

China Speeds Up Renewable Energy Development

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Statistics show that in 2005, a total of US\$38 billion [1] was invested in renewable energy development worldwide. China topped the list with a commitment of US\$6 billion, excluding spending on large hydropower projects.

China has good reason to speed up its renewables development, as the country is fairly poor in many energy resources in per capita terms. Its remaining exploitable reserves of petroleum and natural gas are merely 7.7 percent and 7.1 percent of world averages, while those of coal are 58.6 percent of the world average. At the current rate of extraction, China's proven reserves of these resources could last 15, 30, and 80 years, respectively, compared with world averages of 45, 61, and 230 years.

At a Sino-European economic summit held September 12 in Hamburg, Germany, Chinese Premier Wen Jiabao assured the world that China would rely mainly on domestic supplies to meet energy needs. The government's energy policy would aim to integrate development and conservation, giving priority to the latter. China could definitely find a "new path" for sustainable development, the Premier said.

This new path would have to include energy from renewable resources, in which China is abundant. Two-thirds of its hydropower potential is untapped. Exploitation of wind, solar, and biomass energies has just started. Although renewable energy may not yet be ready for prime time, it is expected to deliver sooner or later.

Already, the pace of adoption is noticeable. China's renewable energy development has grown at an annual average of 25 percent over the past few years, according to Zhang Guobao, deputy director of the National Development and Reform Commission (NDRC). By the end of 2005, the country's installed hydropower capacity reached 110 million kilowatts (kW), compared with 1 million kW in 2004 and only 0.492 million kW in 2000. China's 61 wind-power plants claimed a total generating capacity of 1.26 million kW in 2005, up from 0.764 million kW the year before. The 1,500 or so biogas projects resulted in a combined annual capacity of 1.5 billion cubic meters. In addition, 70,000 kW of solar power facilities were operational nationwide in 2005.

Compared with China's total capacity of 508 million kW for all forms of energy, however, the overall shares of renewables (24.3 percent for hydropower, 0.5 percent for wind, and even smaller amounts for others) remain limited. This means enormous room for development. An incomplete list of exploitable renewable energy reserves puts the country's hydropower potential at 400 million kW, wind at around 3 billion kW, biomass energy at 800–1,000 million tons of coal equivalent a year, and solar energy at a theoretical 1.7 trillion tons of coal equivalent a year.

Premier Wen Jiabao has urged all relevant government departments to take effective measures to accelerate the development of renewable energy, so as to “raise the share of quality, clean energies in the total energy mix.”

According to the State Renewable Energy Medium- and Long-Term Development Program [2], renewable energy is expected to account for 16 percent of China’s total energy supply by 2020, up from 7 percent in 2005. In terms of capacity, hydropower is expected to reach 300 million kW, wind power and biomass energy 30 million kW each, and solar energy 1.8 million kW by 2020. Biogas utilization would reach 44.3 billion cubic meters, solar heating 300 million cubic meters, fuel ethanol 10 million tons a year, and biodiesel 2 million tons a year.

China’s renewable energy development is guaranteed under the nation’s first Renewable Energy Law [3], which came into force on January 1 of this year. In February, the government issued a set of rules to implement the law. In addition, officials have decided to raise the rate for electricity consumption by 0.025 yuan per kilowatt-hour (\$0.32 cents/kWh), a small fraction of which (0.001 yuan/kWh, or \$0.013 cents/kWh)—is being collected for the development of renewable energy. And in early October, the Ministry of Finance released details of a new fund dedicated to the development of renewable energy sources, which will use grants and interest subsidies to give government support to renewables’ development in three main areas: oil alternatives, construction, and power generation. In general, local government officials are enthusiastic about promoting renewable energy projects. Their motives vary from securing a lucrative source of government tax revenues, to building up a “green” government image, to adding a “bright spot” to their work performance records. Factors such as the embrace of new energy technologies now bear considerable weight in an official’s promotion.

