The Changing Landscape of the U.S. Energy Market

*Is China taking over the world? The case of China’s entry into the U.S. wind power sector – Summer 2011*
Is China taking over the world?
The case of China’s entry into the U.S. wind power sector

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1. Introduction and Summary

The Chinese wind turbine manufacturing industry has grown exponentially over the past decade as a result of a voracious demand for power generally and green power specifically. The growth statistics are astounding: wind generating capacity has increased by an incredible 1,000% in the last four years alone, rising from 406 megawatts (MW) in 2001 to 2,588 MW in 2006, and currently standing at 25,833 MW.1 Turbine manufacturing capacity has kept pace with this brisk growth, as domestic manufacturers now dominate the Chinese market with an 85% market share.

Domestic competition and international opportunities have driven Chinese wind turbine manufacturers abroad to pursue further growth opportunities in recent years. Chinese manufacturers focused their initial attempts at global expansion in the European market commencing in 2003. Once the European market began to contract, Chinese attention shifted to the U.S., the world’s second largest wind market, which alone has a projected demand for new installed wind capacity of 300 gigawatts (GW) by 2030.2 Now that Chinese manufacturers are focused on the U.S., only two factors stand in the way of their significant penetration of the market: financing challenges and political resistance.

This note examines the growth of the Chinese wind energy market and the resulting turbine manufacturing industry, as well as the industry’s international expansion. The second section looks at the development of the industry’s legal framework and market. The third section provides an overview of Chinese participation in the European wind market. The final section tracks the Chinese turbine manufacturing sector’s expansion into the U.S., analyzes the challenges it faces in penetrating the market and provides thoughts on how it may overcome these challenges.

2. Overview of U.S. Electricity Generation

Development of the Chinese wind energy sector has proceeded in three phases. Initial activity in the sector dates back to 1986, and the sector’s foundation took root from 1986 to 1997. The sector and its legislative framework matured during the second phase from 1998-2004. This period witnessed modest growth of both installed generating capacity and wind turbine production as government support strengthened into formal programs and China’s earliest international agreements related to

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clean energy and its enabling regulations came into force. The third phase commenced in 2005, and has been typified by extraordinary growth of both the wind market and the turbine manufacturing sector as each matured under comprehensive domestic legislation and China’s obligations under international agreements.


In 1986, China built its very first wind farm in Rongcheng, Shandong Province—an isolated occurrence at the time. In the early 1990s, however, wind power began to take root in China as wind farm development commenced and a regulatory framework slowly began to emerge, consisting of both domestic regulations and rules implemented pursuant to international treaty obligations. In 1992, China signed the United Nations Framework Convention on Climate Change (UNFCCC), which entered into force in 1994. The UNFCCC did not impose any binding obligations on China per se, but did send a clear statement that China viewed climate change matters and clean energy as a priority national interest.

That same year, the first Chinese regulations of both off-grid and on-grid wind energy regulations appeared. In 1996, the Chinese government created the first formal market for wind power through the Ride the Wind program. The program included a 40% local content requirement, and it attracted foreign technology into joint ventures (JVs) with Chinese companies by allowing up to 60% foreign content in each project. This is significant because at the time China had virtually no domestic wind turbine production capability.

2.2 Tempered Development: The Wind Sector Emerges (1998-2004)

The acceleration and refinement of the Chinese legislative framework manifested itself through domestic policies and by China entering into additional international agreements relating to the private development of clean energy. These obligations would not enter into force immediately but added to the legal foundation of the wind power market in China.

(i) International Agreements

In 1998, China signed the Kyoto Protocol to the UNFCCC, which it would approve in 2002 and which would enter into force in 2005. In 2001, China acceded to the World Trade Organization (WTO), a move that heralded not only a new era in China’s growth in the wind market, but also a new openness to trade and capitalism in many other industries.

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6. The Ninth Five-Year Plan, also of 1996, had a 40% local content requirement and many international companies began to form joint ventures. EcoWorld, supra note 3, at 4.
7. Ratification of Kyoto, supra note 4.
(ii) Domestic Regulations

In 1999, the Chinese government passed several domestic regulations regarding wind energy that further established the specific tax and financial incentives through which the government sought to encourage growth in this area. China introduced the National Debt Wind Power Program in early 1999 to offer the first formal subsidies: favorable interest terms for projects using locally manufactured turbines. The program resulted in four projects with an installed capacity of 73 MW. The New and Renewable Energy Program gave priority to renewable energy projects for construction loans from state banks while offering incentives including low interest rates, longer amortization periods and an additional 2% interest rate reduction for projects generating over 3 MW. The Opinions on Further Support for the Development of Wind Power at the end of the year incorporated wind power into local planning and created the first on-grid renewable energy program with secure offtake obligations.

