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Blown Away: How China Outsmarts WTO Rulings in the Wind Industry

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How China Outsmarts WTO Rulings in the Wind Industry

ABSTRACT

Through a study of China's wind turbine sector, this paper demonstrates how China liberally implements industrial policies and then removes them when the WTO disputes them. China's convenient compliance with the WTO rulings reflects Beijing's *realpolitik* navigation through the organization's dispute-resolution process, rather than socialization to international norms.

KEYWORDS: China's industrial policy, World Trade Organization, wind energy, trade dispute, multinational companies

FACED WITH THE NEED FOR GREATER energy independence and environmental protection, governments in both developed and developing countries have invested heavily in clean energy technology. The global financial crisis of 2008–2009 has further prompted countries to increase their promotion of the green energy industry as a new driver of industrial upgrades and job creation. Among renewable energy sources, wind energy has gained a prominent position with its advanced technology, potentially low cost, and convenience for large-scale commercial development. In recent years, China has developed wind energy capacity at a speed that has blown away many pundits and industry actors. Beginning as a country with only 1 gigawatt (GW) of capacity from wind towers in 2005, China surpassed the United States in 2010 to boast the world's largest installed capacity of wind-generated power. China's rapid ascent as a global wind power has been accompanied by a parallel rise of Chinese wind turbine producers in domestic and global markets.

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China's breathtaking coming of age as a global wind power has ignited debates over the effectiveness of industrial policy, as well as the role of state and international institutions, in creating a competitive market and regulatory environment. Implementing various industrial policies is certainly nothing new in developing renewable energy, especially in terms of encouraging domestic producers to capture market share. However, China has employed extensive and integrated industrial policies across the demand and supply sides of the market, which in turn have escalated trade tensions with other countries in recent years. Foreign trade representatives and businesses are increasingly concerned about their diminishing access to the Chinese wind turbine market, as well as about having to compete with inexpensive Chinese products in global markets. Thus, China's rapid success in renewable technology adoption raises the following questions: (1) What are the driving forces behind China's rise as a global wind power? (2) How do state policies and markets interact at the international, national, and sub-national levels? (3) What does this story tell us about the ability of late developers to catch up with earlier developers, especially under the liberalizing and socializing pressures of the World Trade Organization (WTO)?

This article examines such questions by evaluating a case study of multilateral and bilateral trade disputes between the US and China over China's industrial policy measures in the wind turbine industry. In doing so, it challenges conventional wisdom on three points. First, I argue that China's compliance with WTO rulings reflects Beijing's *realpolitik* and skillful navigation through the minefield of the WTO's dispute-resolution process, rather than socialization to international norms. Second, contrary to expectations of multinational companies (MNCs) functioning as export-lobbying groups to push for economic liberalization in China, the development of a global supply chain complicates domestic political calculations among foreign business groups due to their economic and trade relationships with China. Lastly, the use of industrial policy does not come without substantial costs. State-led industry development not only distorts market incentives by favoring quantitative growth at the expense of quality, but also leads to market fragmentation with widespread overcapacity.

This article begins by introducing the empirical puzzle of China's rise as a strong player in the wind power industry, and providing a literature review on the WTO's and MNCs' impact on socializing and liberalizing China. I then introduce my argument regarding how China crafts its protective

industrial policies in such a way as to stay ahead of WTO enforcement, which I demonstrate through a case study of trade disputes in the wind turbine sector. The final section discusses the negative implications of China's heavy use of industrial policies that forestall sustainable long-term growth in the sector. Thus, this research extends its contributions beyond the scope of the wind turbine industry by demonstrating how China's pattern of developing its own national champions through industrial policies occurs in many different sectors. The paper also raises important systemic issues for sustaining economic growth—not only for China, but also for other large transitional economies.

EMPIRICAL PUZZLE: CHINA'S ASTRONOMIC RISE AS A GLOBAL WIND POWER

Renewable energy has steadily captivated Chinese policymakers' attention in recent years as a way to diversify energy resources, mitigate environmental problems, and encourage industrial upgrades. Decades of reliance on labor-intensive and energy-inefficient sectors has taken a mounting environmental toll in the country, leading to increased pollution, carbon emissions, and energy usage. Between 2001 and 2011, Chinese energy consumption grew by 136%,[1] and in 2008, China obtained 90% of its energy from highly polluting energy sources such as coal and oil (Figure 1). China's dependence on export-oriented economic production contributes to the problem, as this production is more energy-intensive than the rest of the economy.[2] Thus, the development of renewable energy is consistent with Beijing's emphasis on the sustainability of China's economic model and industrial upgrades through developing high-value-added and technology-intensive industries. The China Greentech Initiative identifies key sectors to be developed, including renewable energy.[3] The country's 12th Five-Year Plan (2011–2015) set a target to increase non–fossil fuel energy sources from 8.3% in 2010 to 11.4% of total energy use.[4]

1. "A Greener Shade of Grey: A Special Report on Renewable Energy in China," Economist Intelligence Unit, *The Economist*, May 2012.

2. Kahrl Fredrich and David Roland-Holst, "Growth and Structural Change in China's Energy Economy," *Energy* 34:7 (2009), pp. 894–903.

3. China Greentech Initiative, *The China Greentech Report 2009*, <http://www.china-greentech.com/2009report>.

4. KPMG, "China's 12th Five-Year Plan: Energy," April 2011, <http://www.kpmg.com/cn/en/IssuesAndInsights/ArticlesPublications/Documents/China-12th-Five-Year-Plan-Energy-201104.pdf>, accessed November 11, 2012.

FIGURE 1a. China's Energy Consumption Growth (1998–2010) (in million tonnes oil equivalent)

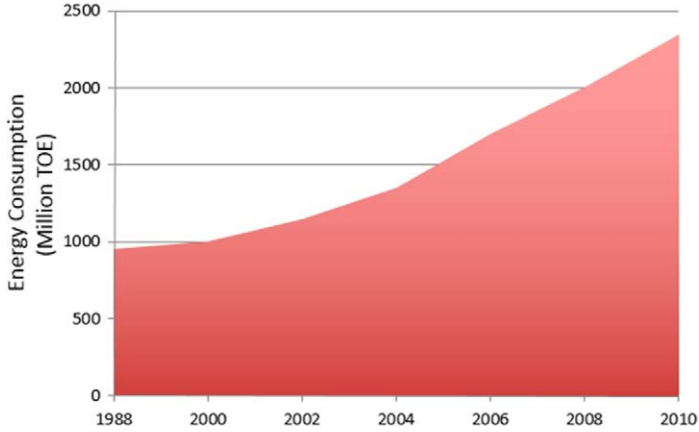
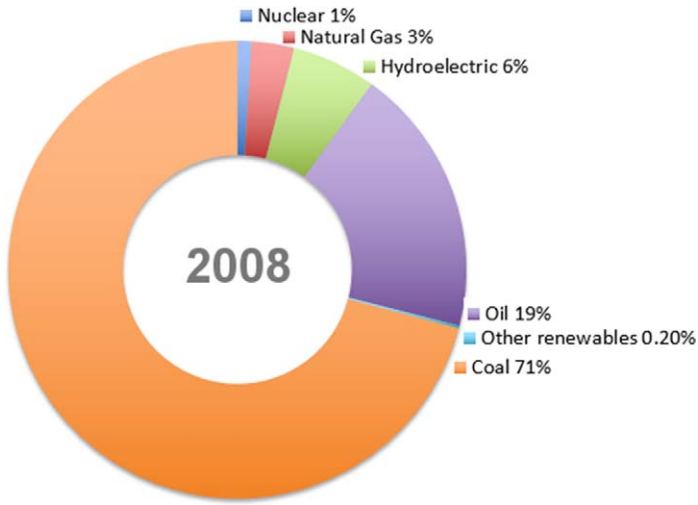


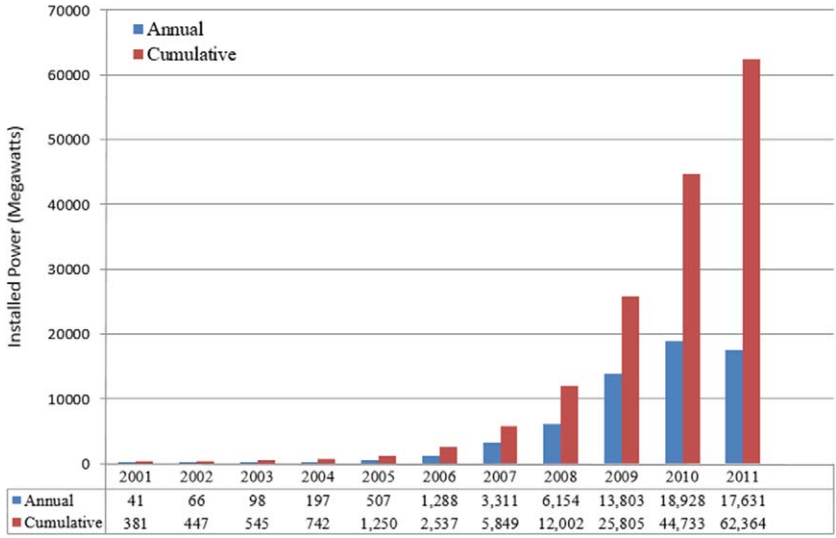
FIGURE 1b. Energy Consumption by Type in 2008



SOURCE: Compiled from BP's Statistical Review of World Energy and US Energy Information Administration, China Country Analysis, 2008.

