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US-CHINA PROGRAM

The US-China Program (USCP) of the American Council On Renewable Energy (ACORE) is dedicated to increasing understanding of the U.S. and Chinese renewable energy markets and fostering public and private sector partnerships between our two countries.

ACORE members who are leading voices in the U.S. and Chinese renewable energy industries are invited to join USCP as partners. Our partners actively shape program direction through consultation with other partners, the USCP strategic advisors, and ACORE staff.

We thank the USCP partners for their special effort toward this US-China Market Review: 2012 Year End Edition.



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CHINA MARKET REVIEW

□ CHINA POLICY: STRATEGIC DEVELOPMENTS IN SOLAR AND WIND POWER POLICIES

Gary Wigmore, James Murray and Shepard Liu
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SUMMARY

Although China has established itself as the world's leading producer of solar panels and developer of wind energy, the vitality of China's solar and wind power sectors and the growth prospects for companies operating in these sectors is far from certain. A combination of contracting international demand for solar panels and domestic grid capacity constraints threatens to undo China's progress in respect of these renewable energy sources. Nevertheless, investors and lenders looking to participate in China's solar and wind energy sectors should be encouraged by recent policy reforms designed to address market and infrastructure concerns.

BACKGROUND

China's renewable energy sector has experienced unparalleled growth over the past six years. Reflecting that growth, solar panel production has increased more than 50 times in that time period. In addition, China's aggregate installed capacity for wind power grew from 1.3 gigawatts (GW) to approximately 77 GW from 2006 to 2012, making China the world's leading country in terms of total installed capacity for wind power.

Recent internal and external challenges threaten the growth and stability of China's solar and wind energy sectors. China's solar industry suffers from a surplus

of solar panel manufacturers and shrinking global demand due in part to the global recession. Since 2007, China has been the number one producer of solar panels in the world. Chinese governmental subsidies attracted significant investment into this industry, resulting in many companies entering the solar manufacturing sector. For example, there are currently about 1,000 solar related companies in Jiangsu province alone. In 2011, China's solar panels accounted for two-thirds of worldwide solar panel production. Most of the solar panels produced in China were exported to Europe and the United States, with only approximately 10% consumed by the domestic Chinese solar market.

The biggest driver for solar project development in Europe and the United States was, and continues to be, government incentives, including generous feed-in-tariffs, subsidies and tax incentives. However, as the economies of Europe and the United States began to contract, government incentives for renewable energy have been reduced or eliminated. The result is a mismatch between solar panel supply and demand, which has driven down the price for solar panels to unprofitable levels. Adding to the woes of Chinese solar panel manufacturers are recent protectionist trade measures undertaken by some of the biggest customers in the United States and Europe. In 2012, the United States imposed heavy anti-dumping and anti-subsidy duties on Chinese solar products, including solar panels, and

the European Union has followed suit by launching an anti-dumping probe into solar panels manufactured in China.

While the Chinese solar power sector has faced external pressure, the Chinese wind power sector has faced internal obstacles to growth. Wind power generation is prone to fluctuations due to variability in wind patterns. China's electrical grid, however, is not equipped to handle fluctuations in electrical inputs, therefore making it difficult to integrate power produced by wind farms into the grid.

Furthermore, the current technology used in China cannot store power, meaning that energy generated by wind turbines must be immediately delivered into the grid to avoid being lost. Recent reports show that in 2012, an estimated 20 billion kilowatt hours (kWh) of electricity generated from wind power across China went to waste, almost double the amount lost in 2011. Economic losses from abandoned wind power reached approximately RMB 10 billion in 2012 (about USD \$1.62 billion).

DEVELOPMENT GOALS

In the face of these various pressures, solar and wind power market players in China can take comfort from the Chinese government's expression of strong support for increasing the country's renewable energy consumption. Part of this support can be explained by China's growing but unmet demand for electricity. In 2012, China became the largest energy consumer in the world. Due to the lack of domestic energy resources, China has been forced to rely more and more on energy imports.

The Chinese government noted in *China's Energy Policy 2012* (中国的能源政策 (2012)) that China's dependence on imported oil increased to 57% in 2012. This growing dependence on imported oil poses a threat to the country's energy security. In addition, heavily populated areas of China are suffering from historic levels of air pollution, which is proving debilitating to the health and productivity of citizens inhabiting these urban areas. These problems place pressure on the Chinese government to find ways to control and abate environmental

deterioration. One obvious solution to reduce both foreign energy imports and air pollution is to accelerate the development and use of clean energy from renewable energy sources.