China also introduced significant financial incentives for the development of renewable energy during this period, thereby stimulating growth in the market. The then-newly formed National Development and Reform Commission (NDRC) replaced the State Development and Planning Commission and introduced a centralized body to regulate the wind market and streamline policy. Of fundamental importance, in 2002 new regulations halved the Value-Added Tax rate, a compounding turnover tax, on wind generation from 17% to 8.5%. From 2003-2006, the second Ride the Wind Program allowed wind investors to bid to create large-capacity wind farms, using economies of scale to reduce the cost of renewable energy.

(iii) Sector Growth

The earliest activity in wind power construction proceeded through government programs, with the wind concession program being the largest. Prior to 2000, there was very little construction in the wind sector, with wind power accounting for a miniscule total of 180 MW of China's total installed capacity by the end of 1999 (then at 300 GW) and 345 MW of China's total installed capacity by the end of 2000. Figure 2.1 below provides a breakdown by province of wind power generating capacity in 1999. At this time, foreign turbines accounted for virtually all of China's wind energy, with Chinese participation in wind farm construction and installation limited largely to civil engineering matters. Many foreign companies, often backed by home-country financing, took advantage of the 60% stake they could hold in a project to become some of the earliest players in the Chinese market. Construction and regulations were both light and temporary at this stage, as the Chinese government explored the practicality of this new policy direction.

13. Opinions, supra note 11.
Figure 2.1 Wind Power in Selected Provinces in 1999

<table>
<thead>
<tr>
<th>Province</th>
<th>Total Capacity (kw)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hebei</td>
<td>9,850</td>
</tr>
<tr>
<td>Inner Mongolia</td>
<td>51,625</td>
</tr>
<tr>
<td>Liaoning</td>
<td>23,745</td>
</tr>
<tr>
<td>Jilin</td>
<td>7,260</td>
</tr>
<tr>
<td>Shandong</td>
<td>5,675</td>
</tr>
<tr>
<td>Zhejiang</td>
<td>30,355</td>
</tr>
<tr>
<td>Fujian</td>
<td>1,055</td>
</tr>
<tr>
<td>Guangdong</td>
<td>50,480</td>
</tr>
</tbody>
</table>

2.3 Phenomenal Growth: The Wind Sector Matures and Looks Outward (2005-present)

China’s renewable energy policies and legal framework began to mature in 2005 through key policy pronouncements, the passage of a major basic law, and various implementing regulations.

(i) Major Policy and Statutory Foundation

China’s Eleventh Five-Year Plan in 2005 contemplated an aggressive energy emissions reduction plan, under which energy intensity of GDP was to be reduced by 20% from 2005 to 2010. This policy foundation was followed by China’s first comprehensive Renewable Energy Law (the Law), which coincided with China’s international obligations under the Kyoto Protocol coming into force. The new Law included several incentives, the most important of which was the mandatory purchase and connection clause. This clause guaranteed the sale of all renewable power produced in China by requiring state grid companies to connect to the grid and purchase all power from renewable energy sources.

(ii) Domestic regulations

China initially restricted approval of CDM projects to Chinese companies, requiring foreign companies to partner with, train, and share corporate research with Chinese counterparts. Adding further to Chinese companies’ advantages, the Notice of the NDRC in Relation to the Relevant Requirements of the Management of Wind Power Construction in July 2005 required 70% of the value of each

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18. CDMs in China, supra note 15, at 8.
19. Id.
wind turbine used in the country to be locally produced.\textsuperscript{20} The measure was eventually revoked in the summer of 2009 under U.S. pressure, but by then it was not needed. By 2009, wind turbines in China averaged over 95% locally produced content, a development discussed more fully below.\textsuperscript{21}

China also introduced numerous new incentive programs, including low-interest loans, interest subsidies, tax credits and guaranteed cost-plus purchase of renewable power by the state-owned grid company during this period. These incentives were so successful that China achieved 143\% of the target development goals of the Medium and Long-Term Development Plan for Renewable Energy of 2007 two years ahead of the targeted schedule.\textsuperscript{22} China showed its commitment to renewable energy against this backdrop of tremendous growth by issuing in November 2009 the Decision to Speed Up Cultivating and Developing Strategic Emerging Industries, listing seven industrial sectors for policy support including energy conservation and new energies.\textsuperscript{23}

\textbf{Figure 2.2}\textsuperscript{24}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{China_wind_power_capacity.png}
\caption{China wind power industry installed capacity (2003-2009)}
\end{figure}

\textbf{Source: BTM Report}

(iii) Sector Growth: Installed Capacity

China’s wind energy generation capacity had already begun to experience double-digit growth in the early 2000s; however, the sector’s phenomenal growth commenced in earnest in the mid-2000s. By 2005, China had achieved 64\% annual growth of wind capacity, and by 2006 China had reached an impressive 2,588 MW of installed wind capacity and launched a period of consistent annual growth