Among renewable energy sources, wind energy has drawn government attention for its low cost of development and contribution to industrial capacity-building. Proactive government support and strong domestic demand have driven explosive growth of the wind turbine manufacturing industry since 2005, an industry that barely existed previously (Figure 2). By

FIGURE 2. China's Annual and Cumulative Wind Installation (2001–2011)



	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Annual	41	66	98	197	507	1,288	3,311	6,154	13,803	18,928	17,631
Cumulative	381	447	545	742	1,250	2,537	5,849	12,002	25,805	44,733	62,364

SOURCE: Junfeng Li, Pengfei Shi, and Gao Hu, *China Wind Power Outlook 2010*, China Renewable Energy Industries Association, Global Wind Energy Council, Greenpeace, October 2010, p. 2, <http://www.greenpeace.org/eastasia/Global/eastasia/publications/reports/climate-energy/2010/2010-china-wind-power-outlook.pdf>.

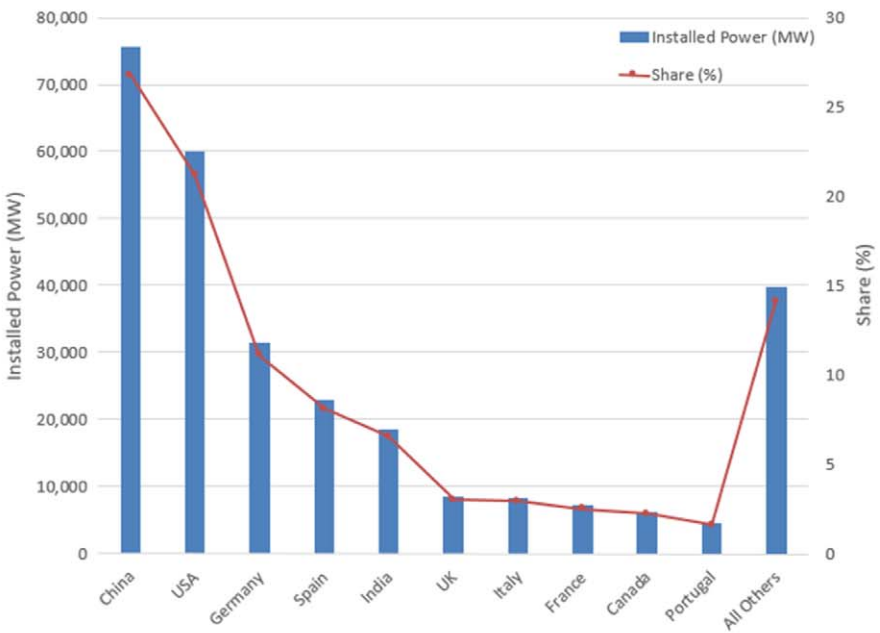
2010, China had established itself as the country with the world's largest amount of installed wind-power capacity,[5] which accounted for 36% and 43% of the growth in the global annual wind turbine production market in 2011 and 2012, respectively. It also possessed 26.8% of all global wind power capacity in 2012 (Figure 3).

China's rapid ascent as a world wind power has been accompanied by the parallel rise of Chinese wind turbine producers. The country installed its first imported utility-scale wind turbine in 1986; its first locally manufactured wind turbine was built by a Sino-foreign joint venture in 2000. From 1996 to 2005, foreign companies—including Denmark's Vestas, America's GE Energy, and Spain's Gamesa—dominated China's domestic wind turbine market, holding a 75% market share. However, by 2009, Chinese companies, led by Sinovel and Goldwind, controlled more than two-thirds of the

5. Global Wind Energy Council, *Global Wind Statistics 2010*, February 2, 2011, <http://dev6.semaforce.be/fileadmin/documents/Publications/GWEC_PRstats_02-02-2011_final.pdf>, accessed October 28, 2012.

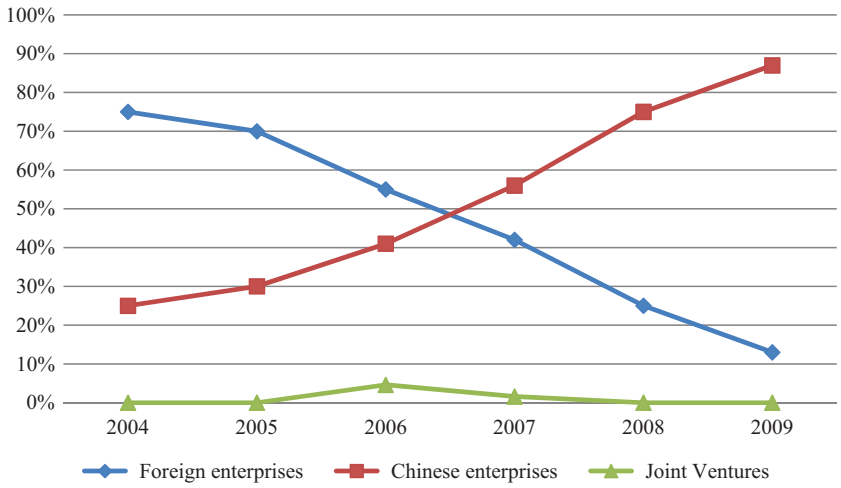
FIGURE 3. Global Top 10 Countries by Cumulative Wind Capacity (December 2012)

Rank	Country	Installed Power (MW)	Share (%)
1	China	75,564	26.8
2	USA	60,007	21.2
3	Germany	31,332	11.1
4	Spain	22,796	8.1
5	India	18,421	6.5
6	UK	8,445	3
7	Italy	8,144	2.9
8	France	7,196	2.5
9	Canada	6,200	2.2
10	Portugal	4,525	1.6
-	All Others	39,853	14.1
-	Top 10 Total	242,630	85.9
-	World Total	282,482	100



SOURCE: Global Wind Energy Council, "Global Wind Statistics 2012," February 11, 2013.

FIGURE 4. Market Share of Domestic and Foreign Wind Turbines in China, by Annual Installed Capacity (2004–2009)



SOURCE: Junfeng Li, Pengfei Shi, and Gao Hu, *China Wind Power Outlook 2010*, China Renewable Energy Industries Association, Global Wind Energy Council, Greenpeace, October 2010, p. 37, <http://www.greenpeace.org/eastasia/Global/eastasia/publications/reports/climate-energy/2010/2010-china-wind-power-outlook.pdf>.

domestic market share (Figure 4). Foreign companies' market share has plummeted to 14%, and they have not won a single central government–funded wind energy project since 2005. In addition, the emergence of Chinese companies has reshuffled the balance of power among market actors in the global wind turbine market. China's largest turbine manufacturer, Sinovel, established itself as the world's third-largest turbine producer in 2009. In 2011, the world's top 10 wind turbine manufacturers accounted for 78.5% of the global market, with the top 4 Chinese companies accounting for 26.7%. How can we explain the breathtaking growth of China as a global wind power?

