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# In Search of Clean Energy to Meet China's Needs

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- **Innovative off-grid solar power systems for 400,000 rural households**
- **China's goal for wind power is 30 GW by 2020**
- **100 MW wind farm on Pingtan island is sign of commitment**

**Fuzhou, China, December 18, 2007** - In Fuzhou, the capital of Fujian province, China's fast-paced growth is reflected in the dizzying number of new residential buildings under construction. The landscape of cranes and alluring real estate billboards is typical of dozens of booming cities across China, where growth and rising living standards are pushing the demand for electricity.

Energy consumption grew at nearly 10 percent per year between 2000 and 2005, more than twice the yearly rate of the previous two decades. This sudden surge in energy consumption, driven mainly by heavy industry, forced China to increase its reliance on coal to almost 70 percent of its energy needs. China's CO2 emissions nearly doubled in the last 6 years, at a time of rising concern about climate change around the world.

China's leadership recognizes the challenge of providing energy to maintain economic growth in the cleanest possible way. With support from the World Bank, China has been seeking innovative ways to develop clean energy and energy efficiency for the last 10 years.

### An evolving partnership

A first [Renewable Energy Development Project](#) financed by the

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Bank in 1999 supported the development of off-grid solar power systems for up to 400,000 rural families in the Northwestern provinces. It helped Chinese producers of photovoltaic (PV) systems meet high standards and compete on international markets. Today, China is the largest exporter of solar panels in the world. The project also supported the installation of two wind farms in Shanghai, each with a capacity of 20 MW.

The evolution of PV production in China is an example of innovation backed by development projects and then scaled up by China for maximum impact. This experimental approach is the focus of a new report entitled [\*China and the World Bank: A Partnership for Innovation\*](#).

The renewable energy project's "focus on market, quality and innovation has brought some Chinese companies to the forefront of the global PV market," notes the report. One such company (Suntech or Wuxi Shangdu by its Chinese name) received a grant in 2002 to develop an intelligent controller for PV systems. Four years later it was listed on the New York Stock exchange and had become one of the world's top 10 PV cell manufacturers.

As China's development has accelerated, the World Bank's role has changed. The Bank's focus shifted from financing large infrastructure projects and institutional reforms in the 1980s and 1990s to smaller, more innovative projects. "Our lending amounts have dropped but we do a lot of innovative, complicated projects now," says Zhao Jianping, the World Bank's energy sector coordinator in Beijing.

Besides investing in renewable energy, the Bank has backed the development of a new energy performance contracting business sector and is helping local banks enter the field of energy efficiency financing. It's also considering financing investments in cutting-edge clean coal technologies that capture CO<sub>2</sub>.

### **A long-term commitment to clean energy**

The rotation of large white blades at a new wind farm on Pingtan island, off the coast of Fuzhou, is the latest sign of China's commitment to clean energy. The Bank lent China \$67 million to finance the wind farm in 2005. Fifty large, state-of-the-art 2MW turbines now dot the beach and the woods of Pingtan, next to smaller wind turbines from an older 6 MW farm.

Installation of the turbines was completed in September 2007. By next year, the 100 MW wind farm is projected to produce about 270 million kilowatt hours annually. Half of the power will cover the needs of the island's 400,000 residents and small businesses; the rest will be exported to the mainland through an undersea cable.

Together with a straw-fired biomass power plant under



Energy consumption in China grew at nearly 10 percent per year between 2000 and 2005.



"The use of wind can save a lot of fuel and is helpful for the sustainable development of energy for future generations," says Han Bin, the manager of the Pingtan wind farm.



Lin Xiuxin, a 67-year old retired farmer, bought a TV set two years ago and a refrigerator just last year.

construction in Jiangsu province, several small hydro power plants in neighboring Zhejiang and another wind farm in Inner Mongolia, the Pingtan wind farm is part of a [Bank-financed project supporting the scaling up of renewable energy in China](#).

China had about 100 wind farms as of the end of 2006, amounting to 2.64 GW. The government's goal is to install 5 GW of wind-generated energy capacity by 2010 and 30 GW by 2020.

"Our real objective is to get a large number of investors in this field. The World Bank alone can't finance all the wind farms China wants to install," says Richard Spencer, a wind energy specialist who initiated the Bank's renewable energy program in China. "We want to demonstrate that a large-scale wind farm using best international practice is possible."

Pingtan is a by-product of the Bank's larger clean energy program in China, a program that includes supporting the development and implementation of a new renewable energy law that became effective in 2006. "It's important to get the incentives right," says Spencer. Pricing of renewable energy must be high enough not only to attract investors but also to encourage operators to manage wind farms for the duration of their 20-year lifetime.

The size of the challenge is daunting. Last year, China added 90 GW of coal-generated power to its grid -- nearly the size of Germany's total installed capacity. "Viewed in that perspective, 100 MW is less than a half-day's worth of incremental capacity," says Spencer. "Clearly it's not going to make a difference in and of itself. But you have to start somewhere."

China was the 6th largest wind power producer in the world in 2006, up from 10th place in 2004.

"Wind power is at an initial phase," cautions Han Bin, the president of the Longyuan Pingtan Wind Power Company. The high cost of wind turbines combined with limited, seasonal output still place wind power at a disadvantage compared to thermal power. "It's a long-term prospect," says Mr. Han. "The use of wind can save a lot of fuel and is helpful for the sustainable development of energy for future generations."

### **Pressing needs**

The pressing need for clean and sustainable energy is felt even in Lou Bei, a sleepy farming village at the foot of Pingtan's giant wind turbines.

Lin Xiuxin, a 67-year old retired farmer, says his electricity use has tripled in the last three years. He bought a TV set two years ago and a refrigerator just last year. His modest kitchen also contains a new rice cooker and a lone light-bulb hanging from the ceiling. One of his six children is working on the construction of a tunnel on the mainland and sends money to Mr. Lin and his wife.

Mr. Lin's situation is not uncommon. As wealth trickles down in the form of partial paychecks sent home by migrant workers, poorer Chinese families are able to afford greater comfort and basic amenities.

China's per capita energy consumption remains low at 1.7 tce (tons carbon equivalent) in 2005, compared with the world average of 2.34 tce and the OECD country average of 7.3 tce. Although industry continues to drive China's energy needs, transport and residential and commercial uses will account for a growing share of national demand as more people move out of poverty.

"It's human nature. China's energy needs will continue to increase for sure," says Mr. Zhao. "The question is how you meet those needs for economic growth and poverty alleviation in the cleanest possible way."

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