\textsuperscript{22} National Development and Reform Commission, Medium and Long-Term Development Plan for Renewable Energy (2007).
\textsuperscript{23} National Development and Reform Commission, Decision to Speed Up Cultivating and Developing Strategic Emerging Industries (2009).
\textsuperscript{24} Goldwin Prospectus, supra note 1, at 62.
in the sector exceeding 100% (see Figure 2.2). Hoping to replicate this growth, by the end of 2004 Chinese manufacturers had produced 200,000 off-grid wind turbine generators, ranking the domestic manufacturing industry first in the world and accounting for 18% of China’s domestic market. That figure increased to 28% by 2005 and 45% by 2006. As Figure 2.3 demonstrates, Chinese manufacturing firms were already on the path to dominance in the Chinese market. In terms of production capacity, year-on-year from 2005, domestic turbine production capacity doubled every year.

(iv) Sector Growth: Turbine Manufacturing

The growth of the turbine manufacturing industry was exponential as China entered its third phase of wind generation growth during the period from 2005 to 2010. By 2005, China’s domestic wind turbine manufacturing capability had grown large enough to not only respond to enormous domestic demand, but also had the capacity to export. By the time the Law was enacted in 2005, the manufacturing industry was capable of supplying a 254% leap in wind power capacity in China in a single year.

In 2005 and 2006, Chinese turbine manufacturers began to displace foreign manufacturers in the domestic market. As illustrated in Figure 2.3, by 2007 domestic supply had exceeded imports and this trend of domestic dominance continued in 2008 and 2009, during which Chinese manufacturers commanded 75% and 87.7% of the market, respectively. By way of example, Spanish-owned Gamesa had a 35% market share in wind turbine manufacturing in China in 2005. Yet by 2010, Chinese companies, including some of the very companies with which Gamesa had previously shared technology and trained, had captured nine-tenths of Gamesa’s previous market share. As a statement of the immense growth of the market, despite its shrinking market share, in 2010 Gamesa was still producing twice the number of turbines as it was manufacturing when it was the market leader.

![Figure 2.2](https://example.com/figure2.2.png)

**Figure 2.2**

**Market Share of WTG Manufacturers in the PRC**

- 2004: 78.9% Foreign Suppliers, 21.1% Domestic and Sino-foreign Joint Venture Suppliers
- 2005: 72.3% Foreign Suppliers, 27.7% Domestic and Sino-foreign Joint Venture Suppliers
- 2006: 55.0% Foreign Suppliers, 45.0% Domestic and Sino-foreign Joint Venture Suppliers
- 2007: 42.5% Foreign Suppliers, 57.5% Domestic and Sino-foreign Joint Venture Suppliers
- 2008: 25.0% Foreign Suppliers, 75.0% Domestic and Sino-foreign Joint Venture Suppliers
- 2009: 12.3% Foreign Suppliers, 87.7% Domestic and Sino-foreign Joint Venture Suppliers

Source: BTM Report

25. Id.
This growth trend has had significant consequences on structural aspects of the domestic turbine manufacturing industry. First, domestic competition has driven prices to dangerously low levels within the Chinese market, as can be seen in Figure 2.4. Lower margins forced manufacturers to enhance production efficiency, diversify product offerings and look to overseas markets for growth potential. Chinese companies are looking to export into a constantly growing world market (see Figure 2.5). As evidence of Chinese activity in overseas wind markets, leaders among the 86 Chinese turbine manufacturers (such as Sinovel and Dongfang)\textsuperscript{30} had by 2010 joined the elite league of manufacturers worldwide and captured close to half of the USD45 billion global market (see Figure 2.6).\textsuperscript{31}

\textsuperscript{31} New York Times, supra note 21, at 2.
Figure 2.5

Cumulative global wind power capacity forecast (2009-2014)

![Bar chart showing cumulative global wind power capacity forecast from 2009 to 2014.](chart)

Source: BTM Report

Figure 2.6

The top ten WTG manufacturers in 2009

<table>
<thead>
<tr>
<th>Name</th>
<th>% Market Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>GE Wind</td>
<td>12.4</td>
</tr>
<tr>
<td>Vestas</td>
<td>12.5</td>
</tr>
<tr>
<td>Sinovel</td>
<td>9.2</td>
</tr>
<tr>
<td>Enercon</td>
<td>8.5</td>
</tr>
<tr>
<td>Dongfang</td>
<td>6.5</td>
</tr>
<tr>
<td>Suzlon</td>
<td>6.4</td>
</tr>
<tr>
<td>Siemens</td>
<td>5.9</td>
</tr>
<tr>
<td>Repower</td>
<td>3.4</td>
</tr>
<tr>
<td>Others</td>
<td>18.5</td>
</tr>
</tbody>
</table>

32. Goldwind Prospectus, supra note 1, at 67.
33. Goldwind Prospectus, supra note 1, at 65.
3 International Expansion of Chinese Turbine Manufacturing Sector: Europe

