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CHINA'S GREENTECH PROGRAMS AND THE USTR INVESTIGATION*

by Joel B. Eisen**

INTRODUCTION

Since the Renewable Energy Law went into effect in 2006, the Chinese government has implemented numerous laws and programs designed to encourage renewables.¹ While China has made strong progress, many factors will influence the nation's future success in renewable energy deployment, including the need for consistent pricing policies to stimulate private sector development and the need to upgrade the country's transmission grid.²

The issue of China's support for renewables has taken center stage in a United States Trade Representative ("USTR") complaint alleging that China unfairly subsidizes its greentech industries, in violation of its obligations as a member of the World Trade Organization ("WTO").³ Well before that investigation began, numerous Americans believed the United States was less engaged in greentech promotion than China,⁴ and many feel the United States is falling behind. *New York Times* columnist Thomas L. Friedman has been perhaps the most active proponent of this view,⁵ but he has plenty of company. If recent reports are to be believed, China could be generating more electricity from renewables in 2020 than any other nation on Earth. It has also advanced rapidly in private sector spending on renewable energy technology and research and development spending.

Many observers state that the two nations are engaged in a new "green energy race."⁶ This term deliberately invokes the "space race" competition between the U.S.S.R. and the United States to achieve milestones in space after the 1957 launch of the Sputnik satellite. To simplify matters a bit, there are two related but different arguments being made. The first is that China will dominate the global market for greentech, diminishing American companies' ability to compete with Chinese firms. This, of course, is the bedrock principle of the USTR investigation, and must be considered in the context of the complex relationship between the two nations. The United States has departed from its "courtship" of China, criticizing it for its currency stance and other economic policies.⁷

To some, "losing" the race and falling behind the Chinese would have serious consequences for national supremacy. Even senior military leaders recognize that the United States is jeopardizing its future by not taking appropriate steps to address the dire situation presented by climate change. In this view, failing to transition to a clean energy economy would leave the United States vulnerable to ceding its position as a major world power.

Playing into fears about China provided a convenient means of political theater in the 2010 election season,⁸ but portraying China's ascendancy in greentech as a national threat will have

unacceptable costs. Given our nations' pressing needs to address climate change, it would be much more productive to forego the rhetoric of the greentech war and support both nations' greentech initiatives. Moreover, the reasons given for why China is "winning" the "race" are not yet completely convincing.

Invoking a race metaphor may be less productive than capturing national attention in the United States with concrete, clear domestic goals. I believe that the United States should articulate a single, clear national goal, just as it did with space research in the Cold War era. Elsewhere, I have argued for the creation of "solar utilities"⁹ that would deliver greentech in the residential setting by consolidating all of the functions of financing, installing, and servicing in single entities that would ramp up to utility-size scale in individual areas. This is the sort of idea that could capture the popular imagination and lead to more greentech development in the United States than casting China as a competitor.

GEOPOLITICAL COMPETITION IN GREENTECH?: SUITABILITY OF THE "SPACE RACE" METAPHOR

The idea that the United States and China are in a competition for greentech supremacy has many adherents. A recent Internet search for "China" and "green energy race" yielded over 300,000 results, with most of the top one hundred having titles such as "Who's Winning the Clean Energy Race?,"¹⁰ "Is China Beating the U.S. in Green Technology Development?,"¹¹ and so forth. The "China as green competitor" narrative has captivated journalists,¹² bloggers,¹³ politicians,¹⁴ environmentalists,¹⁵ think tanks,¹⁶ executives of venture capital and energy companies,¹⁷ financial market analysts and commentators,¹⁸ and many others. The USTR investigation is yet another measure of

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the strength of the race idea. Some say the race is already over. One observer notes, “[t]he United States ceded its leadership in the production of clean energy technologies during the past decade of neglect.”¹⁹

WHAT IS THE “RACE,” AND IS CHINA “WINNING”?

In the space race, there were concrete goals in physical space: put satellites and humans in orbit, and land a man on the moon. Here, it is not so clear. What is the competition with *China*? To have more solar panels and wind turbines in place? More governmental and private investment in greentech? More greentech-friendly governmental policies? All of the above? Those writing about it often have different agendas. Companies want more investment in greentech and more access to China’s markets. Environmentalists want more active federal policies to encourage deployment of renewables. Free traders want barriers to trade removed.

Consider a threshold question: Why are we competing with China? European nations²⁰ have had greentech policies for many years, have seen strong growth in greentech, and have generated much electricity from renewables.²¹ Some observers note that the race is not with one nation but many,²² yet the prevailing comparison is to China. There is something more to the “race” metaphor, then, than growth in greentech. As in the space race, there is the pervasive sense that if China has more extensive greentech investments and deployment than we do, there will be drastic consequences for national power and wealth. Denmark and Germany attract less attention than China because they pose less of a threat to the United States’ superpower status.²³

Evaluating the “race” claims on their merits, it is hardly clear that the United States is “losing” to China. The differences between the two nations are much more subtle than they appear in the prevailing narrative.²⁴

Growth of China’s Greentech Industry

One fear is that multinational companies will find it difficult to sell their greentech in China, and Chinese companies will flood the United States with their products. This fear reflects broader American unease about China’s potential for global economic dominance. In 1979, China began to experiment with the free market, and since then, has experienced robust growth.²⁵ In 2010, China’s economy had become the world’s second largest, surpassing Japan’s.²⁶ China’s “pace of industrialization is significantly faster than that experienced by other countries throughout history.”²⁷ So much of China’s manufacturing output is already sold in the United States that observers believe we are “joined at the hip economically.”²⁸ Many believe domestic products cannot compete against those manufactured in China due to China’s advantages in less expensive labor, more lax protections of intellectual property, fixed currency rates (until very recently), and weaker environmental protections.²⁹ In the depths of a recession in the United States, descriptions of growing Chinese greentech firms invoke images of a rising Asian industrial juggernaut.