OUTSMARTING THE WTO: CHINA AND INDUSTRIAL POLICY

China's rise as a green power has drawn substantial attention from countries looking for a way to reinvigorate their industries and governments' engagement with markets after the severe economic distress of the 2008 global financial crisis. Scholars have long pointed to the significance of industrial

policy, particularly for late developers, as the main tool to move up the global production ladder.[6] This logic also applies to strategic industries like the green energy sector, where governments intervene to create a comparative advantage and develop domestic champions for national security and economic reasons. After decades of consensus that industrial policy does not work for developing nations,[7] the World Bank actually began recommending its use; Justin Lin, a former chief economist at the World Bank, has discussed the important role government plays in fostering comparative advantage.[8] Another economist, Ha-Joon Chang, claims that creating comparative advantage requires a government to identify winners and encourage the movement of resources to the industries with the highest growth prospects.[9] Vinod Aggarwal and Simon Evenett specifically demonstrate how the recent financial crisis has prompted China, Korea, and Japan to strategically develop green industries.[10] In fact, the only debatable issue is not *whether* the state intervenes, but *how* the government intervenes and for what purposes. These newly emerging debates about the use of industrial policies pose a threat to the liberalizing ideology behind international trade regimes and their ability to facilitate the liberalization of transitional economies such as China.

China's entry into the WTO in 2001 seemed to heighten expectations regarding the effectiveness of international institutions in accelerating China's economic liberalization. The WTO creates, monitors, and enforces trade rules on a multilateral basis, while its Dispute Settlement Body (DSB) serves as an arena for the resolution of trade disputes.[11] By entering the WTO, China lifted over 7,000 trade-related barriers and revised an additional 2,300

6. Alexander Gerschenkron, *Economic Backwardness in Historical Perspective: A Book of Essays* (Cambridge, MA: Belknap Press of Harvard University Press, 1962).

7. World Bank, *The East Asian Miracle: Economic Growth and Public Policy* (New York: Oxford University Press, 1993).

8. Justin Y. Lin and Celestin Monga, "Growth Identification and Facilitation: The Role of the State in the Dynamics of Structural Change," Policy Research Working Paper no. 5313, World Bank, 2011; Justin Y. Lin, *Demystifying the Chinese Economy* (Cambridge: Cambridge University Press, 2012).

9. Justin Y. Lin and Ha-Joon Chang, "Should Industrial Policy in Developing Countries Conform to Comparative Advantage or Defy It? A Debate between Justin Lin and Ha-Joon Chang," *Development Policy Review* 27:5 (2009), pp. 483–502.

10. Vinod K. Aggarwal and Simon J. Evenett, "Financial Crisis, 'New' Industrial Policy, and the Bite of Multilateral Trade Rules," *Asian Economic Policy Review* 5:2 (2010), pp. 221–244.

11. Marc L. Busch and Eric Reinhardt, "The WTO Dispute Settlement Mechanism and Developing Countries," Department for Infrastructure and Economic Cooperation, Swedish International Development Cooperation Agency, 2004; Donald McRae, "What is the Future of WTO Dispute Settlement?" *Journal of International Economic Law* 7:1 (2004), pp. 3–6.

pieces of trade-related legislation from 1999 to 2005. Constructivists emphasize these developments as evidence of how the socialization of international institutions has helped China adopt international norms.[12]

Another group of scholars, including Robert Wade and Linda Weiss, contend that the very nature of WTO rules places structural limitations on developing countries like China by restricting the use of industrial policies to protect infant industries or develop domestic companies at the expense of foreign companies.[13] For example, the WTO's Agreement on Trade-Related Investment Measures prohibits popular nontariff barriers such as imposing requirements on foreign companies regarding local content, export performance, and technology transfer. Meanwhile, other WTO rules permit—or at least do not explicitly prohibit—the pursuit by advanced countries of more-restrictive industrial policy in technology-intensive industries. Advanced countries can offer substantial support for venture capital financing of high-tech start-ups, and provide strategic financing for precommercial technologies and product development. Thus, Wade and Weiss argue, developed countries craft WTO rules that best suit their current developmental trajectory, placing developing countries at a systemic disadvantage.

China has certainly played by the international rules and has learned to engage in the multilateral forum of the WTO, rather than in bilateral retaliatory trade disputes, when it sees the benefits of doing so. As the country with the world's highest volume of international trade, China has increasingly dominated WTO trade dispute settlements. Since joining the WTO, China has participated in 176 disputes—13 as a complainant, 34 as a respondent, and 129 as a third party. Foreign countries have started relying on the WTO's DSB as the main instrument for addressing trade concerns with China, and China has grown confident in dealing with trade disputes within the WTO. Beijing has demonstrated a strong record of compliance with the organization's dispute-settlement rulings since its entry, when it moved from being a cautious observer of WTO proceedings to being an active participant; in

12. Ann Kent, "China's International Socialization: The Role of International Organizations," *Global Governance* 8:3 (2002), pp. 343–364; Marcia Don Harpaz, "Sense and Sensibilities of China and WTO Dispute Settlement," *Journal of World Trade* 44:6 (2010), pp. 1155–1186.

13. Robert H. Wade, "What Strategies Are Viable for Developing Countries Today? The World Trade Organization and the Shrinking of 'Development Space,'" *Review of International Political Economy* 10:4 (2003), pp. 621–644; Linda Weiss, "Global Governance, National Strategies: How Industrialized States Make Room to Move under the WTO," *Review of International Political Economy* 12:5 (2005), pp. 723–749.

most cases, Beijing has either reached agreements with the complainant over the disputed practices or discontinued measures that the WTO found inconsistent with China's WTO obligations. China's record at the WTO *appears* to confirm international relations and legal studies scholarship regarding international organizations' effectiveness in socializing and pressuring China toward further economic liberalization.

However, China's achievement in this regard is overshadowed by foreign governments' and businesses' increasing criticism regarding their diminishing access to the Chinese market, and Beijing's continuing use of WTO-inconsistent industrial policy measures. For foreign businesses, China has been a "pay-to-play" market with mandated joint venture and local-content requirements, as well as forced technology transfers in key industries, which function as the price of market admission.[14] At the same time, China continues to create national champions mainly by developing state-owned enterprises as the main drivers of economic development and then never fully privatizing these companies. With state sponsorship, these state-owned enterprises not only block international businesses' entry into China's "pillar" industrial sectors, but also bring their inexpensive products and services to international markets, with a competitive edge over global companies.

Despite expectations that China would abandon its more protective industrial policies after entering the WTO, during the past decade the Chinese government has increased its reliance on WTO-inconsistent measures as a key tool for managing the country's economy. This is especially true since the 2008 financial crisis, which led to a severe contraction in China's export market. Subsequently, trade disputes involving China have increased at the WTO, focusing on the issues of subsidies, dumping, favorable treatment of domestic companies, and discrimination against foreign businesses and imports. In its report covering 2009–2011, the U.S.-China Economic and Security Review Commission frequently criticized China's restrictions on foreign firms' market access, disregard for intellectual property rights, forced technology transfers, and the many direct and indirect subsidies to Chinese exporters.[15] In its annual

14. James McGregor, "Time to Rethink U.S.-China Trade Relations" *Washington Post*, May 19, 2010, <http://www.washingtonpost.com/wp-dyn/content/article/2010/05/13/AR2010051303551.html>, accessed July 6, 2012.

15. U.S.-China Economic and Security Review Commission, *Investment Measures, Subsidies, and Intellectual Property Protection Which Raise WTO Compliance Concerns*, Trade Lawyers Advisory Group, October 1, 2007; Annual Report to Congress 2010 and 2011, *U.S.-China Economic and*

reports from 2010 to 2012, the EU Chamber of Commerce in China outlined hundreds of protectionist hurdles that still impede foreign businesses.[16]

The wind turbine industry serves as a representation of China's use of industrial policies to develop certain industries at the expense of foreign companies. In examining the empirical puzzle of China's continued (and increased) implementation of industrial policies, along with its ability to flout international rules, this article argues the following two points. First, under the WTO system China has room to maneuver to implement WTO-inconsistent regulations that protect infant industries, develop strategic industries, and nurture national champions. China conveniently complies with WTO dispute rulings when the measures are contested, thereby keeping its industrial policies one step ahead of the WTO umpire. This is partly possible because the legal process at the WTO's DSB takes months or even years to complete.

Formal WTO dispute settlement has four stages: consultations, panel proceedings, appellate review, and implementation.[17] The process begins with a written request for consultations by a complaining party; the procedure then grants both sides 60 days to reach a "mutually satisfactory solution." If these bilateral consultations fail, the complaining party may request that a panel be established to hear the case. The WTO has up to 45 days to appoint the panel, which is granted about six months to conclude its investigation. WTO panels take around a year to complete their proceedings and issue a decision. The disputing parties can then either accept and implement the panel decision, or they can appeal to the Appellate Body, which may take up to 90 days to issue its decision. Thus, the total process takes at least a year without appeal, and a year and half with appeal—and this timetable does not take into consideration the domestic investigation that leads to the formal filing at the WTO. Another issue with the WTO's institutional design is that DSB rulings are prospective, covering only losses commencing as of the date of the ruling (alternatively, the date of the filing of a complaint or of the formation of a panel), not the date of violation.