In line with this goal, the National Energy Administration (NEA) issued:

- (i) The "12th Five-Year Plan for Solar Power Development" (太阳能发展“十二五”规划, Guonengxinneng [2012] No.194) (the "Solar Plan") and
- (ii) The "12th Five-Year Plan for Wind Power Development" (风能发展“十二五”规划, Guonengxinneng [2012] No.195) (the "Wind Plan" and together with the Solar Plan, the "Plans"). Developers, investors, lenders and other participants in the solar and wind sectors in China are eagerly studying the Plans, which set out the following goals for China's solar energy and wind power development from 2011 to 2015:

Solar Energy

- ▶ Increase by 2015 the installed generation capacity of solar power to 21 GW, with electricity output of 25 billion kWh per year;
- ▶ Focus on the construction of distributed solar systems linked to buildings or facilities in eastern and central China;
- ▶ Increase the total installed generation capacity of distributed solar systems to approximately 10 GW by 2015;
- ▶ Promote the construction of large scale grid-connected solar stations in regions having rich solar resources and large amounts of unutilized land, including Qinghai, Xinjiang, Gansu and Inner Mongolia provinces, to increase local electricity supplies; and
- ▶ Increase the total installed generation capacity of grid-connected solar stations to approximately 10 GW by 2015.

Wind Power

- ▶ Increase by 2015 the installed generation capacity of wind power to approximately 100 GW, with electricity output of 190 billion kWh per year;
- ▶ Ensure that wind power production accounts for 3% of total electricity production in the country by 2015; and
- ▶ Increase by 2015 the total installed generation capacity of wind power of Hebei province, eastern Inner Mongolia, western Inner Mongolia, Jilin province, Gansu Quanzhou, Xinjiang Hami, Jiangsu's coastal region, Shandong's coastal region, and Helongjiang province, the areas with rich wind resources, to approximately 79 GW.

DEVELOPMENT STRATEGIES

To achieve the ambitious goals stated in the Solar Plan and the Wind Plan, the Chinese government has adopted the following development strategies aimed at promoting the growth of the solar and wind sectors and, in particular, addressing the excess manufacturing capacity and infrastructure constraints facing the two industries, respectively. The government's commitment reflected in the Plans should be welcomed by investors, developers and lenders involved in the solar and wind businesses in China.

1. Solar Energy

To mitigate the excess manufacturing capacity and shrinking foreign demand faced by the solar panel industry, one of the key directives of the Solar Plan is to promote the development of China's domestic solar power market. At the end of 2012, China had an aggregate installed solar energy generation capacity of just 7 GW. The Solar Plan provides that, by 2015, the total installed solar energy generation capacity will increase to 21 GW, reflecting a three-fold increase in just three years.

The Solar Plan sets out strategies to meet these growth targets, including the concurrent promotion

of large-scale and small-scale solar energy powered electricity production.

Firstly, China will construct large-scale grid-connected solar power plants in areas with rich solar resources that will feed power directly into the local utility grid. Article 3.1 of the Solar Plan provides that such large-scale grid-connected solar plants will be concentrated in the provinces of Qinghai, Xinjiang, Gansu, Inner Mongolia, Ningxia, Shanxi, Tibet and Yunnan. Hybrid energy systems like solar and hydropower hybrids or solar and wind power hybrids are also encouraged.

In addition to large-scale plants, China will also promote the development of small-scale distributed solar energy generation systems such as roof-top solar panels where power is used directly by the consumer with excess generation fed into the grid. With respect to distributed solar energy generation systems, the Solar Plan specifies that China shall encourage users to install distributed solar systems on the rooftop of public facilities, commercial buildings and industrial parks, and link distributed solar systems to large industrial companies' intra grid. The Solar Plan provides that such distributed systems will be promoted in the central part and the east coast of China.