Is greentech destined to be another area in which the Chinese overpower American firms? China’s 2007 “Medium and Long-Term Development Plan for Renewable Energy in China”

contained an explicit goal to develop a domestic renewables sector.³⁰ China’s wind turbine industry rose from virtual nonexistence to become a major player in the global market in less than five years. In 2009, three of the largest wind turbine manufacturers in the world were Chinese.³¹ China leads the world market for solar photovoltaics (“PV”) cells and modules, producing more than forty percent.³² Chinese firms’ share of the domestic market has increased rapidly,³³ and Chinese companies have become major players around the globe.³⁴

The USTR petition details a growing imbalance in “environmental goods” between the United States and China,³⁵ but in some categories, Chinese firms have been less successful in the United States. Chinese firms sold only 28 megawatt (“MW”) worth of wind turbines outside of China in 2009.³⁶ Some predict an upswing in Chinese greentech exports to the United States,³⁷ and at least one high-profile proposed project involving Chinese technology has attracted negative attention.³⁸

Another factor cited in the USTR investigation is that the Chinese government appears to be shutting foreign manufacturers out of its domestic market.³⁹ Official Chinese government policy promotes “indigenous innovation,” calling for reliance on foreign technology to decrease to thirty percent or less.⁴⁰ Foreign observers report that it has become more difficult for foreign companies to get their technology accepted in domestic projects.⁴¹ A recent report states that thirty-six government regulations promote domestic greentech and hamper foreign firms’ ability to compete in China.⁴² The USTR investigation petition claims, for example, that the indigenous innovation policy gives Chinese firms a five to ten percent advantage in wind turbine procurement processes.⁴³ Encouraging announcements of joint ventures and other developments seem to contradict this protectionist trend.⁴⁴ China has dropped a requirement that seventy percent of the components in wind turbines come from domestic sources.⁴⁵ Agreements between American companies such as First Solar⁴⁶ and Chinese local governments to develop renewable energy projects point to a potentially large market for American greentech in China.⁴⁷ Perhaps ironically, however, the USTR investigation complaint cites the First Solar memorandum of understanding to develop a 2 gigawatt (“GW”) solar project as impermissible under the WTO because First Solar agreed to work to support China’s domestic industries.⁴⁸

The concern seems to be that Chinese firms will dominate the global greentech market if current growth rates continue. However, some signs in the past year point to overbuilding and overcapacity in the wind industry, and a possible retrenchment and consolidation. In mid-2010, concern about the failure to agree on a climate change agreement and projections of slowing demand in China for wind energy made for an uncertain business climate for wind energy companies.⁴⁹ The top three IPOs in 2010 in global greentech were by Chinese companies.⁵⁰ Other firms moved forward with their offerings,⁵¹ but a planned initial public offering for one firm had to be scrapped in mid-2010 due to unfavorable market conditions.⁵²

There is also evidence that Chinese firms are not yet competitive in certain market segments. Some provincial utilities

have chosen Western wind turbines due to superior control systems and longer experience with manufacturing larger turbine sizes.⁵³ As recently as 2009, Chinese wind turbines were less capable than their foreign counterparts,⁵⁴ as measured by lower capacity factors (the percentage of time that turbines operate to generate electricity).⁵⁵

Chinese firms often do not hold key technology patents that would enable them to develop more sophisticated equipment.⁵⁶ Firms have grown rapidly through acquiring manufacturing equipment and capitalizing on advantages such as their lower cost of labor.⁵⁷ As a result, they have a leadership position in “downstream” areas of the PV production chain, but lag behind in “upstream” areas requiring more technological skill, such as silicon purification, ingot, and wafer manufacturing.⁵⁸ In 2009, American companies held the top ten cited patents worldwide in solar technology.⁵⁹

Many familiar with China believe that it is only a matter of time before Chinese greentech improves through importing foreign technology and assimilating it. Even if Chinese solar and wind technology improves, however, the greentech industry in the United States is growing.⁶⁰ The cost advantages of Chinese firms may eventually fade,⁶¹ or the gap may close. Chinese workers increasingly are demanding higher wages and better working conditions.⁶² Some greentech, like larger components of wind turbines, is heavy and expensive to transport.⁶³ In the American market, the costs of shipping large turbines from China might outweigh higher domestic labor costs. And American greentech firms enjoy other cost advantages, such as preferential tax policies.⁶⁴

On the whole, then, Chinese firms are not yet invincible juggernauts displacing their foreign counterparts. There is obvious concern, as the USTR investigation and high-level discussions and trade missions suggest.⁶⁵ Some retort that fear of Chinese firms is as overblown as rhetoric in the 1980s claiming that mighty Japan was about to dominate the world economic scene.⁶⁶ Setting up China as an economic bogeyman has a potential drawback: it could imperil the bumpy economic relationship between the two nations. Some have argued that for this reason alone, it would be best to drop the rhetoric about a green energy race.⁶⁷

Central Government Support

Observers believe China’s national government offers consistent and committed support to the greentech sector. In this view, a Communist nation with a central government planning process can develop renewables far more quickly.⁶⁸ However, the reality is that China occasionally struggles to find consistency in its greentech policies. Some have led to considerable progress,⁶⁹ such as the Renewable Energy Law and the 2009 stimulus package,⁷⁰ but others, including reorganizations of the governmental energy bureaucracy, have been less successful.⁷¹

The most frequently cited instance of government support is direct financial aid, in the form of low-interest loans, export promotion, and other aid such as subsidized land made available to developers.⁷² The USTR complaint cites “prohibited subsidies to green technology”⁷³ that include the Ministry of

Finance’s “Special Fund for Wind Manufacturing,” the Ministry of Finance and Ministry of Commerce’s “Export Product Research and Development Fund,” and the provision of financing through export credits by China’s Export-Import Bank.⁷⁴ The state-owned China Development Bank made \$42 billion in loans in 2010 to solar and wind energy companies,⁷⁵ a sum that exceeds comparable financing levels in the United States.⁷⁶

Yet some other policies, such as pricing for electricity generated from renewables added to the national electricity grid, have been anything but consistently encouraging. Over the past two years, prices in China’s feed-in tariff for solar have been inconsistent.⁷⁷ A project priced in late summer 2010 involved a feed-in tariff of 0.73 renminbi (RMB, \$0.108 at 6.8 RMB to the dollar) per kilowatt-hour.⁷⁸ This was more than one-third less than a previous project’s winning bid, which suggests the winning bidder may have been a state-owned enterprise (“SOE”) that could undercut a private company’s bid. This hybrid system of state-owned and private companies competing for the same projects is cited in the USTR complaint as disfavoring competition.⁷⁹ It is an ongoing challenge to China’s energy system,⁸⁰ and as one report observes, “lack of competition reduces efficiencies and innovation that come from open and competitive markets.”⁸¹

Until 2009, a bidding tender system was also in place for electricity generated from wind turbines above 50 MW. That system was criticized for failing to promote wind power development.⁸² For smaller wind installations, provincial governments set pricing policies on a project specific basis, which provided little long-run guidance on pricing. A new system of “zonal tariffs” largely replaced the previous pricing scheme, but it is too early to tell whether it will encourage more wind power development.