Security Review Commission, <http://origin.www.uscc.gov/Annual_Reports>, accessed September 22, 2012.

16. EU Chamber of Commerce, *The European Business in China Position Paper 2010/11, 2011/12, 2012/13*.

17. Jeanne J. Grimmett, "Dispute Settlement in the World Trade Organization (WTO): An Overview," Congressional Research Service, April 5, 2012.

These institutional limitations create huge incentives for countries to initially break WTO rules and resolve any disputed measures only after the WTO makes a final ruling. During this initial period of legal review, countries can benefit from disputed policies and repeal them only once the challenge succeeds. Often, winning a trade dispute depends on more than the final ruling; for example, in China, the real victory can come from buying time for domestic industry adjustment, as well as signaling its policy preferences to MNCs operating in the country. By navigating through the WTO's loopholes, China not only achieves its developmental goals of putting those measures in place, at least temporarily, but also builds a reputation as a responsible WTO member that complies with final DSB rulings. Thus, China's compliance with WTO rulings reflects Beijing's *realpolitik* calculations. This challenges the conventional wisdom, which states that China's compliance reflects its socialization to international norms and the effectiveness of WTO's dispute-settlement process.

Second, I also contend that global supply chain dynamics certainly complicate the issue of initiating trade disputes with China, as well as the interests of MNCs vis-à-vis Chinese companies. Private parties do not have any standing at the WTO, but they often petition their country's trade representatives to bring a dispute and also provide evidence regarding relevant Chinese government policies. MNCs are typically seen as an export-lobbying group pressuring China for further liberalization and demanding greater market access to push values such as free market competition and the rule of law.[18] In contrast to this conventional wisdom, however, I argue that MNCs implicitly or explicitly support protectionist measures in China due to either their fear of retribution from Chinese government officials, or their hope to gain even small pieces of the ever-enlarging pie of the Chinese economy. Fear of Chinese government retribution prevents MNCs from contesting Chinese behavior or bringing evidence to support cases at the WTO. Chinese officials can flex their muscles through measures such as blocking an MNC's entrance into the Chinese market, delaying permits, withholding raw materials, and detaining finished products at ports. Officials at the Office of the United States Trade Representative frequently complain that most US companies are

18. Jeffry Frieden, "Invested Interests: The Politics of National Economic Policies in a World of Global Finance," *International Organization* 45:4 (1991), pp. 425–451; Helen Milner, *Resisting Protectionism: Global Industries and the Politics of International Trade* (Princeton, NJ: Princeton University Press, 1988).

unwilling to file formal complaints because they fear Chinese retaliation—they will share information about Chinese rule-breaking practices only privately.[19] In the recent WTO case involving the Chinese dumping of solar panels in the US market, SolarWorld Industries America was the only company willing to publicly support the case; the six other companies involved chose to remain anonymous. When problems arise, individual companies and industries are forced to choose between tacitly accommodating them and squaring off against various levels of the Chinese government.

MNCs are not always a unitary economic actor pressuring China to live up to its promises. First, global supply chain dynamics complicate the domestic political payoff of contesting Chinese measures at the WTO. While some economic actors within home countries benefit from inexpensive Chinese products, others are hurt by them. In America's solar panel dispute with China, the parties that benefit from cheap Chinese imports, such as panel installers and individual consumers, have opposed opening the dispute case at the WTO; solar panel producers, on the other hand, have pressured the US government to initiate a trade dispute. Second, foreign businesses have diverging interests, depending on whether they already have investments or contracts with China.[20] Business interest groups that do not have direct investments in China tend to make dispute cases proactively. Ultimately, China's pattern of compliance with DSB rulings is facilitated not only by the WTO's bureaucratic legal process of dispute settlement, but also by the MNCs' diverging interests in China.

EXPLAINING THE RAPID RISE OF CHINA AS A GLOBAL GREEN POWER

In an effort to establish China's behavior in multilateral and bilateral trade disputes, I examine China's WTO trade dispute regarding its Special Fund for Wind Power Equipment Manufacturing and its bilateral disputes with the US regarding anti-dumping (AD) measures and countervailing duties (CVD) on imports of wind towers from China. The WTO case started in 2010, when

19. Office of the United States Trade Representative, *USTR Report to Congress on China's WTO Compliance*, December 2010, <http://www.ustr.gov/webfm_send/2596>, accessed on July 22, 2012.

20. Seung-Youn Oh, "Fragmented Liberalization in the Chinese Automotive Industry: The Political Logic behind Beijing Hyundai's Success in the Chinese Market," *China Quarterly* 216 (2013), pp. 920–945.

the US and the EU contested China's subsidies for domestic wind turbine manufacturers that used domestic rather than imported goods. The US–China bilateral trade dispute started in late 2011, when four US wind component companies filed a petition to the US Department of Commerce. I chose the wind turbine industry as an indicative example of how various levels of the Chinese government provide strategic support, without being constrained by the WTO rules, to promote national and regional champions.

With its first installment of an imported utility-scale wind turbine in 1986, China started developing its wind industry sector. Until the early 2000s, China mostly focused on producing noncommercial wind turbines that were supported with government subsidies; it did not intend to strategically develop domestic manufacturers. Thus, domestic manufacturers of wind power equipment were not significant in the Chinese domestic market before 2000 and held a market share of less than 10%. Beginning in 2003, Beijing placed a strategic emphasis on the development of renewable energy, including the wind industry, as a response to the need for greater energy independence, environmental protection, and industrial upgrades. First, the central government created incentives for the development of wind farms and domestic wind turbine makers by granting provincial governments the right to approve wind power projects of less than 50 megawatts (MW). Second, the Chinese government manipulated local-content requirements to nurture national champions and promote industrial capacity-building for indigenous firms. In 1997, China's top economic planning agency at the time, the State Development and Planning Commission, started its Ride the Wind Program, and promoted local capacity-building within joint venture enterprises. In this program, Beijing required joint ventures to meet a 20% local-content requirement, with a goal of increasing that value to 80% as domestic producers built up their technological capabilities. In 2003, the National Development and Reform Commission (which succeeded the State Development and Planning Commission) quietly increased the local-content requirement on wind turbines to 50% and finally to 70%, while also substantially hiking tariffs on imported components. From 2003 to 2007, to provide stronger incentives for foreign companies to utilize domestic parts, the government organized five rounds of bidding competitions for national wind power projects totaling more than 3 GW capacity. These wind resource concessions drove rapid wind energy development during these years. As the Chinese market for wind turbines exploded, foreign manufacturers were unable to

expand their supply chains quickly enough to meet the increased demand. Thus, they were left with no choice but to establish manufacturing facilities in China.

China's adoption of the Renewable Energy Law in 2005 marked the beginning of exponential growth in the country's wind energy sector, and started to threaten foreign producers' dominance over the deployment of on-grid wind capacity. The law created a framework for regulating renewable energy—establishing a national target for production, a mandatory connection and purchase policy, a feed-in tariff system, and a cost-sharing mechanism. Most importantly, the law dramatically increased government subsidies for wind energy projects by Chinese-owned domestic enterprises. This development enabled dozens of local companies to pick up the slack in the wind energy market share rapidly and cost-effectively, mainly through licensing technology from small European turbine producers. For example, Goldwind's licensing arrangements with Repower, a German company, provided enough knowledge for Goldwind to jump into the wind turbine industry and innovate by using the transferred technology.[21] China's 2007 Foreign Investment Industry Guidance Catalogue promoted opportunities for foreign firms to invest in the country's wind turbine manufacturing sector. At the same time, however, foreign involvement in the manufacturing of wind turbines with greater than 1.5 MW capacity in China was restricted to joint ventures or partnerships, to promote the upgrading of domestic wind turbine capabilities.

In 2008, the Chinese government modified its subsidies framework by creating the Wind Base Program, which was designed to accelerate the shift away from joint ventures and create greater domestic capacity to build large wind turbine components. The program strongly boosted the development of the wind power industry in China, establishing positive market conditions for domestic wind turbine manufacturers and leading to the creation of seven 10 GW wind bases around the country. Additionally, domestic enterprises that import core components or materials for such systems were granted import tariff and value-added tax rebates, contingent on documentation of R&D activity, knowledge transfer, and employment of skilled Chinese workers.