To facilitate the development of these solar energy systems, China's Ministry of Finance, Ministry of Science and Technology and the NEA established the "Golden Sun" program, which provided for upfront subsidies for qualified demonstrative solar projects developed from 2009 to 2011. In May 2012, these three administrative agencies jointly issued the "Notice on Excellent Implementation of Golden Sun Demonstrative Program" (关于做好 2012 年金太阳示范工作的通知, the "Notice") to establish the 2012 program after the 2009-2011 program expired. The purpose of the 2012 Golden Sun program is to incentivize the development of self-consumption solar projects in economic and technological development areas, high-tech development parks, industrial parks and business districts. The central government will provide subsidies for qualified

demonstrative solar projects at RMB 5.5 per watt. It is worth noting that the Chinese government has changed the calculation method for subsidies. Under the Golden Sun program, the central government provided upfront subsidies equal to a specified percentage of the total cost of the installed system, while under the 2012 Golden Sun program, the subsidies are calculated based on the amount of electricity generated. This change reflects the shift in China's focus from growth in capacity to growth in efficient generation of renewable energy.

2. Wind Power

Article 3.1 of the Wind Plan stresses that China will centralize the construction of large-scale, grid-connected wind power plants as well as promote the development of distributed wind power generation systems. The Wind Plan provides that China will promote the construction of large-scale grid-connected wind power plants in provinces with rich wind resources. Specifically, China will form several large wind power generation bases in northern and western China, including Hebei, Inner Mongolia, Jilin, Gansu, Xinjiang and Heilongjiang provinces, and on the coast of eastern China, including the coastal regions of the Jiangsu and Shandong provinces. According to the Wind Plan, China aims to establish 79 GW installed wind power generation capacity by 2015 in these regions. At the same time, under the Wind Plan, the Chinese government will stop approving wind power projects in areas with low wind power consumption rates.

The Wind Plan also emphasizes the importance of developing distributed wind power generation systems. The Wind Plan requires each province (city and district) to (i) create a plan for developing grid-connected distributed wind power generation systems in accordance with the layout of existing low voltage grids and other specific local conditions; (ii) combine the use of wind, solar, water and biomass energy in rural areas, plateaus, mountains and islands; and (iii) further the development of off-grid wind power in villages and ranches that are far away from cities and therefore utility grids.

In order to incentivize the development of distributed wind power generation systems, State Grid issued *"The Opinions on Offering Good Grid Connection Service for Distributed Power Generation Systems"* (关于做好分布式电源并网服务工作的意见, the "Opinions") on February 28, 2013. The Opinions clarify what systems qualify as distributed power generation systems. "Distributed power generation systems" refer to those systems (i) whose location to end-users permit their generated power to be utilized locally; (ii) that can be connected to the grid at the voltage level of 10 kilovolts or less; and (iii) with the total installed capacity of individual grid connection points of less than 6 megawatts (MW), including wind, solar, biomass and other clean renewable energy. State Grid will pay for the costs associated with the modification of public grids for the purpose of connecting individual distributed power generation systems. It will not charge any service fees for designing the connection scheme, reviewing the connection scheme, installing power calculation devices, examining grid connection or debugging and calculating subsidies from the government. Finally, in addition to generating power for self-use, distributed wind power generation systems owners may sell their surplus powers to the grid. State Grid has previously offered to provide free grid connection services for solar power in 2012. The Opinions expanded the scope of free grid connection services to wind power, natural gas, biomass energy, geothermal energy, ocean energy and other clean renewable energy.

CONCLUSION

China has become a leader in the world's renewable energy development and consumption, especially in the solar and wind sectors. While it experienced unparalleled growth over the past several years, China's renewable energy industry is facing tremendous internal and external challenges. Nevertheless, companies looking to invest in, or lend to, China's solar and wind sectors should be encouraged by China's recent strategic adjustments and policy reforms, as analyzed in this article.

So far, industry participants are generally positive about the Plans and welcome the increased commitments by the government to encourage project development of the solar and wind sector in China. “China is ramping up at a time when traditional markets in Europe have been stagnant,” noted SunEdison’s Legal Counsel for International Business Development Peter Norman. While commenting on China’s dominance in the global clean energy market, the Global Head of Clean Energy in Project & Export Finance at Standard Chartered Bank, Brad Sterley, commented that China is a huge market and “even a small share of what is a very big market is of significant interest to us.” And

more importantly, Sterley continued, “the Chinese government does officially welcome foreign investment in renewable energy.”

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