Chinese turbine manufacturers’ initial international focus was on Europe in response to robust demand projections and related legal developments. Specifically, a number of European jurisdictions—notably Germany, Spain and Italy—presented significant growth potential evidenced by the renewables market demand (see Figure 3.1) supported by a host of regulations that provided incentives and subsidies for renewable energy projects such as wind.34

Figure 3.135

*Installed capacity of world’s top ten largest country markets for wind power as of end of 2009*

Source: BTM Report

35. Goldwind Prospectus, supra note 1, at 67.
The first European regulatory system—the European Union Emissions Trading System—came into force in 2001, and various jurisdictions, including Germany, Spain and Italy, passed national legislation implementing the cap-and-trade system. Germany enacted a feed-in tariff system that gave priority connection to the grid systems for electricity from renewable energy sources, and the priority purchase, transmission, distribution of and payment for such electricity by the grid system operators. In 2005-2008, Spain aggressively targeted renewables growth through generous feed-in tariffs, which gave a fixed tariff for every kilowatt-hour of electricity produced by renewable sources and sent to the grid. Over 200 MW of projects were commissioned in this low-risk, high-return period. Italy stimulated its wind power market through green certificates that were granted for each megawatt of renewable power produced, and these certificates could be sold privately or in a regulated market.

Chinese companies began exporting into Germany, Spain, Italy and other European jurisdictions in response to the opportunities presented. The non-proven nature of the Chinese wind turbines presented inevitable financing hurdles to China’s ability to capitalize on the wind opportunities, though China saw much more success on the solar front. Ultimately, politics forestalled China achieving full growth potential in Europe. Specifically, the global recession brought government support programs to an end, and each of these European jurisdictions experienced a serious contraction of wind generation demand. The German measures were repealed in 2008, undermining the economics of all future projects in Germany and bringing the market to a halt. In Spain, the government announced in 2008 not only that it would be lowering the tariffs 25-40% for new projects, but that it might lower tariffs for existing projects whose return structure depended on the cash flow from these tariffs. For a short period, investors feared they might actually be expected to repay amounts previously received through these programs. Many companies were forced to resort to litigation to attempt to recover the loss of government support that financed project development. In Italy, a subsequent regulation required producers to introduce a quota of renewable energy into the grid, creating an excess of green certificates and causing the price to plummet. The Italian government then began buying all excess certificates in 2008 before they expired in an effort to salvage the program, but the obligation imposed by law on the Italian government to buy the certificates has since been transferred between government entities several times, and ultimately the legislation may be overturned. The government has not introduced another program to incentivize further production or compensate companies for this loss.

As a statement of market potential for expanding Chinese turbine manufacturers and developers in Europe going forward, the most recent European renewable energy policy pales in comparison to other global programs. The European Union has proposed only 300 million euro in subsidies and

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40. EREC, supra note 39.
10.3 billion euro in loans over the life of its newest program, designed to generate 20% of electricity from renewable sources by 2020, whereas China Development Bank has offered USD42 billion in loans to Chinese solar panel and wind turbine makers in 2010 alone.


As competitive domestic forces in China continued to drive China's wind turbine manufacturers abroad and the European markets experienced significant contraction, Chinese wind turbine manufacturers began to set their sights on the fertile U.S. market. U.S. demand alone is projected at 300 GW by 2030, and the renewables market in the U.S. has persisted despite the economic crisis and continued recession. The American Recovery and Reinvestment Act of 2009 has set aside up to USD93 million in incentives for wind energy in the form of grants, loan guarantees and tax incentives. As of 2010, 29 states and the District of Columbia had renewable portfolio standards in place requiring electricity providers to obtain a minimum percentage of their power from renewable energy resources by a certain date, and federal-level tax incentives continue to play an important role in domestic renewable energy development.

Despite the massive size of the U.S. market, the Chinese share has been remarkably miniscule, with only six Chinese companies managing to sell turbines to be used in a mere three U.S. wind farms (see Figure 4.1). General Electric (GE) currently dominates the U.S. market, and on average over 50% of the parts purchased and expenditures made in an American wind farm project are domestic. This is remarkable since the U.S. has no local content requirement and Chinese products are usually priced on average up to 33% cheaper than their American counterparts. Chinese turbines cost on average USD600/kW hour, whereas American turbines cost on average USD800/kW hour, with labor up to ten times more expensive. As late as July 2010, 99.9% of the turbines produced in China were used exclusively in Asia, with the remaining 50 turbines being exported overseas, less than half of which have been sold to the U.S.
However, new projects are already underway aimed at increasing Chinese market share in the U.S. Several Chinese companies, such as Goldwind USA, Inc. and A-Power Energy Generation Systems Ltd. (A-Power), have announced plans to build manufacturing plants in the U.S.\(^\text{49}\) A-Power is China’s leading distributor of power and a wind turbine manufacturer, and announced in 2010 its intention to build a wind turbine factory in Nevada.\(^\text{50}\)