No fewer than nineteen governmental bodies have responsibility for some aspect of greentech policy.⁸³ There are inevitable delays in coordination. Ambitious announcements are not always translated quickly into concrete policies.⁸⁴ National proclamations tend to be broad frameworks requiring implementation by administrative organs of the national government. Unlike the American system, where public involvement can help steer actions of administrative agencies, the Chinese government has little accountability to accomplish its advertised objectives.⁸⁵ Key personnel changes in the inner circle of the Chinese Communist Party can make for policy reversals or alterations.

The Chinese government’s top-down nature creates enormous reliance on provincial and local governments to implement national policies. Robust policy announcements by Beijing do not easily translate to the provinces,⁸⁶ and coordination between national and local officials is difficult.⁸⁷ Local officials often have incentives to prefer projects that can deliver short-term profits,⁸⁸ not renewable energy projects that might not pan out for years.⁸⁹ Some local governments have direct conflicts of interest between responsibilities to promote SOEs and mandates to implement national policies.⁹⁰

The perception that China’s government is unwaveringly committed to supporting greentech is often accepted uncritically, without these or any other caveats. Observers often jump

to conclusions that might be erroneous or oversimplified. It is difficult to obtain accurate information from China's national government, which is secretive and prone to releases of propaganda (as any reader of Xinhua knows).⁹¹ Information routinely available in the West is often protected in China as state secrets, and recent efforts to promote a freedom of information regime⁹² show how difficult it is to understand governmental actions.⁹³ According to the USTR petition, "there is a lack of official, detailed information regarding the terms upon which financing is provided by China ExIm Bank."⁹⁴ Thus, sweeping pronouncements about the Chinese government's intentions and policies should be avoided when possible.

The Results Speak for Themselves . . . Or Do They?

By some metrics, Chinese greentech progress is impressive. In 2009, China obtained a larger share of electricity from renewable sources than the United States (17% versus 8.8%),⁹⁵ but this figure is skewed by the predominance of hydroelectric generation in China,⁹⁶ especially the mammoth Three Gorges Dam project.⁹⁷ China added 13.8 GW of new wind power capacity to 10.0 GW for the United States in 2009,⁹⁸ but its installed total capacity still trailed that of the United States (35.1 GW versus 25.8 GW). Those numbers cannot be compared directly, as China's wind projects have been less efficient.⁹⁹ In 2009, China had a mere 0.4 GW of grid-connected solar PV capacity,¹⁰⁰ though it pledged to meet a much higher target by 2020.¹⁰¹ The United States had a larger 1.2 GW of installed PV capacity, still far less than world leader Germany's 9.8 GW.¹⁰²

At present, then, China is not outstripping the United States in total installed capacity, but it might if it achieves its ambitious targets for 2020—30 GW for wind (or possibly 100 GW, according to recent reports) and 1.8 GW for solar PV (or possibly as much as an astounding 20 GW).¹⁰³ However, much of the increase will be in hydropower.¹⁰⁴ And apples should be compared to apples: Europe and the United States also plan to increase installed capacity substantially above current levels by 2020.¹⁰⁵

Some point to a different metric. Asset financing levels in China have recently outpaced those of American firms.¹⁰⁶ According to a recent report,¹⁰⁷ in 2009, Chinese spending (excluding R&D) totaled \$34.6 billion to \$18.6 billion for the United States.¹⁰⁸ As the spending levels are within the same order of magnitude, it does not seem that this is reason for panic. The real fear seems to be that if the United States does not adopt progressive climate measures (including a cap-and-trade law), it will fall further behind China.¹⁰⁹ The market data seems to capture the spirit of American inaction on renewables, but does it matter, except for international bragging rights, whether the United States or China occupies the top spot in solar and wind investment or installed capacity?

Total investment figures or gigawatts of renewable energy capacity installed do not tell us how China is moving toward reducing its usage of fossil fuels and achieving climate goals. China is adding renewable energy capacity rapidly, but is much more dependent on conventional fossil fuel generation than the

United States. Coal accounts for a staggering seventy percent of the nation's electricity generation capacity.¹¹⁰ Even large deployment of renewables will not enable China to reduce that number substantially over the next decade.¹¹¹ And that only tells part of the story. China's growth and increasing appetite of its citizens for modern conveniences has resulted in rapid increases in energy demand.¹¹² In 2010, China achieved the dubious milestone of surpassing the United States as the world's largest primary energy user.¹¹³ Its industries are far less energy-efficient than those in the United States and Japan.¹¹⁴ The government's initiatives have helped,¹¹⁵ but China still has a long way to go.

To satisfy its increasing energy demand, China has added more conventional generation capacity than greentech.¹¹⁶ An article on China and greentech stated that, "China's investment in renewable energy and other green technologies is miniscule compared to the resources devoted to its continued building of coal-fired power plants and efforts to secure dirty oil shale supplies in Canada and elsewhere."¹¹⁷ In 2009, China began construction of a mammoth 13.6 GW power base fueled by coal in Gansu province, the same location planned for a much-praised 10 GW wind farm.¹¹⁸ New investments in conventional technology made up over one-third of the 134.4 billion RMB (just under twenty billion dollars) in the first half of 2010.¹¹⁹ As of 2010, China "uses more coal than the United States, Europe, and Japan combined."¹²⁰ That context should be a central part of any discussion that touts China's achievements in deploying solar panels and wind turbines or in greentech financing levels.

INVOKING THE SPACE RACE METAPHOR IS COUNTER-PRODUCTIVE FOR ADDRESSING CLIMATE CHANGE

While many believe the United States is losing the green energy race, the reality does not yet match the rhetoric.¹²¹ However, there is more at stake. We need to confront a powerful reality: the United States and China are interdependent, not independent competitors.¹²² We *need* China to take the very actions some posit as competition. This makes the USTR investigation especially unwelcome.¹²³ Without its greentech efforts and other measures¹²⁴ such as its announced goal to reduce the "carbon intensity" of its economy (CO₂ emissions per unit of GDP),¹²⁵ China's increasing energy demand and spending on conventional technology would add considerably to greenhouse gas emissions.¹²⁶

There will be no effective global reduction of emissions that does not include the United States and China,¹²⁷ because they are by far the world's two largest emitters of greenhouse gases.¹²⁸ Failure by either nation to reduce its emissions would imperil the entire global effort.¹²⁹ We should encourage and support China's efforts, not consider them a threat to our national wellbeing.¹³⁰ Rather than creating the scorched earth of a "greentech war,"¹³¹ both nations can benefit from collaboration.¹³² The urgency to do this is compelling. No nation has ever had to address such daunting environmental challenges at the same time as it has pursued such rapid growth.¹³³ This poses major hurdles to tackling climate change that must be surmounted by nations working together. And there are not just two

nations involved, but the whole world.¹³⁴ Rather than creating a two-nation race, we should encourage China's domestic policies and the climate change collaborations of the "BRIC" developing economies (Brazil, Russia, and India, in addition to China).¹³⁵

