to a small room with computers controlling the direction of the 68-metre-high turbine. The sound of the whirring blades vibrated through the enclosed chamber as Li pointed to the readings: Wind speed 10.4km per hour (6.4mph), power generation 1,000 kilowatts.

"This is the future in China," said Li. "Everyone is opting for big turbines. It is more economic to have one 1,500 kw turbine than two 750kw turbines and the maintenance costs are lower."

But even this will soon be trumped. At Jiuquan in Gansu province, the ground has been broken for what could one day be the world's biggest wind farm.

Even the first phase - to be completed by 2010 - will add 3.8 gigawatts, more than the wind generating capacity of the entire country at the end of 2006. When the project is finished, it will be almost three times bigger and linked up to a "wind energy corridor" through Gansu which will be connected to an expanded national grid.

As in India and Brazil, investment in the industry is surging. These three countries' share of new wind financing in the world rose from 12% to 22% between 2004 and 2007.

But the growth is from a tiny base. The industry remains minuscule compared with coal. **China's wind** industry is still dominated by five state-owned power generation utilities and a handful of other energy-related state-owned enterprises. It was these giant companies that snapped up the first set of "national concession project" government tenders for large wind power generation projects.

Competition is heating up. The turbine industry used to be dominated by foreign manufacturers, such as Vestas of Denmark, Gamesa of Spain and GE of the US. But last year for the first time, domestic manufacturers grabbed more than 50% of the market.

The biggest player by market share is Goldwind, which is based in Urumqi and piloted much of its technology in nearby Dabancheng. The firm says it has grown by more than 100% for each of the past eight years. Now it produces its own big 1.5 megawatts turbines and is developing a model with twice the capacity that it aims to start testing by 2009.

"There is still a gap between Chinese companies and western companies in terms of research and development because we started later," said a Goldwind executive, who asked to remain nameless. "Most of our technology comes from Germany. But in the first half of this year, we bought the company that taught us how to do things. That has solved the problem of research and development. Now we want to start selling overseas."

Goldwind recently made its first sale of turbines to Cuba and it and other domestic manufacturers have been in talks with potential buyers in Pakistan, the Philippines and South Korea. The government already promotes coal technology in energy deals with countries in Africa and the Middle East. "In this context it is reasonable to expect Chinese wind turbines to find receptive export markets in the near term despite the financing and insurance related challenges stemming from limited track-record for many products," said Sebastian Meyer, director of research and advisory at Azure International. The biggest growth, however, is likely to be in the domestic market. In addition to the current 6 gigawatts of generating capacity, Azure estimates that a staggering 130 gigawatts is in the pipeline in China.

Established turbine manufacturers continue to ramp up production even as new entrants try to squeeze their way into the market. If all of their plans are added together, China's new production capacity could surge to 11 gigawatts this year - almost three times the amount installed last year.

This supply considerably exceeds current demand, which means the waiting times for turbines should decrease.

"It is probably going to be the most competitive turbine market in the world very quickly. Elsewhere, it is a seller's market. Now in China, we are on the tipping point of

it becoming a buyers' market," according to Meyer. "In 2008 it is likely to grow 1.5 times so growth is actually decelerating, but in terms of volume, size and scale this has become a respectable market globally."

Competition

Rising demand for electricity and tighter safety regulations in mines have driven up the price of domestic coal, which supplies 70% of China's energy needs. Domestic prices are now so high that many power plants in Guangdong and elsewhere in southern China import coal from Australia.

This year, the big five utilities are bleeding money because coal costs have been steadily rising. They cannot pass costs on to their customers because of government regulation of power prices.

Even so, wind energy produces a kilowatt-hour of electricity at about twice the cost of a Chinese coal-fired power plant. Even with the recent price rises, coal remains king in China. To meet the demands of the fast growing economy, power plants and factories burn 2bn tonnes of coal each year, about a third of the world's total.

This is why China has overtaken the US as the biggest emitter of greenhouse gases and it is unlikely to fall back to second place for decades.

Wind is also far less favoured than hydro-electricity. Take the dams out of the energy mix and renewables will barely manage 1% of all power generation by 2010 and only 3% by 2020 even in regions with well-developed grids. That is a low proportion compared with the world leader Denmark, which gets about 20% of its electricity from wind.

Long term, the future of wind power is secured by government commitments to renewable energy. The authorities are increasingly alarmed by global warming, which is melting glaciers in Tibet and Xinjiang that provide drinking water to tens of millions of people.

Extreme weather conditions have also led some regions to suffer the worst snowstorms and droughts in decades. Last week, officials in Sichuan province warned that summer flooding was likely to start earlier and be the biggest in a decade because of abnormally high rainfall in May.

On the global stage, China has refused to set binding targets to reduce carbon emissions. But the official rhetoric has shifted. At the end of last month, President Hu Jintao called a politburo study session on the subject of climate change, which energy industry insiders described as an unprecedented level of attention to the problem.

"Our task is tough, and our time is limited. Party organisations and governments at all levels must give priority to emission reduction and bring the idea deep into people's hearts," the president was quoted as saying by the state-run Xinhua news agency.

Environmental groups say the country needs to set more ambitious goals for wind power. With the right government policy, Greenpeace predicts that China's installed wind power capacity could reach 122 GW by 2020, equivalent to the capacity of five Three Gorges Dams, or 10% of the total installed capacity of the country.

In the near future, more and bigger turbines will be spread over a wider area of China. As well as manufacturing more wind power equipment than any other country, analysts predict that China may soon be the world leader in installation.

"China is catching up fast," said Meyer. "The market is ripe for China not replicating what Europe and US did in the past, but doing it better."

Hong Kong-based CLP Holdings Ltd Agrees to Buy Chinese Wind Farm

Source: Lexinexis

Hong Kong-based CLP Holdings Ltd. has agreed to buy Roaring 40s Renewable Energy Ltd.'s 122-MW Chinese wind farm portfolio for \$94 million.

In a news release CLP said the acquisition would be completed in April. CLP said it also plans to buy the Roaring 40s' 50-MW wind power assets in India.

Roaring 40s is an equally owned joint venture between CLP and Australia's Hydro Tasmania.

CLP's CEO Andrew Brandler said the acquisition was made to achieve the target of increasing the non-carbon emitting generating capacity in its portfolio to 20% by 2020. At present, the renewables capacity is less than 10% of total capacity. "The restructuring of ownership of the Roaring 40s' **China** portfolio will strengthen CLP's position as a leading developer of renewable energy projects in Mainland **China** and aligns with the commitment set out in our Climate Vision 2050," Brandler said. Roaring 40s' 122-MW stake in **China** is through 10 wind projects.

Brandler said Roaring 40s would continue to implement solar and geothermal projects in Australia.

An analyst at JP Morgan said the acquisition was too small to make an impact on CLP's earnings. He said the acquisition was made to allow CLP to concentrate on the renewable energy business in Asia while Roaring 40s would focus entirely on Australia. In March, CLP announced plans to develop two 49.5-MW wind farms in **China** in a joint venture with CWP Wind Power Investment Ltd.

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