Despite the various incentives available in the U.S. market and the clear desire for Chinese manufacturers to come here, two primary obstacles have slowed Chinese entry into the U.S.: financing challenges and political resistance. On the financing side, the inability to secure domestic U.S. debt financing due to a lack of proven track record has led to some alternative structures, explored further below. With respect to the political issues, renewable energy projects in the U.S. market are highly reliant on government incentives to compensate for the increased cost of renewable energy over fossil fuels.\(^\text{51}\) Wind farm projects are simply not profitable currently without some form of government support. This makes government, and thus political, support necessary, which poses a serious obstacle for Chinese manufacturers. Both the financing and political impediments are discussed in more detail below.

\(\text{51. ARRA, supra note 44.}\)
4.1 The Obstacles: Financing Challenges and Political Resistance in the U.S. Market

(i) Financing challenges

The major impediment to Chinese turbine manufacturer expansion in the U.S. is sourcing financing. This has been difficult because Chinese turbines have not yet been deemed proven technology by U.S. financiers given their extremely limited track record in the U.S. Chinese turbines, unlike those from GE, Mitsubishi and others, simply have not operated in the U.S. for a sufficient number of generating hours to demonstrate an acceptably low level of risk for a typical 20- to 25-year project (see Figure 4.2)

Figure 4.2 Chinese MW-Class Wind Turbine Track Record Outside of Home Market, Dec 2010

<table>
<thead>
<tr>
<th>Name</th>
<th>Units delivered</th>
<th>Units delivered to U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sinovel</td>
<td>10</td>
<td>1.5</td>
</tr>
<tr>
<td>Baoding Huide</td>
<td>10</td>
<td>1.0</td>
</tr>
<tr>
<td>Sany</td>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>Sewind</td>
<td>4</td>
<td>1.25</td>
</tr>
<tr>
<td>Goldwind</td>
<td>3</td>
<td>1.5</td>
</tr>
<tr>
<td>Huayi</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>A-Power</td>
<td>1</td>
<td>2.05</td>
</tr>
<tr>
<td>Mingyang</td>
<td>1</td>
<td>1.5</td>
</tr>
</tbody>
</table>

This challenge up to now has virtually precluded U.S.-sourced debt for wind farm projects using Chinese equipment. The various Chinese turbine manufacturers are adopting different approaches to confront this challenge.

(A) Offshore Financing

Given their proven track record in China and other parts of Asia, Chinese manufacturers are able to get better credit from banks and other financial institutions in China. One model that has emerged is for the Chinese suppliers to secure financing from one of their relationship banks in China (either through one of the bank’s branches in China, or through its U.S. branch, if one exists). This financing can be secured by the turbines themselves, or through credit support given by the manufacturer’s ultimate parent in China, either through a corporate guarantee or letter of credit. Figure 4.3 summarizes the major PRC-backed financing support for U.S. wind development. Alternatively, in certain circumstances, China Ex-Im or the China Development Bank may be able to provide export credit financing for these turbines as well. In contrast to the situation with U.S. financiers, one of the biggest challenges to this type of offshore financing structure is not getting the banks comfortable with the technology risk of these turbines, but instead getting them comfortable with lending into U.S.-based

52. Pollock, supra note 49.
projects. There is often a steep learning curve in terms of understanding their collateral position, various intercreditor issues with respect to equity and other debt that may be in the transaction, as well as understanding the tax and other incentives available in the U.S.

**Figure 4.3** Select China Wind Player PRC Financing Support

<table>
<thead>
<tr>
<th>Company</th>
<th>Financier</th>
<th>Line/Limit</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baoding Huide</td>
<td>CATIC (CAIC)</td>
<td>USD300 million</td>
<td>Loans and guarantees for U.S. projects</td>
</tr>
<tr>
<td>Goldwind</td>
<td>China Development Bank (CDB)</td>
<td>USD6 billion</td>
<td>Equity and debt</td>
</tr>
<tr>
<td>A-Power</td>
<td>Shenyang Power Group</td>
<td>USD36.6 million</td>
<td>Third party financing of up to 49% of CAPEX of U.S. project</td>
</tr>
<tr>
<td>Baoding Tianwei</td>
<td>CDB</td>
<td>undisclosed</td>
<td>Loans</td>
</tr>
<tr>
<td>Mingyang</td>
<td>ICBC Guangdong</td>
<td>USD737.3 million</td>
<td>Loans and lease financing</td>
</tr>
<tr>
<td>Sinovel</td>
<td>CDB</td>
<td>USD6.5 billion</td>
<td>Medium and long-term loans</td>
</tr>
<tr>
<td>XEMC</td>
<td>XEMC New Energy Investment Co.</td>
<td>USD301.1 million</td>
<td>Equity and debt</td>
</tr>
<tr>
<td>CSIC Haizhuang</td>
<td>Chongqing Energy Investment Group</td>
<td>undisclosed</td>
<td>Equity and debt</td>
</tr>
</tbody>
</table>