Nationalistic rhetoric on climate change would be especially unfortunate for the U.S.-China relationship on climate matters. The two nations have ongoing tensions on a whole host of sensitive topics,¹³⁶ but have worked productively with each other to address climate change.¹³⁷ In the two-year period of international negotiations between the promulgation of the Bali Action Plan and the December 2009 Copenhagen summit, talks took place under the auspices of the U.S.-China Strategic and Economic Dialogue.¹³⁸ Discussions also took place during 2009 with world leaders at the Pittsburgh G-20 summit¹³⁹ and at the Major Economies Forum on Energy and Climate.¹⁴⁰ The two nations have pledged several times to take mutual action to address climate change,¹⁴¹ and while the promises are often hortatory, the ongoing discussion does have important value in strengthening the bilateral relationship.¹⁴² Advocating competition with the Chinese undercuts these activities. Continued antagonistic rhetoric about a clean energy race will also make it difficult to conduct cooperative efforts in energy and environmental matters. Unlike the near-complete scientific secrecy that marked the Cold War era,¹⁴³ China and the United States are working to develop technology together.

Some even argue that China's programs to promote renewables can be good for the United States' economy.¹⁴⁴ The Council on Foreign Relations' Michael Levi, argues that "it's quite possible for the United States and China both to win, with China lowering the cost of relatively low-tech parts of the value chain, in turn growing the market for the higher-tech parts that are still handled by the United States."¹⁴⁵ Levi compares this to other situations in which China manufactures products developed in the United States.

Finally, greentech warring makes it more difficult to reach a global climate agreement. According to some accounts, China's foot-dragging¹⁴⁶ and refusal to adopt binding reduction targets was in part responsible for the failure of the Copenhagen Accord to incorporate global binding limits.¹⁴⁷ As China's economy continues its rapid growth, there will be even greater demand for it to agree to limit emissions.¹⁴⁸ Castigating it for its greentech policies could foster a climate of distrust and delay further progress on a post-Kyoto agreement.

For all of these reasons, the symbolism of the space race is simply not helpful in a discussion of global climate change.

Lessons for Energy Policy From the "Space Race"

Blaming China deflects attention from our own inability to develop progressive policies on renewables and climate change. Numerous observers have noted that we lack a stable set of policies to encourage greentech research, development, and deployment.¹⁴⁹ While we have done well to invent new technologies,¹⁵⁰ our efforts to advance them to the commercial stage and promote their deployment are "fragmented," spread among numerous agencies, and lacking coordination.¹⁵¹ As many have

noted, "[g]overnment policies can provide a strong impetus for constructing renewable generation facilities," and there is a wide variety of potential incentives, including support for research and development, tax incentives, government procurement policies, renewable portfolio standards ("RPSs"), carbon cap-and-trade programs, and feed-in tariffs.¹⁵² Federal spending on renewable energy is both anemic in its overall levels¹⁵³ and, even after the added billions of dollars in the 2009 stimulus package,¹⁵⁴ well behind that devoted to fossil fuels.¹⁵⁵ Federal tax policy for renewables is inconsistently supportive,¹⁵⁶ and in some years, many new projects come to fruition, but the pipeline often dries up.¹⁵⁷ The cyclical pace of support "clearly illustrates the consequences of on-again, off-again short-term federal incentives for wind as a market signal."¹⁵⁸

Some Obama administration actions are similar to actions taken in response to Sputnik, such as the creation of a Cabinet-level position to address climate change, which echoes governmental reorganizations taken in the late 1950s. One action that is especially comparable and noteworthy is the funding of the Advanced Research Projects Agency-Energy ("ARPA-E") with four hundred million dollars from the American Recovery and Reinvestment Act ("ARRA") stimulus package. ARPA-E's name and mission deliberately echo that of the Advanced Research Projects Agency ("ARPA")¹⁵⁹ created after Sputnik in the Department of Defense.

The moon landing was the product of an amalgamation of many disparate efforts to develop different types of technologies. So too is energy research and development. Like the Apollo program, it is not clear at the outset which technology will prevail, so we need to work on a variety of fronts over a long period of time. Programs established in the stimulus package are temporary, not the comprehensive approach we need.¹⁶⁰

Much of our effort to develop greentech is mired in a rut. No climate bill, renewable electricity standard, or national feed-in tariff is forthcoming.¹⁶¹ Progress toward a stand-alone national renewable electricity standard is doubtful.¹⁶² Many have noted the failure of federal leadership¹⁶³ and the actions of progressive states that have stepped into the void with their own programs.¹⁶⁴ These policies are not uniform throughout the country. A national program may achieve results that piecemeal state and regional efforts underway cannot.¹⁶⁵

How can we make more progress? Addressing climate change requires the kind of committed and strong support from the federal government that the space program received throughout the 1960s.¹⁶⁶ The race is really to meet a national goal that we have articulated and that is in our national self-interest, whether or not it has geopolitical significance. We put a man on the moon in part because we were captivated by the idea of a simple, clear goal. I have focused on one idea that could catalyze a push toward rapidly increasing development of renewables: a "solar utility" that would reduce the upfront cost of panels to nearly zero by subsidizing and installing them at houses.¹⁶⁷

Conclusion

China has become a major player in greentech in a short amount of time. If it could keep up its breakneck pace of growth it might look like it has pulled far ahead of us in the new “green energy race,” but at present the picture is more muddled. The “space race” metaphor and the USTR investigation are

counterproductive in that they pit the two nations against each other, when they should emphasize interdependence and cooperation. In the end, competing with China in greentech is about as useful as “energy independence.” It may be much more productive to convince Americans that their nation’s future depends on investment in renewables through a specific national goal. 

Endnotes: China’s Greentech Programs and the USTR Investigation

¹ See generally Joel B. Eisen, *China’s Renewable Energy Law: A Platform for Green Leadership?*, 35 WM. & MARY ENVTL. L. & POL’Y REV. 1 (2010).

² *Id.*

³ *United States Launches Section 301 Investigation into China’s Policies Affecting Trade and Investment in Green Technologies*, OFF. U.S. TRADE REPRESENTATIVE (Oct. 15, 2010), <http://www.ustr.gov/node/6223>. A full discussion of this investigation under prevailing trade law is beyond the scope of this article.