Jiangsu Province in eastern China is particularly active in the renewable energy game. The prosperous region appears determined to take the lead in wind power exploitation. In less than five years, it plans to boost its wind capacity from virtually zero to 1,500 megawatts (MW). The region is also an important base for the solar industry, where more than 180 companies are involved in the development, manufacturing, and servicing of solar heating appliances. Earlier this year, Shanghai, China’s leading industrial and financial city, announced a plan to build up 100 MW of offshore wind energy capacity. The metropolis hopes to raise the share of renewables in its total energy capacity to 5 percent by 2010. The capital city of Beijing, meanwhile, in its newly released infrastructure construction plan, has vowed to lift renewables’ share in its total energy consumption from the present 1 percent to 4 percent by 2010.

Companies across China—whether state-owned or private, domestic or foreign-funded—are eager to embrace renewable energy projects. Many believe the sector will soon be a gold mine, if it is not already. For some companies, particularly state-owned enterprises, the government’s strong support for renewables is an inspiration. At a number of public occasions this year, NDRC deputy director Zhang Guobao noted that big energy developers in the country would ultimately be expected to derive a certain proportion of their products from renewable sources. Earlier this year, Longyuan Electric Power, the biggest wind player in China, announced a plan to raise its wind-power generating capacity from an existing 416 MW to 3,000 MW by 2010, and to 7,000 MW by 2020. Other major energy developers like Huaneng,

Guodian, and the Three Gorges Corporation have set up subsidiary companies dedicated to new or renewable energy development. Foreign companies have been active as well. The world's leading wind equipment suppliers—Vestas, GE Energy, Gamesa, and Suzlon—have each set up wholly owned manufacturing facilities in China. And seven foreign development banks, including the International Finance Corporation, Germany's DEG, and France's Proparco, have invested in China's renewable energy projects.

The 30,000 MW wind-power goal for 2020 represents a market of 210 billion yuan (US \$26.6 billion), and the country's combined renewables targets amount to US\$100 billion. The coming years are likely to witness rapid development of these energy sources, and the targets might even be reached ahead of schedule, industry analysts say. Yet several major barriers are preventing more rapid development of renewable energy in China. One is the weakness the country has shown in independent technology development. To date, most of the renewables' equipment being used—whether for wind power, biomass, or solar—has been imported, resulting in higher production and consumption costs. The *Outline of National Medium- and Long-Term (2006-2020) Program for Scientific and Technological Development*, released by the government in February, designates energy as the top area needing “urgent S&T support.” The document lists a host of government-supported plans covering key fields of study, cutting-edge technologies, and special large programs, as well as basic research.

China is one of 48 countries worldwide that have enacted laws for renewable energy development. But industries have given only a cautious welcome to the country's laws and accompanying rules of implementation. For many, the wording of the rules is too general to be practical. And some measures remain controversial. For instance, new regulations for wind power decree [4] that the grid feed-in tariffs be decided through a tendering process. The measure has been criticized by industry players, who fear the practice will result in price cuts and thus deny companies a reasonable profit.

Human resources are another problem. According to experts, China aims to engage hundreds of thousands of people in wind power exploitation by 2020. The number of specialized workers alone would be in the tens of thousands. But China currently has a very meager supply of wind energy experts. Only one of the country's more than 1,000 institutions of higher learning provides a four-year program dedicated to wind energy. The situation for other renewables is not much better. Solving this problem will require the joint efforts of many government departments and social institutions, experts say. While the shortage of conventional energy resources is the main driver behind China's push for renewable energy, the country is also making the transition out of environment concern. The nation's coal-dominated energy system has caused severe pollution in many regions, which has compelled the government to turn to cleaner energy resources. Meanwhile, China has pledged to stage a “green” Olympics [5] in 2008, and the environmentally friendly games are expected to be a showcase for the nation's embrace of renewable energy.

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