21. Joanna I. Lewis, "Technology Acquisition and Innovation in the Developing World: Wind Turbine Development in China and India," *Studies in Comparative International Development* 42:3–4 (2007), pp. 208–232.

Technology transfers—established through required local-content regulations, government subsidies, preferential tax policies, and preferential treatment in project tendering and bidding—have fueled the rapid growth of China's domestic wind turbine companies in both Chinese and global markets.[22] In the Chinese domestic wind turbine market, foreign companies held 75% of market share from 1996 to 2005. In 2004, China had only eight small domestic companies manufacturing turbines, and the market for component suppliers was just beginning to emerge. However, by the end of 2007, there were 40 domestic turbine manufacturers in China, 20 of which already had products on the market; by the end of 2009, there were over 70 domestic turbine manufacturers, 30 of which had products on the market and had captured two-thirds of the country's wind turbine market.[23] The average size of the wind turbine generating systems produced by Chinese companies increased very quickly as well, from 0.43 MW in 2002 to 0.66 MW in 2005, and eventually to 1.55 MW in 2011.[24]

The entry of China's national and regional champions into the world wind energy market significantly weakened traditional market leaders. In 2005, companies from northern Europe and the US dominated the world wind turbine market, with four companies producing more than 75% of the world's large wind turbine generation systems—Denmark's Vestas (34.1%), Spain's Gamesa (18.1%), Germany's Enercon (15.8%), and America's GE Wind (11%).[25] However, in 2008, three Chinese companies were featured in the list of the world's top 10 wind turbine manufacturers. Figures for newly installed wind turbine systems in 2009 further confirmed the rise of Chinese companies in the global market: the traditional four European and American market leaders' combined market share fell to 47%, while emerging enterprises such as Sinovel and Goldwind from China captured a 30% share.[26]

22. Joanna I. Lewis, *Green Innovation in China: China's Wind Power Industry and the Global Transition to a Low-Carbon Economy* (New York: Columbia University Press, 2012).

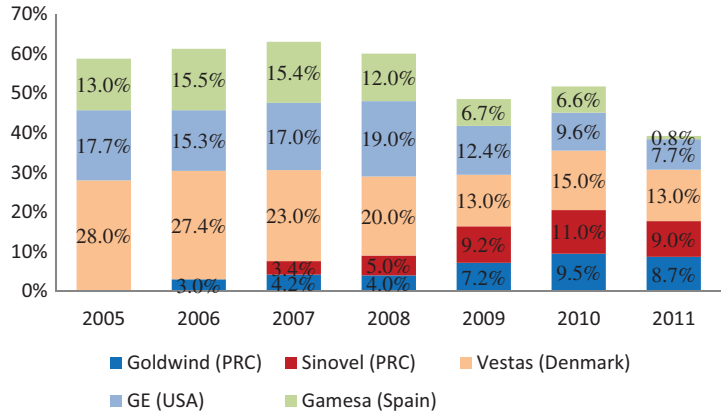
23. Global Wind Energy Council, *The Development of Wind Power Tariffs in China,* 2010.

24. Jialu Liu and Don Goldstein, "Understanding China's Renewable Energy Technology Exports," *Energy Policy* 52 (2013), p. 420.

25. Alasdair Cameron, "Steady as She Goes: BTM's World Market Update," *Renewable Energy World* 8:4 (2005).

26. Junfeng Li, Pengfei Shi, and Gao Hu, *China Wind Power Outlook 2010*, China Renewable Energy Industries Association, Global Wind Energy Council, Greenpeace, October, 2010, <http://www.greenpeace.org/eastasia/Global/eastasia/publications/reports/climate-energy/2010/2010-china-wind-power-outlook.pdf>.

FIGURE 5. Market Share of Global Top 10 Wind Turbine Manufacturers



SOURCE: Compiled by the author from various sources including World Wind Energy Association, "Acquisition of Repower by Suzlon is Important Step in International Cooperation," 2007, http://www.wwindea.org/home/index.php?option=com_content&task=view&id=175&Itemid=40; BTM Consult, "World Market Update," March 2010, http://www.businesswire.com/news/home/20110328006651/en/BTM-Consult-Releases-Wind-Report-World-Market; BTM Consult, International Wind Energy Development Market 2010, March 2011, http://www.navigant.com/~/media/WWW/site/downloads/energy/world_market_update_2010.ashx/; Junfeng Li et al., *China Wind Power Outlook 2010*, China Renewable Energy Industries Association, http://gwec.net/wp-content/uploads/2012/06/wind-report0919.pdf; Global Wind Energy Council, *Global Wind Statistics 2010*, February 2, 2011, http://dev6.semaforce.be/fileadmin/documents/Publications/GWEC_PRstats_02-02-2011_final.pdf; "Wind Turbine Manufacturers: Global Market Shares," *Cleantech Magazine* 6, no. 2 (2012), http://www.cleantechinvestor.com/portal/wind-energy/10502-wind-turbine-manufacturers-global-market-shares.html.

As Figure 5 suggests, Sinovel and Goldwind's combined global market share grew from 3% in 2006 to over 20% in 2010. This is a breathtaking achievement given that prior to 2005, there was only one Chinese company among the top 15 global manufacturers.

The wind power industry is just one sectoral example of China's developmental pattern of regulating foreign competitors with mandated joint ventures, local-content requirements, and forced technology transfers, while also providing state support to national champions to help them compete in the global market. This arrangement repeats itself in other sectors, such as in China's high-speed railway and solar energy industries. With the high-speed railway system, the Chinese national railway company received most of the state-sponsored contracts. From 2003 to the end of the 11th Five-Year Plan (2006–2010), the Chinese government approved more than CNY 4 trillion in investment for railway construction. As a result, Chinese companies

triumphed over foreign competitors, who had controlled two-thirds of the Chinese high-speed rail market in the early 2000s, including France's Alstom, Japan's Kawasaki, and Germany's Siemens. In the international solar energy industry, China has emerged as the world's leading supplier of solar modules, surpassing Japanese and German solar cell and module vendors. Currently, Chinese firms produce 65% of solar panels worldwide and account for nine of the world's top 10 solar panel producers.[27] According to Milan Nitzschke, a vice president at SolarWorld, "Chinese companies have captured over 80% of the EU market for solar products from virtually zero only a few years ago." He claims that "EU manufacturers have the world's best solar technologies, but are beaten in their home market due to illegal dumping of Chinese solar products below their cost of production."[28]

GONE WITH THE WIND: TRADE DISPUTES OVER CHINA'S WIND POWER

China's strategy for developing the wind power sector has not only portended the comeback of state capitalism, but also created increasing trade tensions with other countries in bilateral and multilateral settings. The WTO trade dispute regarding China's wind sector stemmed from a 5,800-page petition that the United Steelworkers union filed with the Office of the United States Trade Representative in September 2010. The petition claimed that China was employing a wide range of policies that were inconsistent with WTO principles and that unfairly supported domestic producers of green energy technology—including wind and solar energy products, advanced batteries, and energy-efficient vehicles.[29] The Office of the United States Trade Representative proceeded with an investigation in October 2010, ultimately deciding to only challenge China's Special Fund for Wind Power Equipment

27. Ehren Grossens, "The Downside of China's Clean Energy Push," *Bloomberg Businessweek*, November 21, 2012.

28. "Solar Trade Complaint Filed against the Chinese, This Time in Europe," *SustainableBusiness.com News,* July 27, 2012, <http://www.sustainablebusiness.com/index.cfm/go/news.display/id/23909>, accessed October 8, 2012.

29. Office of the United States Trade Representative, "United States Launches Section 301 Investigation into China's Policies Affecting Trade and Investment in Green Technologies," October 2010, <https://ustr.gov/about-us/policy-offices/press-office/press-releases/2010/october/united-states-launches-section-301-investigation-c>.

Manufacturing (hereafter, Special Fund) at the WTO by filing a request for consultations in December 2010.