⁴ See, e.g., Thomas L. Friedman, *Failure Is Not an Option*, N.Y. TIMES, Apr. 27, 2010, <http://www.nytimes.com/2010/04/28/opinion/28friedman.html?ref=thomasfriedman> (opening the column with “China is having a good week in America. Yes it is. I’d even suggest that there is some high-fiving going on in Beijing. I mean, wouldn’t you if you saw America’s Democratic and Republican leaders conspiring to ensure that America cedes the next great global industry—E.T., energy technology—to China?”).

⁵ Friedman has written often in his column about the need for American energy policy to move forward expeditiously, frequently contrasting America’s lack of progress unfavorably with China’s policies. See Christina Larson, *America’s Unfounded Fears of a Green-Tech Race with China*, YALE ENV’T 360 (Feb. 8, 2010), <http://e360.yale.edu/content/feature.msp?id=2238> (stating that “Friedman has used the bully pulpit of his influential *New York Times* column to warn that the United States is engaged in a global green-tech competition with China, whose potential dominance represents a ‘new Sputnik’”). Friedman has written numerous columns in the first half of 2010 alone that mention China’s energy ascendancy. See, e.g., Thomas L. Friedman, *We’re Gonna Be Sorry*, N.Y. TIMES, Jul. 24, 2010, <http://www.nytimes.com/2010/07/25/opinion/25friedman.html?ref=thomasfriedman>; Thomas L. Friedman, *What 7 Republicans Could Do*, N.Y. TIMES, Jul. 20, 2010, <http://www.nytimes.com/2010/07/21/opinion/21friedman.html?ref=thomasfriedman> (noting that “by 2012, China should pretty much own the clean-tech industry”); Thomas L. Friedman, *No Fooling Mother Nature*, N.Y. TIMES, May 4, 2010, <http://www.nytimes.com/2010/05/05/opinion/05friedman.html?ref=thomasfriedman>; Friedman, *supra* note 4; Thomas L. Friedman, *Global Weirding Is Here*, N.Y. TIMES, Feb. 17, 2010, <http://www.nytimes.com/2010/02/17/opinion/17friedman.html?ref=thomasfriedman> (“China . . . is investing heavily in clean-tech, efficiency and high-speed rail. It sees the future trends and is betting on them. Indeed, I suspect China is quietly laughing at us right now.”).

⁶ See *infra* notes 10-24 and accompanying text.

⁷ Sewell Chan & Keith Bradsher, *U.S. to Investigate China’s Clean Energy Aid*, N.Y. TIMES, Oct. 15, 2010, <http://www.nytimes.com/2010/10/16/business/16wind.html>. Note this comment from Rep. Charles Schumer, however: “An investigation into China’s illegal subsidies for its clean energy industry is overdue, but it’s no substitute for dealing with China’s currency manipulation.” *Id.*

⁸ See CAGWmedia, *Chinese Professor*, YOUTUBE (Oct. 20, 2010), <http://www.youtube.com/watch?v=OTSQozWP-rM>.

⁹ Joel B. Eisen, *Can Urban Solar Become a “Disruptive” Technology?: The Case for Solar Utilities*, 24 NOTRE DAME J.L., ETHICS & PUB. POL’Y 53 (2010).

¹⁰ THE PEW CHARITABLE TRUSTS, WHO’S WINNING THE CLEAN ENERGY RACE?: GROWTH, COMPETITION AND OPPORTUNITY IN THE WORLD’S LARGEST ECONOMIES 7 (2010), http://www.pewtrusts.org/uploadedFiles/wwwpewtrustsorg/Reports/Global_warming/G-20%20Report.pdf (containing a section titled “China Takes the Lead, While the U.S. Slips”).

¹¹ *Is China Beating the U.S. in Green Technology Development?*, BUILDAROO.COM (Mar. 7, 2010), <http://buildaroo.com/news/article/china-green-technology-development>.

¹² See e.g., Keith Bradsher, *On Clean Energy, China Skirts Rules*, N.Y. TIMES, Sept. 8, 2010, http://www.nytimes.com/2010/09/09/business/global/09trade.html?pagewanted=1&_r=1&ref=keith_bradsher; Keith Bradsher, *China Leading Global Race to Make Clean Energy*, N.Y. TIMES, Jan. 30, 2010, <http://www.nytimes.com/2010/01/31/business/energy-environment/31renew.html>; Kent Garber, *U.S. Lacks a Coherent Clean Energy Strategy: China Is the Main Competitor in the Global Energy Race*, U.S. NEWS & WORLD REP., May 7, 2010, <http://politics.usnews.com/news/energy/articles/2010/05/07/us-lacks-a-coherent-clean-energy-strategy.html>; Evan Osnos, *Letter from China: Green-Tech Space Race*, NEW YORKER, Apr. 21, 2009, <http://www.newyorker.com/online/blogs/evanosnos/2009/04/greentech-space-race.html>; Bruce Usher, *Red China, Green China*, N.Y. TIMES, May 6, 2010, <http://www.nytimes.com/2010/05/07/opinion/07Usher.html> (observing that “[b]y giving China more time to develop its capacity while neglecting our own, America is not just losing the clean-tech race, it’s forfeiting it”); Gerard Wynn, *Is Clean Tech China’s Moon Shot?*, REUTERS, Jan. 28, 2010, <http://www.reuters.com/article/idUSTRE60R02520100128>; *supra* note 5 and accompanying text (including Thomas Friedman’s *New York Times* columns).

¹³ Richard Brubaker, *Will China Surpass the US as a Superpower?*, ALL ROADS LEAD TO CHINA (Jul. 16, 2010, 6:22), <http://www.allroadsleadtochina.com/2010/07/16/will-china-surpass-the-us-as-a-superpower>; Derek Thompson, *Is China Winning the Energy Race?*, THE ATLANTIC (Jun. 17, 2010, 2:25 PM), <http://www.theatlantic.com/business/archive/2010/06/is-china-winning-the-energy-race/58321>, *republished* by Julian L. Wong, *Interview with The Atlantic on China and the Clean Energy Race*, GREEN LEAP FORWARD (Jul. 8, 2010), <http://green-leapforward.com/2010/07/08/interview-with-the-atlantic-on-china-and-the-clean-energy-race>.

¹⁴ Rep. Ed Markey, *Landing a Clean Energy Victory*, HUFFINGTON POST (Jul. 20, 2009, 9:57 AM), http://www.huffingtonpost.com/rep-ed-markey/landing-a-clean-energy-vi_b_240938.html.

¹⁵ Frances Beinecke, *In the Clean Energy Race, Jobs Can Stay in America*, SWITCHBOARD: NAT. RESOURCES DEF. COUNCIL STAFF BLOG (Feb. 23, 2010), http://switchboard.nrdc.org/blogs/fbeinecke/in_the_clean_energy_race_with.html (providing commentary by Frances Beinecke, President of the Natural Resources Defense Council); Robert F. Kennedy, Jr., *The New Arms Race*, HUFFINGTON POST (Nov. 19, 2009, 3:11 PM), http://www.huffingtonpost.com/robert-f-kennedy-jr/the-new-arms-race_b_364211.html.