(B) Backstopped Warranties

One of the key aspects underlying the bankability of any project involving unproven technology is the strength of the performance warranties given by the manufacturer. Any wind farm project in the U.S. will contain standard warranties from the turbine manufacturer regarding defects, availability and power curve, which will protect equity investors and creditors against losses due to issues with the turbines themselves. These warranties are only as good, however, as the credit standing behind them. Unlike GE, Vestas, Mitsubishi and others entrenched in the U.S. market, lenders and equity are not familiar with the credit of many of the new Chinese turbine manufacturers in the market, which only compounds the issue around proven technology. To remedy this, Chinese manufacturers may consider providing a backstop of their warranties in one of two ways. The first is to provide a corporate guaranty from their parent entity, assuming the parent entity is credit worthy and sufficiently accessible in the U.S. to provide an adequate source of funds on default. The second, and more likely option is for the manufacturer to provide credit support for its warranties in the form of a letter of credit or other financing arrangement provided by a Chinese bank based in the U.S. Much like the offshore financing model discussed above, the Chinese manufacturer will often be able to obtain financing from a Chinese bank on the strength of its or its parent’s credit back in China. The Chinese bank can then, through

55. Id., at p. 9.
inter-branch arrangements, issue a letter of credit or other credit support through its U.S. branch. The beneficiary of this credit support (either the project lenders and/or equity) will then have direct access to funds in the U.S. in the event of any breach of the warranties.

(C) Increased Equity Financing

Another alternative for Chinese manufacturers is to structure their projects to utilize more equity financing, instead of debt. In a typical project finance structure, equity comprises approximately 15-20% of total project costs. As Figure 4.3 above demonstrates, several Chinese manufacturers have significant cash that can be available for direct or indirect equity investment in their own projects, in addition to a smaller amount of debt financing. Where Chinese manufacturers are not willing to participate as equity in their own projects, they can alternatively look to the equity markets generally for financing. Prior to the financial crisis, a common wind farm financing structure was to utilize debt financing during the construction phase that was refinanced completely by tax equity (those institutional investors that can take advantage of PTCs, ITCs and cash grants) at commercial operation of the facility.56 This structure was no longer viable during the financial crisis, but has seen a resurgence in recent months as tax equity investors are returning to the market. For Chinese manufacturers, the advantage of this structure is that it does not utilize debt long-term. However, tax equity investors will be just as concerned with the bankability of (and therefore the strength of the warranties behind) the turbines in their project. So, any project involving Chinese turbines will need to utilize some combination of this equity approach, along with the backstopped warranties discussed above.

With respect to certain government incentives mentioned above (specifically, the cash grant program), obtaining these credits raises sensitive political considerations, which are examined in the following section. In the European market, Chinese manufacturers in certain cases bought or merged with European companies to overcome this hurdle to the market. As we will see, the Chinese manufacturers face similar issues as they enter the U.S.

4.2 Political Resistance: Current Trade Controversy over Wind Turbines

In addition to the financing challenges, both Chinese turbine manufacturers and developers using Chinese equipment in the U.S. market must be able to work within the U.S. political and legal structure. Two recent disputes in the U.S. involving Chinese turbines provide good illustrations.

(i) 2009 Texas wind farm controversy

In December 2009, private developers closed a deal to build a wind farm in Texas using Chinese-made parts, planning to use U.S. Department of Energy (DOE) renewable energy subsidies to assist in financing the project,57 as well as approximately 20% Chinese financing by A-Power. In reaction to

56. This is normally a non-recourse financing package, with all assets of the Project, including interests in project documents, equity funds, and possible insurance proceeds providing the security for any debt that finances construction or remains outstanding. Alternatively, in certain circumstances, the sponsor will provide a guaranty to the construction lenders.

this announcement, public controversy arose due to specific actions by the United Steelworkers union (the USW) and Senator Charles Schumer (NY). Both parties objected to using the DOE subsidies for projects that “took American jobs.” Eventually, the controversy was settled when the USW and the developers negotiated a deal in August 2010 whereby major components of the project would be supplied by U.S. companies. In recent weeks, however, the project has shown signs of being in jeopardy. A-Power announced that it has not yet received a binding purchase order, and the joint venture has raised the possibility of dissolution and liquidation.