The US held its WTO-mediated consultations with China in February 2011. During those sessions, the US stated that Chinese subsidies to domestic manufacturers under the Special Fund program violated Article 3 of the WTO's Agreement on Subsidies and Countervailing Measures ("Prohibited Subsidies"), which prohibits WTO members from granting subsidies that are contingent on export performance or on the use of domestic instead of imported goods. The WTO's Trade-Related Investment Measures also prohibit member countries from imposing performance requirements or implementing non-tariff barriers, such as export subsidies and local-content requirements, on foreign investors. Despite these legal restrictions under the WTO, China's Special Fund promoted the use of domestic goods over the purchase of imported goods by offering grants (ranging from $6.7 million to $22.5 million) to Chinese wind turbine manufacturers that agreed to use key parts and components made in China. Consequently, domestic brands of wind turbines are 10% cheaper in China than domestically made foreign brands, and 20% cheaper than imports. The US trade representatives also attacked China's Special Fund and the general use of subsidies on transparency-related grounds: China has submitted only one subsidy notification to the WTO since 2001, and never officially notified the WTO of the existence of the Special Fund. China's actions violated Article 25 of the WTO's Agreement on Subsidies and Countervailing Measures ("Notification") regarding members' obligation to submit information on all of their subsidy programs on a regular basis (every two years). Beijing's much-delayed report on subsidy programs, submitted in April 2006, covered only national subsidies and excluded sub-national programs, despite its clear obligations to include them. China has also failed to translate program specifics from Chinese into any of the three official WTO languages (English, French, and Spanish).

In a Chinese Ministry of Commerce press release that responded to the US criticism, China defended the subsidies by citing environmental concerns and the need to decrease emissions.[30] Beijing claims that its investments in

30. Ministry of Commerce of the People's Republic of China, "Commerce Department of Treaty and Law Department Is Responsible for the United States in the WTO on the Chinese Wind Energy Measures Issued a Statement Filed the Request for Consultations," December 23, 2010, <http://www.mofcom.gov.cn/aarticle/ae/ai/201012/20101207325758.html>.

TABLE 1. Proceedings of China's Fund for Domestic Wind Turbine Makers

Stage	*Year*	*Date*	*Procedures*
Pre-litigation	2010	Sept. 9	The United Steelworkers Union petitions the US government to investigate China's prohibitive government incentives for domestic wind power equipment manufacturers under Section 301 of the Trade Act of 1974
		Oct. 15	Office of the United States Trade Representative launches an investigation in response to the petition
Consultation	2010	Dec. 22	The US files a request for consultations regarding import substitution subsidies under the PRC Special Fund for Wind Power Manufacturing Program
	2011	Jan. 1	The EU requests to join consultations
		Jan. 17	Japan requests to join consultations
		Feb. 16	The US holds WTO-mediated consultations with China
Implementation	2011	June 7	The US announces that China has terminated the Special Fund, but transparency concerns related to China's bidding process remain unresolved

green energy benefit not only China but also the global environment, especially as China became the world's largest producer of greenhouse gas emissions in 2006. However, this argument does not adequately explain why these subsidies are not available to all companies operating in China, regardless of national origin. Following the WTO consultations, China in June 2011 resorted to rescinding the legal measure that had created the Special Fund program (Table 1), and removed some of the barriers on foreign businesses. For example, foreign developers with overseas experience in wind farm development can now seek to build offshore wind farms in China. They were previously banned from these projects on the grounds of national security.

To what extent does China's compliance with WTO rulings affect the pattern of competition in the wind power market? In the years leading up to the WTO's formal consultations with China in 2011, China's wind industry continued to grow, as shown by how its installed capacity quickly surpassed that of any other country in the world. China's manufacturers have had ample time to scale up production to compete with established companies, and have controlled more than two-thirds of the Chinese domestic market since 2009 (Table 2). In 2009, the European Union Chamber of Commerce in China criticized Chinese government tenders in the wind power sector for

TABLE 2. Market Share (%) of Top 10 Wind Turbine Manufacturers in China (Chinese companies in bold type)

Rank	*2006*		*2007*		*2008*		*2009*		*2010*		*2011*	
1	**Gold Wind**	33.3	**Gold Wind**	25	**Sinovel**	22	**Sinovel**	25.3	**Sinovel**	23.2	**Goldwind**	20.4
2	Vestas	23.6	**Sinovel**	21	**Goldwind**	18	**Goldwind**	19.7	**Goldwind**	19.7	**Sinovel**	16.7
3	Gamesa	15.9	Gamesa	17	**Dongfang**	17	**Dongfang**	14.8	**Dongfang**	13.9	**Guodian United Power**	16.1
4	GE	12.67	Vestas	11	Vestas	10	**Guodian United Power**	5.6	**Guodian United Power**	8.7	**Minyang**	6.7
5	**Dongfang**	5.6	**Dongfang**	7	**Gamesa**	8	**Minyang**	5.4	**Minyang**	5.5	**Dongfang**	5.4
6	CASC-Acciona	3.7	GE	6	Windey	4	Vestas	4.4	Vestas	4.7	**XEMC**	4.1
7	Nordex	2.0	Suzlon	6	SHE	3	**XEMC**	3.3	**Shanghai Electric**	3.2	**Shanghai Electric**	4.0
8	**Sinovel**	1.5	**Hangtian**	2	**Minyang**	3	GE	2.3	Gamesa	3.1	Vestas	3.7
9	Suzlon	0.9	**Zhejiang Yunda**	2	**Hangtian**	2	Suzlon	2.1	**XEMC**	2.7	**Huachang**	3.5
10	Windey	0.7	Nordex	1	GE	2	Gamesa	2.0	**Huachang**	2.6	**China Southern Rail**	2.5

SOURCE: Compiled by the author from various sources including Junfeng Li, Pengfei Shi, and Gao Hu, *China Wind Power Outlook 2010*, China Renewable Energy Industries Association, Global Wind Energy Council, Greenpeace, October, 2010; Junfeng Li, Pengfei Shi, and Gao Hu, *China Wind Power Outlook 2012*, China Renewable Energy Industries Association, Global Wind Energy Council, Greenpeace; Global Wind Energy Council, *Global Wind Energy Outlook*, 2010; Global Wind Energy Council, *The Development of Wind Power Tariffs in China*, 2010.

including criteria that only Chinese companies could meet and thereby purposely excluding foreign bidders. It also pointed out that none of the 25 most valuable contracts under the government's $584 billion stimulus package was awarded to a foreign company.[31] In 2010, nondomestic manufacturers' market share in China had diminished. Vestas's share of the Chinese market is tiny (4.9%) when compared with its dominance in Sweden (54.3%) and England (38%).[32] Moreover, Chinese players can now independently manufacture—and, in fact, dominate the market for—1.5 MW wind turbines, the main size installed on today's wind farms. In general, China only complies with the WTO rulings when that is convenient, and thus benefits from anticompetitive behavior while avoiding many negative consequences. By the time China removes measures that are contested at the WTO, it has already achieved its goal of putting its desired industrial policy measures in place during the most strategically important periods of development. In this way, Chinese industrial policy outfoxes WTO rulings.

Foreign businesses' concerns are not limited to their diminishing access to the Chinese market—they also face increasing competition with Chinese companies in the global market. With state sponsorship, Chinese national champions have recently begun dominating the global wind turbine industry. In 2011, the world's top 10 wind turbine manufacturers accounted for 78.5% of the global market, with four Chinese companies accounting for 26.7%, including Sinovel (no. 2) and Goldwind (no. 3—see Table 3). In competition with MNCs, Chinese companies have dramatically expanded their capacity to manufacture alternative energy technologies. In 2011, Goldwind and Sinovel alone secured €8.7 billion (USD 11.6 billion) in overseas expansion funding from the China Development Bank, while the European Investment Bank, hampered by the European debt crisis, could only provide €6.2 billion (USD 8.69 billion) in funding for all renewable energy projects in the EU.[33] In April 2011, Sinovel signed an agreement with the Greek Public Power

31. Malcolm Moore, "China Closes Doors to European Businesses," *The Telegraph*, September 2, 2009, <http://www.telegraph.co.uk/finance/china-business/6124973/China-closes-doors-to-European-businesses.html>, accessed October 2, 2012.

32. AOL Energy, "Wind Rush 2012: An AOL Energy White Paper," March 2012, <http://breakingenergy.sites.breakingmedia.com/wp-content/uploads/sites/2/2012/03/Wind_Rush_White_Paper_AolEnergy.pdf>, accessed September 21, 2012.

33. Felicity Carus, "Wind Rush: Asian Typhoon Hits Debt-Crisis Europe," *Breaking Energy*, November 15, 2011, <http://breakingenergy.com/2011/11/15/wind-rush-asian-typhoon-hits-debt-crisis-europe/>, accessed October 2, 2012.