¹⁶ Daniel J. Weiss & Susan Lyon, *Running for First in the Clean-Energy Race*, CTR. FOR AM. PROGRESS (Jan. 28, 2010), http://www.americanprogress.org/issues/2010/01/sotu_energy.html. The Center’s “Out of the Running” report, as discussed below, analyzes the race in detail. ROB ATKINSON ET AL., BREAKTHROUGH INST. & THE INFO. TECH. & INNOVATION FOUND., RISING TIGERS SLEEPING GIANT: ASIAN NATIONS SET TO DOMINATE THE CLEAN ENERGY RACE BY OUT-INVESTING THE UNITED STATES (2009), http://thebreakthrough.org/blog/Rising_Tigers.pdf; Van Jones & Pan Jiahua, Inst. for Pub. Policy Research, *Climate Change, Innovation and the Clean Energy Race*, GOV MONITOR (May 23, 2010), http://www.the-govmonitor.com/world_news/britain/climate-change-innovation-and-the-clean-energy-race-31528.html.

¹⁷ John Doerr & Jeff Immelt, *Falling Behind On Green Tech*, WASH. POST, Aug. 3, 2009, <http://www.washingtonpost.com/wp-dyn/content/article/2009/08/02/AR2009080201563.html> (providing commentary by John Doerr, partner in the venture capital firm Kleiner Perkins Caufield & Byers, and by Jeff Immelt, chairman and chief executive of General Electric, a major manufacturer of wind turbine equipment).

¹⁸ Eric Pooley, *Senate Inaction Cedes U.S. Energy Race to China*, BLOOMBERG, Jul. 29, 2010, <http://www.bloomberg.com/news/2010-07-30/senate-inaction-cedes-u-s-energy-race-to-china-commentary-by-eric-pooley.html>; Kerri Shannon,

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China, Europe Lapping the United States in the Clean Energy Race, MONEY MORNING, Apr. 2, 2010, <http://moneymorning.com/2010/04/02/clean-energy/>; Jeff Siegel, *Have We Even Entered The Clean Energy Race Yet?*, SOLAR FEEDS (Aug. 12, 2010), <http://www.solarfeeds.com/green-chip-stocks/13829-have-we-even-entered-the-clean-energy-race-yet>; Nick Hodge, *China's Clean Energy Progress: Who's Winning the Cleantech Arms Race?*, GREEN CHIP STOCKS (Feb. 16, 2010), <http://www.greenchipstocks.com/articles/cleantech-2010-enter-the-dragon/744>.

¹⁹ Daniel J. Weiss, Susan Lyon & Tina Ramos, *The Stone Soup Clean Energy and Climate Bill*, CLIMATE PROGRESS (Jul. 16, 2010), <http://climateprogress.org/2010/07/16/the-stone-soup-clean-energy-and-climate-bill>.

²⁰ See Preben Maegaard, *Danish Renewable Energy Policy*, WORLD COUNCIL FOR RENEWABLE ENERGY, www.wcre.de/en/images/stories/pdf/WCRE_Maegaard_Danish%20RE%20Policy.pdf (last visited Oct. 6, 2010) (Denmark); *Renewable Energy Policy in Germany: An Overview and Assessment*, JOINT GLOBAL CHANGE RES. INST., <http://www.globalchange.umd.edu/energytrends/germany/6/> (last visited Oct. 6, 2010) (Germany).

²¹ By some measures (for example, amount of solar power generated), Spain is winning the greentech race, just as it won the soccer World Cup. Talk about dominance! Jasmine Green, *Spain: Leading the Renewable Energy Race*, CARE2, <http://www.care2.com/causes/environment/blog/spain-number-one-in-solar-power-and-more/> (last visited Oct. 6, 2010). One could also point to Portugal, which will get an astounding forty-five percent of its electricity from renewables in 2010. Elisabeth Rosenthal, *Portugal Gives Itself a Clean-Energy Make-over*, N.Y. TIMES, Aug. 9, 2010, <http://www.nytimes.com/2010/08/10/science/earth/10portugal.html>.

²² A recent report by the Center for American Progress compares United States' renewable energy policies unfavorably to both European nations and China. KATE GORDON, JULIAN L. WONG & JT McLAIN, CTR. FOR AM. PROGRESS, *OUT OF THE RUNNING? HOW GERMANY, SPAIN, AND CHINA ARE SEIZING THE ENERGY OPPORTUNITY AND WHY THE UNITED STATES RISKS GETTING LEFT BEHIND* (2010), http://www.americanprogress.org/issues/2010/03/pdf/out_of_running.pdf. See also Markey, *supra* note 14 (noting Rep. Markey's comment that "Russia was our singular competitor in the celestial contest. In this terrestrial endeavor, we have many.").

²³ Christina Larson puts it as follows: It is telling what is left out of the increasingly dominant "U.S. versus China" green-tech "race" narrative. For starters, there are a lot of other countries at work developing green-tech and becoming significant green-tech markets—the low-carbon future, after all, isn't solely a G-2 aspiration. Yet because the politics are different (there's not the anxiety of the reigning superpower nervously eyeing the new kid on the block), the green aspirations of any country not named China are viewed through an entirely different prism by U.S. commentators. Germany, for instance, is home to the world's top two solar manufacturing companies. Yet we don't read headlines about Old Europe "cleaning our clock" to the 21st century. Larson, *supra* note 5.

²⁴ *Id.* (including statement of Elizabeth Economy, director of Asia Studies at the Council on Foreign Relations, that "[e]ven when you are looking at these big numbers that are coming out of China today, I think it really pays to give a close look at what is actually happening on the ground [and t]hen you begin to get a different, more nuanced picture than what is blasted on the business section of the *New York Times*").

²⁵ CONSTANTIN CRACHILOV, RANDALL S. HANCOCK & GARY SHARKEY, CHINA GREENTECH INITIATIVE, *THE CHINA GREENTECH REPORT 2009 21* (2009), <http://www.chinagreentech.com/sites/default/files/CGTR2009-FullReport.pdf> (citing similar data from the United States Department of Agriculture's International Macroeconomics Data Set for 1978-2008 and noting that China's economy has doubled roughly every seven to eight years); WAYNE M. MORRISON, FOREIGN AFFAIRS, DEFENSE & TRADE DIV., CONG. RESEARCH SERV., IB98014, *CHINA'S ECONOMIC CONDITIONS* (2006), www.fas.org/srgp/crs/row/IB98014.pdf (detailing the government's shift in policy and stating that "[f]rom 1979 to 2005 China's real GDP grew at an average annual rate of 9.6%"); *Data: GDP Growth (Annual Percentage)*, WORLD BANK, <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG> (last visited Oct. 6, 2010) (providing data for 2005-2008).