(ii) 2010 USW complaint to Office of the U.S. Trade Representative

In late September 2010, the USW filed a 5,800-page complaint with the office of the U.S. Trade Representative (USTR), Ron Kirk, claiming that China was ignoring rules that prohibit excessive subsidies. The complaint cited official Chinese support for the clean energy industry in the form of land, low-interest or soft loans, and raw materials from state-held stockpiles as some of the problem practices. The complaint, called a Section 301 filing, is the first filed and accepted by President Barack Obama’s administration after President Bush turned down trade complaints against China. On October 13, 2010, Kirk’s office agreed to conduct a 90-day Section 302 investigation, the first step toward filing formal charges and a chance to investigate the factual basis of the claim. Kirk has said his office will defend a “level playing field” for American workers, businesses and clean technology entrepreneurs and will pursue a case with the WTO if necessary.

The Bureau of Fair Trade of China’s Ministry of Commerce responded by filing a 300-page brief with the Office of the USTR in response to the USW complaint urging the office to dismiss the case and open the path to innovation for all nations. On October 16, 2010, Zhang Guobao, director of the Cabinet’s National Energy Administration and also vice chairman of the National Development and Reform Commission, held a very unusual press conference, in which he sternly labeled Washington’s decision to accept the USW complaint filing a blatant attempt to “win votes” rather than have a serious trade discussion. China’s position is that renewable energy technology should be encouraged worldwide, and that the U.S. is threatening the future of an entire industry where a competitive gap exists between alternative and fossil fuel energy sources. Beijing also sees U.S. criticism as inconsistent

60. Platts, supra note 60, January 6, 2011 at 29.
61. Platts, supra note 60, October 15, 2010 at 1.
62. The USTR is empowered to launch such an investigation under Section 301 of the 1974 Trade Act. Comments on the Section 301 filing were due November 15, 2010, and 33 comments were filed. “US Tries to Trip China at Starting Line of Green Energy.” Jie, Zhang. Political Affairs. 25 October 2010. p.1 Besides the American complaint, many foreign business groups have long complained that in wind, Beijing is improperly supporting fledgling domestic clean energy producers by restricting access to its market. They say the central government picks equipment based only on its upfront price rather than the long-term cost, which for more durable foreign equipment is much lower, and as a result shuts foreign producers out. “China Wind Power: U.S. Commerce Sec. Says China to Lift Local Manufacturing Rule.” Hopkins, Sam. Energy & Capital: Practical Investment Analysis in the New Energy Economy, October 30, 2009. p. 1.
63. Id.
64. Platts, supra note 60, October 18, 2010 at 6.
65. Id., October 25, 2010 at 4.
with the U.S. government’s own actions, as the Obama administration has itself proposed billions of dollars of subsidies to clean energy companies, as well as provisions that only products made in the U.S. can be part of government-funded programs.\textsuperscript{67}

The U.S. announced on December 22, 2010, that it had found China in violation of WTO rules and asked to initiate formal talks.\textsuperscript{68} Other U.S. findings include that China offers subsidies of between USD6.7 million and USD22.5 million to domestic manufacturers, totalling to possible hundreds of millions of dollars in subsidies since 2008.\textsuperscript{69} If the two countries cannot reach agreement during talks, then the U.S. has said it may seek a hearing before the WTO.\textsuperscript{70} The WTO’s primary punitive measure is to ask the violating country to repeal the rule in question.\textsuperscript{71} The WTO also has the power to ask government subsidies to be repaid.\textsuperscript{72} The outcome of these talks and/or the ultimate WTO action remains pending.

4.3 2011 Hu Jintao Washington Visit: Trade Relations Tighten

Chinese Premier Hu Jintao visited Washington, D.C. in January 2011. The visit was highly successful in addressing the various political impediments to growth in the wind power sector. Despite negative industry/labor sentiment towards Chinese manufacturers, President Obama adopted an approach with the visiting premier of mutual benefit through growth. Premier Hu also attempted to demonstrate the positive effects China is having on the American economy\textsuperscript{73} by announcing an estimated USD6.2 billion of Chinese investment in U.S.-based companies, real estate and other assets last year.\textsuperscript{74} In particular, during Premier Hu’s visit, a host of U.S. companies signed agreements with Chinese counterparties on a variety of energy projects including nuclear fuel fabrication, clean-coal technology and wind power projects in China, including the following:

- UPC Renewables and China Guodian formed a JV for the construction and operation of one GW of wind power in China;
- GE and the Chinese company Shenhua created a JV to pursue coal-gasification technology;
- Westinghouse Electric and China State Nuclear Power Technology Corp. signed a two-year extension of a nuclear cooperation pact;
- Westinghouse entered into an agreement with the China National Nuclear Corporation for the manufacture and installation of nuclear fuel fabrication equipment;