TABLE 3. Market Share (%) of Global Top 10 Wind Turbine Manufacturers (Chinese companies in bold type)

Rank	***2005***		***2006***		***2007***		***2008***		***2009***		***2010***		***2011***	
1	Vestas (DK)	27.9	Vestas (DK)	27.4	Vestas (DK)	22.8	Vestas (DK)	19.8	Vestas (DK)	12.5	Vestas (DK)	14.8	Vestas (DK)	12.7
2	GE (US)	17.7	Gamesa (ES)	15.5	GE (US)	16.6	GE (US)	18.6	GE (US)	12.4	**Sinovel**	11.1	**Sinovel**	9.0
3	Enercon (GE)	14.2	GE (US)	15.3	Gamesa (ES)	15.4	Gamesa (ES)	12.0	**Sinovel**	9.2	GE (US)	9.6	**Goldwind**	8.7
4	Gamesa (ES)	12.9	Enercon (GE)	14.5	Enercon (GE)	14.0	Enercon (GE)	10.0	Enercon (GE)	8.5	**Goldwind**	9.5	Gamesa (ES)	8.0
5	Suzlon (IND)	6.1	Suzlon (IND)	7.5	Suzlon (IND)	10.5	Suzlon (IND)	9.0	**Goldwind**	7.2	Enercon (GE)	7.2	Enercon (GE)	7.8
6	Siemens (DK)	5.5	Siemens (DK)	7.1	Siemens (DK)	7.1	Siemens (DK)	6.9	Gamesa (ES)	6.7	Suzlon (IND)	6.9	GE (US)	7.7
7	Repower (GE)	3.2	Nordex (GE)	3.3	Acciona (ES)	4.4	**Sinovel**	5.0	**Dongfang**	6.5	**Dongfang**	6.7	Suzlon (IND)	7.6
8	Nordex (GE)	2.6	Repower (GE)	3.2	**Goldwind**	4.2	Acciona (ES)	4.6	Suzlon (IND)	6.4	Gamesa (ES)	6.6	**Guodian United Power**	7.4
9	Ecotecnia (FR)	2.1	Acciona (ES)	2.8	Nordex (GE)	3.4	**Goldwind**	4.0	Siemens (DK)	5.9	Siemens Wind (DK)	5.9	Siemens Wind (DK)	6.3
10	Mitsubishi (JP)	2.0	**Goldwind**	2.8	**Sinovel**	3.4	Nordex (GE)	3.8	REpower	3.4	**Guodian United Power**	4.2	**Guangdong Minyang**	3.6

SOURCE: Compiled by the author from various sources.

TABLE 4. Proceedings of CVD and AD Investigations

Event	*AD investigation*	*CVD investigation*
Petition filed	December 29, 2011	
Department of Commerce initiation	January 18 2012	
International Trade Commission preliminary determination	February 13, 2012	
Department of Commerce preliminary determination	July 26, 2012	May 29, 2012
Department of Commerce final determination	December 17, 2012	
International Trade Commission final determination	January 31, 2013	
Issuance of order	February 7, 2013	

SOURCE: US Department of Commerce, "Fact Sheet: Commerce Finds Dumping and Subsidization of Imports of Utility Scale Wind Towers from the People's Republic of China (China) and Dumping of Imports of Utility Scale Wind Towers from the Socialist Republic of Vietnam (Vietnam)," December 18, 2012, <http://ia.ita.doc.gov/download/factsheets/factsheet_china-vietnam-uswt-adcvd-final-20121218.pdf>.

Corporation to supply up to 300 MW of onshore capacity in Greece, with the potential for additional offshore development.[34]

Lastly, Chinese companies also flood foreign markets with inexpensive products, fueling more trade tensions. The US–China bilateral trade dispute surrounding the Chinese wind industry came to a head on December 29, 2011, when four US wind component companies formed the Wind Tower Trade Coalition and filed a petition asking the US Department of Commerce to initiate AD and CVD investigations of imports of utility-scale wind towers from China (as well as Vietnam). In 2011, the US imported $222 million worth of utility-scale wind towers from China. In its petition, the trade coalition listed nearly 40 separate Chinese subsidy and assistance programs—ranging from cash grants and subsidized steel to tax breaks—that allegedly allowed Chinese wind tower manufacturers to engage in predatory pricing in the US.

The Commerce Department announced in January 2012 that it had initiated AD and CVD investigations regarding certain Chinese programs listed in the Wind Tower Trade Coalition's petition (but not others). The list of claims being investigated included cash grants, cheap raw materials, free land, electricity, preferential loans and credit, and tax exemptions (Table 4). In December 2012, the department concluded its AD investigation and announced that it had determined that Chinese producers had sold utility-scale wind towers in

34. AOL Energy, "Wind Rush 2012."

the US at dumping margins of 44.99–70.63%. It set final dumping margins of 47.59% on wind towers from Chengxi Shipyard and 44.99% for Titan Wind Energy.

In its CVD investigation, meanwhile, the department set anti-subsidy duties of 21.86% for CS Wind China and 34.81% for Titan Wind Energy.[35] The dumping rates in cases like this one, however, are applied specifically to companies that are hurting the US with their imports. Therefore, in this context, a WTO ruling has one big advantage over bilateral AD and CVD rulings: the WTO filing can work toward removing policies that distort trade worldwide, while bilateral AD and CVD rulings only protect one country's home market.

Diverging interests among foreign companies in complainant countries further complicate trade-dispute processes. For the trade dispute in the wind sector, many wind companies did not support the petitions of the US Commerce Department because they feared revenge from Chinese partners or losing economic gains in their business deals with China. Immediately after United Steelworkers filed its complaint, the American Wind Energy Association cited the lack of sufficient renewable energy policy support in the US, rather than China's illegal subsidies, as the primary problem facing the US wind energy industry. The US solar energy industry, on the other hand, has articulated several complaints about Chinese practices. In October 2011, the Coalition for American Solar Manufacturing—a trade group representing solar panel manufacturers—filed a petition with the Department of Commerce and the International Trade Commission that challenged China's illegal subsidies to solar companies. The group has called for tariffs of more than 100% on imports of Chinese solar panels, which had pushed prices down from $3.30 per watt in 2008 to as low as $1 per watt in 2011. At the same time, however, the Coalition for Affordable Solar Energy, which consists of 25 US companies that purchase and install solar panels, opposed tariffs that would increase the price of modules and therefore the price of solar energy, saying that such a strategy would undermine the success of the US solar industry and prolong US reliance on fossil fuels.[36]

35. US Department of Commerce, "Commerce Finds Dumping and Subsidization of Imports of Utility Scale Wind Towers from the People's Republic of China and Dumping of Imports of Utility Scale Wind Towers from the Socialist Republic of Vietnam," December 18, 2012.

36. Zachary Shahan, "Chinese Solar Cells & Panels Get Low U.S. Tariff, & U.S. Solar Energy Industries Association Responds," *Clean Technica,* March 20, 2012, <http://cleantechnica.com/2012/

As illustrated above, China's pattern of convenient compliance allows Beijing not only to achieve its economic developmental goals through measures that flout WTO rules, but also to improve its reputation as a responsible member of the international community. Contrary to Wade and Weiss's concerns about the WTO working to *restrict* the trade policies of developing countries, China still has a lot of room to maneuver under WTO rules.

THE TRUE COST OF INDUSTRIAL POLICY

China's various uses of industrial policy have been key to the exponential growth of the country's wind energy industry. However, heavy government involvement often distorts market incentives and dampens market competition, eventually hampering the sustainable growth of an industry. First of all, the Chinese government's strategic focus on certain sectors creates incentives for local governments and Chinese companies to swarm into the government-supported sectors. This in turn creates quantitative growth at the expense of quality, setting the negative spiral effect in motion—leading to widespread overcapacity, heated price competition, squeezed profit margins, sectoral fragmentation, and large numbers of bankruptcies.