²⁶ CHINA GREENTECH INITIATIVE, *supra* note 25, at 21 (citing data from the International Monetary Fund and stating that most analysts predict that China will overtake Japan); David Barboza, *China Passes Japan as Second-Largest Economy*, N.Y. TIMES, Aug. 15, 2010, <http://www.nytimes.com/2010/08/16/business/global/16yuan.html>. By some predictions, China may overtake the United States by 2030. See, e.g., CHINA GREENTECH INITIATIVE, *supra* note 25, at 32 fig.15.

²⁷ CHINA GREENTECH INITIATIVE, *supra* note 25, at 21.

²⁸ *U.S. and China Vie for Clean Energy Leadership*, ENERGY CHINA FORUM (Aug.

17, 2010), <http://www.energychinaforum.com/news/39260.shtml>.

²⁹ See, e.g., Stan Abrams, *This is Your Brain on Nationalism: US-China Trade Deficit Follies*, CHINA/DIVIDE (Apr. 14, 2010), <http://chinadivide.com/2010/your-brain-on-nationalism-us-china-trade-deficit-follies.html> (summarizing a number of claims and reports). With respect to greentech specifically, see Bradsher, *China Leading Global Race to Make Clean Energy*, *supra* note 12, citing low labor costs as a Chinese advantage.

³⁰ Nat'l Dev. & Reform Comm'n, *Medium and Long-Term Development Plan for Renewable Energy in China*, CHINA DEV. GATEWAY (Sept. 4, 2007), http://en.chinagate.cn/reports/2007-09/13/content_8872839.htm ("By 2020, a relatively complete renewable energy technology and industry system will have been established, so that a domestic manufacturing capability based mainly on China's own IPRs will have been established, satisfying the needs for deploying renewable energy on a large scale in China.").

³¹ RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, *RENEWABLES 2010: GLOBAL STATUS REPORT 30* (2010) [hereinafter *RENEWABLES*], <http://www.unep.org/sefi-ren21/>.

³² *Compare Global Market Outlook for Photovoltaics Until 2014: May 2010 Update*, EUR. PHOTOVOLTAIC INDUSTRY ASS'N, at 22 (May 15, 2010), http://www.epia.org/fileadmin/EPIA_docs/public/Global_Market_Outlook_for_Photovoltaics_until_2014.pdf (listing activities of European solar manufacturers), with U.S. DEP'T OF ENERGY, OFFICE OF ENERGY EFFICIENCY AND RENEWABLE ENERGY, *2008 SOLAR TECHNOLOGIES MARKET REPORT 15* (2010), <http://www1.eere.energy.gov/solar/pdfs/46025.pdf> (stating that the 2008 market share of Chinese firms was twenty-seven percent).

³³ Global Intelligence Alliance, *China to Lead Global Wind Energy Development?*, RENEWABLE ENERGY FOCUS (Feb. 15, 2010), http://www.renewableenergyfocus.com/view/7283/china-to-lead-global-wind-energy-development/?opattr=China_to_lead_global_wind_energy_development%3F.

³⁴ JIM HIGHT, *BUILDING BRIDGES FOR CLIMATE CHANGE MITIGATION: A ROADMAP OF GLOBAL TRADE PATTERNS IN WIND POWER GOODS AND SERVICES*, OECD GLOBAL FORUM ON TRADE: TRADE AND CLIMATE CHANGE 6 (2009), www.oecd.org/dataoecd/29/63/42886096.pdf ("[I]n 2004, China had only one domestic WTG manufacturer—Goldwind. By the end of 2008, there were approximately 60, with Goldwind as the leading seller, followed by Sinovel, Dongfang and Windey."); Eric Martinot & Li Junfeng, *Renewable Energy Policy Update for China*, RENEWABLE ENERGY WORLD (July 21, 2010), <http://www.renewableenergyworld.com/real/news/article/2010/07/renewable-energy-policy-update-for-china>.

³⁵ Pet. for Relief Under Section 301 of the Trade Act of 1974, as amended: *China's Policies Affecting Trade and Investment in Green Technology*, 13, Sept. 9, 2010.

³⁶ *Chinese Wind Turbine Manufacturers' Global Expansion: The Dream and The Reality*, GERSON LEHRMAN GROUP (May 9, 2010), <http://www.glgroup.com/News/Chinese-Wind-Turbine-Manufacturers-Global-Expansion—The-Dream-and-The-Reality-48260.html>; see also E-mail from Alexander U. Conrad to author (Sept. 7, 2010) (on file with author) (noting that Chinese firms have not penetrated the Brazilian wind market, despite that government's promotion of wind energy and a favorable climate between the two nations).

³⁷ *Solar Market Experiences Shakeout, China Is Well Positioned to Dominate World Market*, TOMMY TOY'S BLOG (Mar. 10, 2010, 7:36 AM), <http://tommytoy.vox.com/library/post/solar-market-experiences-shakeout-china-is-well-positioned-to-dominate-world-market.html>.

³⁸ See, e.g., Press Release, Senator Charles E. Schumer, *Schumer, Casey, Brown & Tester Urge Obama Administration to Suspend Stimulus Program Funneling Billions Overseas* (Mar. 3, 2010), <http://schumer.senate.gov/record.cfm?id=322732&> (detailing efforts by four Senators to block federal funding for the project); see also Yael Borofsky & Jesse Jenkins, *The Real Policy Lesson From the Chinese Wind Turbine "Scare"*, BREAKTHROUGH INST. BLOG (Nov. 9, 2009, 1:47 PM), http://thebreakthrough.org/blog/2009/11/the_real_policy_lesson_from_th.shtml (claiming that "Senator Schumer and others who seek to bar Chinese manufacturers from stimulus funds are missing the point" and should focus instead in promoting American greentech firms).

³⁹ See, e.g., Wynn, *supra* note 12 (stating that "Western businesses are worried China is freezing them out of this lucrative market, preferring to nurture its own nascent industries without subjecting them to competition"); Keith Johnson, *Protectionist Breezes: Wind-Power Companies Cry Foul on China*, WALL ST. J. BLOGS (May 28, 2009, 12:02 PM), <http://blogs.wsj.com/environmentalcapital/2009/05/28/protectionist-breezes-wind-power-companies-cry-foul-on-china/>.