\textsuperscript{67} Platts, supra note 60, October 25, 2010 at 4.
\textsuperscript{68} Platts, supra note 60, December 22, 2010 at 10.
\textsuperscript{69} Platts, supra note 60, January 6, 2011 at 28.
\textsuperscript{70} Id. at 1.
\textsuperscript{71} New York Times, supra note 21, at 2.
\textsuperscript{72} New York Times, supra note 20, at 2.
\textsuperscript{73} E.g., Hu Jintao visited depressed Chicago. His message of investment is likely to be well-received there, where Chicago-area companies include the parent company of United Airlines and Continental Airlines, Boeing Co., McDonald’s Corp., and Motorola, all of which are deeply embedded in China. Cooper, Helene, “For Chinese Leader’s Visit, U.S. to Take a Bolder Tack,” New York Times, January 17, 2011.
\textsuperscript{74} Lee, Don and Righter, Paul, “Chinese President Hu Jintao’s visit with Obama may be more show than substance,” LA Times, January 19, 2011. p. 1.
– GE and China Huadian Corp. signed a five-year joint agreement to develop distributed energy, combined heat and power projects in China; and

– Duke Energy and ENN Group signed a memorandum of understanding creating the Future Energy Technology Demonstration Fund.75

While these agreements are at an early stage, it is indicative of the interest of both U.S. government and industry to work with the Chinese on key energy initiatives. Notably, the above proposals involve mostly joint venture or cooperation arrangements that may be easier to manage from a political perspective than direct sales or acquisitions, which may raise subsidization or technology transfer issues. In addition, proposals by Chinese developers to build manufacturing capacity in the U.S. may undercut some of the concerns regarding U.S. jobs. Finally, if wind power development accelerates with economic growth and deadlines to meet REP or CES mandates, imported turbines may be needed to meet demand, providing a further opportunity for wind power development.

5. Conclusion: Forecast Going Forward

China’s domestic wind energy market is the largest and most vibrant in the world. China’s turbine manufacturers have achieved phenomenal growth to respond to market demand. The growth statistics are nothing short of astounding. The Chinese wind power market has increased generating capacity alone by 1000% in just four years, from 2,588 MW in 2006 to 25,833 MW in 2010. In just over five years, domestic turbine manufacturers took over the market, going from 21.1% market share in 2004 to 87.7% market share in 2010. This remarkable growth has not only given rise to considerable domestic competition, but also created production capacity that offers global opportunities.

With domestic competition so fierce domestic consolidation and internationalization are the Chinese turbine manufacturers’ key safeguards against extinction. Chinese manufacturers were reasonably successful in their initial foray into Europe; however, the scaling back of government economic support to wind projects presents a major obstacle to continued expansion in European markets.

The import of Chinese turbines and other wind power technology to the U.S. has not been smooth or robust, due largely to financing and political issues. The financing issue is largely a function of the very rapid emergence of the Chinese wind turbine on world markets. That Chinese wind turbines have yet to be recognized as “proven technology” outside of China, particularly in the U.S., is not an insurmountable challenge. On the contrary, Chinese manufacturers of other power-generating equipment far more technologically complex than wind turbines—such as hydropower and coal and gas-fired turbines and generators—demonstrated extraordinary skill in successfully establishing themselves as accepted suppliers with international financiers after similar initial hurdles in the mid-to-late 1990s. For example, the Shandong Zhonghua Power Project in 1998 was noteworthy as

75. Platts, supra note 60, January 18, 2011 at 1.
one of the earliest deals to source almost all its major equipment from within China without Chinese financing, a move that came after financiers had overcome their initial apprehension of unproven Chinese electric power generating technology. The “proven technology” issue is really more an issue of time than an obstacle to growth.

Therefore, Chinese manufacturers’ greatest challenges in establishing themselves in this burgeoning market will be securing and structuring financing that will support growth during this gap period, as well as navigating through sensitive political issues. China’s further penetration of the very fertile U.S. wind market will require creativity and agility in marshalling the vast onshore Chinese financial resources available for the foreign expansion of Chinese turbine manufactures and developers. What is a challenge for the Chinese presents an opportunity for forward-thinking financiers. The position almost calls out for a financing product tailored to both address the risks unique to projects with Chinese turbines and capitalize on available PRC financial support. A financing product that could be rolled out with efficiency and uniformity (that would no doubt be priced commensurate with the technical risk of Chinese equipment) would have great appeal. Based on conservative estimates of the depth of the market for Chinese turbines, the market presents more than a few opportunities for U.S.-based funds and banks (including the New York branches of PRC banks) to create such a packaged debt product that would be available for U.S. wind projects. The financier would benefit from a steady stream of lending opportunities, and the Chinese manufacturer could offer the financing package as part of their marketing for U.S. projects.

Turbine sales and development will also need to proceed in a manner that shows a clear awareness of the political crosswinds surrounding wind energy development with foreign participation that is reliant on one form or another of government investment support or incentives. As described above, unexpected political issues can arise suddenly and early recognition of the issues accompanied with affirmative response plans designed to navigate through the political shoals will be essential to any aspiring Chinese participant in the U.S. market. China’s wind players certainly have a long way to go to penetrate the U.S. market, but if past performance is any indicator, we will likely be reading much more about Chinese activity in the U.S. wind power sector.
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