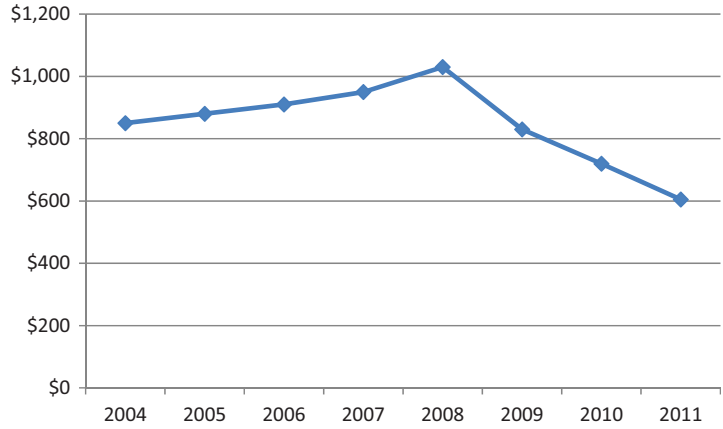
The wind power sector is no exception. In 2003, to encourage local governments to create economic actors in the wind energy sector, Beijing granted these governments the right to approve wind farms smaller than 50 MW. According to Lu Hong, a renewable energy expert at the Energy Foundation's Beijing office, this arrangement created a phenomenon of "49.5 MW wind farms," where wind farm developers built many wind farms with a capacity slightly below 50 MW with the support of the local government; this was a ploy to avoid having to obtain approval from the central government.[37] As of July 2011, local governments in China had approved more than 90% of all wind farm proposals.[38] Such dramatic quantitative growth led to over-supply and over-competition, which was followed by bruising price wars among

03/20/chinese-solar-cells-panels-get-low-u-s-tariff-u-s-solar-energy-industries-association-responds/>, accessed October 5, 2012.

37. Coco Liu, "Grid Problems Steer China's Huge Wind Power Industry into Financial Doldrums," *Environment & Energy Publishing*, May 25, 2012, <http://www.eenews.net/stories/1059964937>, accessed May 18, 2013.

38. Junfeng Li et al., *China Wind Power Outlook 2012*, China Renewable Energy Industries Association, November 2012, p. 59, <http://www.gwec.net/wp-content/uploads/2012/11/China-Outlook-2012-EN.pdf>, accessed on December 29, 2013.

FIGURE 6. Wind Turbine Price Change



SOURCE: Joanna I. Lewis, *Green Innovation in China: China's Wind Power Industry and the Global Transition to a Low-carbon Economy* (New York: Columbia University Press, 2012), p. 66.

Chinese producers and decreasing profit margins. Average turbine prices in China declined by 17% between June 2010 and June 2011, culminating in a price of roughly RMB 3.77 million (USD 590,000) per MW.[39] Even the market leader, Sinovel, reported a 73% decrease in profits in 2011; another market leader, Goldwind, earned about one-quarter less income than in the previous year.[40] Price reductions have cut into profit margins and R&D investment among Chinese turbine makers and component manufacturers, laying the basis for serious structural problems in terms of long-term development (Figure 6).

The discrepancy between the growth in demand and supply in China's wind energy sector has aggravated market conditions. Besides the problem on the wind energy supply side, market demand and grid installation have not kept up with the pace at which new wind farms have opened. At its peak, China's installed wind energy capacity more than doubled each year from 2005 to 2010 (as shown in Figure 1), and demand for turbines consequently skyrocketed. However, by 2011, installation slowed, and demand for new turbines actually dipped below levels from the previous year for the first time (although China was nonetheless still the world's biggest market, installing

39. AOL Energy, "Wind Rush 2012."
40. *A Greener Shade of Grey*.

nearly half of all new wind towers erected in 2011). In addition, 28% of turbines in China did not even have a connection to the grid at the end of 2011. State Grid, China's dominant electricity utility company, dislikes wind energy because of its high costs and the instability of the electricity network. In the first half of 2011, three wind farms suffered outages that affected nearly 2,000 turbines, which raised concerns among leaders in Beijing.

Concerned about the health of the wind sector, the central government started to bring the industry more tightly under its own control and shift the focus from quantitative to qualitative growth.[41] In August 2009, the State Council listed wind turbine production as an "excess capacity sector," leading to the Ministry of Land and Resources reportedly denying all applications for new wind turbine manufacturing facilities in an effort to slow growth. The National Energy Administration also issued a series of industry management standards and technical requirements in July 2011 that were intended to strengthen wind farm construction planning and management. For example, the administration issued the "Notice on the Planning and Arrangement of the First Group of Tentatively Approved Wind Power Projects for the 12th Five-Year Plan Period," which stated that projects not already listed as approved could not be approved. While the lower tiers of government retain their rights to approve wind power projects with a capacity below 50 MW, the central government has for the first time capped the total amount of wind power capacity that each region can approve. Any projects that exceed the cap will not be allowed to connect to power grids, let alone sell electricity at government-subsidized prices.

This negative chain reaction from heavy state-led industry development can be found in several different sectors in China. The solar industry has followed a similar path: solar module prices dropped 47% in 2012, and debt-to-equity ratios at Chinese solar firms are nearly 80%, as opposed to 50%, which is the typical value for global companies.[42] No example better epitomizes the problem of over-capacity than Suntech Power, the world's largest solar panel maker, which filed for bankruptcy in the eastern city of Wuxi in early 2013.[43] Suntech's

41. This information came from Dong Luying, an associate professor at the Energy Research Institute at the National Development and Reform Commission. Coco Liu, "Grid Problems."

42. "Sunset for Suntech: The Troubling Bankruptcy in a Troubled Business," *The Economist*, March 30, 2013, <http://www.economist.com/news/business/21574534-troubling-bankruptcy-troubled-business-sunset-suntech>, accessed on April 7, 2013.

43. Junfeng Li et al., *China Wind Power Outlook 2012*.

debt had swelled from USD 841 million in 2007 to almost USD 2.3 billion in 2011.[44] Certainly, the sector-specific factor of the worldwide plunge in solar panel prices affected Suntech's bankruptcy filing, but the stories of over-capacity, fragmentation, and over-competition are nothing new in China, and are often seen in other sectors, such as in the automotive and wind turbine industries.

CONCLUSION

Following the 2008 global financial crisis, debates about the potential merits of industrial policy intensified within policy and academic circles, as governments of both developed and developing countries urgently searched for new ways to increase growth and employment. The stark contrast between the economic woes of the liberal market economies in Europe and America, and the relatively thriving economies in state-centric countries like China, has drawn attention to China's newly reinvigorated industrial policies, as well as to the potential return of state capitalism.

Through a case study of the wind turbine sector and related trade tensions, this article has offered explanations on how China's industrial policy functions as a double-edged sword. During its 15 years of WTO membership, China has certainly learned how to play by the rules through its socialization into WTO norms, but it has also learned how to keep its industrial policies one step ahead of the WTO umpire through convenient compliance. China often uses protective industrial policy measures to achieve its developmental goals. Then, it opportunely complies with the WTO's DSB rulings after the measures are no longer needed, thereby developing a reputation as a responsible WTO member. For developing countries like China, the primary goal of compliance with the WTO mediation process is to win time for domestic industry adjustments, and to signal policy preferences to domestic and foreign businesses operating in China; thus, the final trade dispute ruling is rendered mostly irrelevant. Through this strategy, China has not only been able to develop Chinese national champions that can compete in domestic and global markets, but has also provided incentives for multinational companies to become a part of China's protectionism.

44. "The Man at the Center of Solar-Panel Maker Suntech's Fall," *Wall Street Journal*, May 3, 2013, <http://online.wsj.com/article/SB10001424127887324743704578442422720766046.html>, accessed on May 14, 2013.

Important systemic issues emerge when a large transitional economy like China outruns the WTO system—not only for the WTO, but also for the free market. First, countries are increasingly resorting to the WTO's DSB as the main instrument to address bilateral trade disputes in multilateral settings, because bilateral disputes between countries tend to spiral into retaliatory trade wars. And just as foreign countries have increasingly relied on the DSB as the main instrument for addressing trade concerns with China, China has grown increasingly confident in dealing with trade disputes within the WTO. Between its accession to the WTO in 2001 and the end of 2005, China was a party to only two of the 93 trade disputes at the WTO. However, by the end of 2015, China is a party to 49 ongoing trade-dispute cases filed with the organization (15 as complainant and 34 as respondent).

Second, due to the failed Doha round of WTO negotiations during the past decade, global economic and trade liberalization have slowed on account of increasing litigation and disputes over WTO rules. We have also witnessed a parallel rise in trade tensions among countries due to increasing governmental intervention across various sectors in the wake of the global financial crisis. Setting aside the counterfactual claim that protectionism would have been worse during the crisis in the absence of WTO rules, states have often deliberately attempted to circumvent existing multilateral trade rules during the past six years. Thus, when a country such as China games the system and exploits the institutional limitations of the WTO, interesting questions arise regarding who is socializing whom, and who is limiting whom, in the relationship between the WTO and China. This set of developments challenges the conventional wisdom regarding the effectiveness of international organizations in socializing China into international norms.