⁴⁰ See JAMES MCGREGOR, *CHINA'S DRIVE FOR "INDIGENOUS INNOVATION": A WEB*

OF INDUSTRIAL POLICIES 1, 15 (2009), www.apcoworldwide.com/content/PDFs/Chinas_Drive_for_Indigenous_Innovation.pdf (providing a comprehensive discussion of these policies); Julian L. Wong, *How to Deal with Chinese Green Protectionism: A U.S. Perspective*, GREEN LEAP FORWARD (July 30, 2010), <http://greenleapforward.com/2010/07/30/how-to-deal-with-chinese-green-protectionism-a-us-perspective/> (discussing the Medium-to-Long Term National Plan for Science and Technology Development and the National Indigenous Innovation Accreditation Program in the greentech context).

⁴¹ See, e.g., Andrew Peaple, *For Foreigners, China's Solar Market Is Cloudy*, WALL ST. J., Aug. 18, 2010, <http://online.wsj.com/article/SB10001424052748704554104575434991356731852.html>; Joe McDonald, *U.S., Europe Look to China for Clean Energy Sales*, CHINA MINING (May 16, 2010), <http://www.chinamining.org/News/2010-05-17/1274063691d36211.html>.

⁴² MCGREGOR, *supra* note 40, at 33.

⁴³ *Id.* at 96.

⁴⁴ See, e.g., Michael Kanellos, *Innovalight Signs with Yingli for Second Chinese Solar Deal*, GREENTECH SOLAR (July 26, 2010), <http://www.greentechmedia.com/articles/read/innovalight-signs-with-yingli-for-second-chinese-solar-deal/> (detailing cooperation between Sunnyvale, California-based Innovalight, and Yingli Solar).

⁴⁵ Chen Limin & Wan Zhihong, *China's Wind Energy Industry Sees Challenges*, CHINA DAILY, Feb. 22, 2010, http://www.chinadaily.com.cn/china/2010-02/22/content_9481836.htm.

⁴⁶ *First Solar and Ordos Take Key Step Forward in 2GW China Project: Cooperation Framework Agreement Signed During China-US Presidential Summit*, FIRST SOLAR (Nov. 17, 2009), <http://investor.firstsolar.com/phoenix.zhtml?c=201491&p=irol-newsArticle&ID=1356152&highlight=>.

⁴⁷ Julian L. Wong, Ctr. for Am. Progress Action Fund, *The Challenge of China's Green Technology Policy and Ohio's Response: Written Testimony Before the U.S.-China Economic and Security Review Commission* 9 (July 14, 2010), http://www.uscc.gov/hearings/2010hearings/written_testimonies/10_07_14_wrt/10_07_14_wong_statement.pdf (discussing “success stories of American companies such as First Solar, eSolar, and American Superconductor making headway into the Chinese market”).

⁴⁸ Pet. for Relief Under Section 301 of the Trade Act of 1974, as amended, 94-95.

⁴⁹ Stuart Biggs, *Turbine Makers Face 'Tough' Market as Goldwind Slumps (Update2)*, BLOOMBERG BUSINESSWEEK, June 21, 2010, <http://www.businessweek.com/news/2010-06-21/turbine-makers-face-tough-market-as-goldwind-slumps-update2-.html>; Zhang Qi, *Sun is Settling on China's Solar Industry*, CHINA DAILY, Jan. 19, 2009, http://www.chinadaily.com.cn/bizchina/2009-01/19/content_7408525.htm (predicting a shakeout in the Chinese solar PV sector).

⁵⁰ Dallas Kachan, *China Has Already Surpassed the U.S. in Cleantech*, SEEKING ALPHA (Aug. 15, 2010), <http://seekingalpha.com/article/220547-china-has-already-surpassed-the-u-s-in-cleantech>.

⁵¹ *China's Renewable Energy Giants Look to IPO*, NEW NET (Aug. 18, 2010), http://www.newenergyworldnetwork.com/renewable-energy-news/by_technology/solar-by_technology-new-news/china%E2%80%99s-renewable-energy-giants-look-to-ipo.html.

⁵² Biggs, *supra* note 49.

⁵³ Thomas Hout, *China's Renewable-Energy Clout*, FORBES (July 30, 2010), http://www.forbes.com/2010/07/30/china-solar-wind-industry-markets-equities-clean-technology-companies_3.html.

⁵⁴ David Cyranoski, *Renewable Energy: Beijing's Windy Bet*, 457 NATURE 372, 372 (2009), <http://www.nature.com/news/2009/090121/pdf/457372a.pdf> (“Wind-turbine manufacturers and wind-farm developers everywhere have faced teething problems, but China has perhaps faced more difficulties than most. Its wind farms are much less efficient than those in other leading countries [and] manufacturing defects have plagued Chinese equipment . . .”).

⁵⁵ Hout, *supra* note 53 (calling the quality of Chinese turbines “questionable”); Richard Lim, Julisa Mandeville, Ryan Petersen, Jon Saxon, Benjamin Vannier & Tom Wuellner, *Winds of Change: How China's Government Supports Domestic Wind Energy Providers*, KELLOGG SCH. OF MGMT, NORTHWESTERN U. (Oct. 1, 2009), http://www.kellogg.northwestern.edu/departments/international/internationalfocus/article/winds_of_change.aspx (“Chinese-made turbines cost up to 20% less than those of multinational manufacturers. However, field data suggests that Chinese turbines significantly lag foreign products in quality, to the extent that the long-term revenue sacrificed from lower quality (as measured by turbine capacity factor) outweighs the upfront cost savings.”).

⁵⁶ *Id.*

⁵⁷ Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12; see generally Arnaud de la Tour, Matthieu Glachant & Yann Ménière, *Innovation and Inter-*

national Technology Transfer: The Case of the Chinese Photovoltaic Industry (MINES ParisTech, Cerna Working Paper Series, Working Paper 2010-12), http://hal-ensmp.archives-ouvertes.fr/docs/00/49/85/78/PDF/CERNA_WP_2010-12.pdf.

⁵⁸ de la Tour, Glachant & Ménière, *supra* note 57; *Global Market Outlook for Photovoltaics Until 2014: May 2010 Update*, *supra* note 32, at 22 & fig.23 (demonstrating that China leads in production of cells and modules but trails in other areas).

⁵⁹ *Id.*

⁶⁰ As but one example of this growth, see Herman K. Trabish, *The Birth of a U.S. Wind Power Manufacturing Industry*, WIRED (Aug. 15, 2010), <http://www.wired.com/epicenter/2010/08/wind-power-industry/#ixzz0x5attOL6> (noting that “five U.S. turbine manufacturers in operation in 2005 grew to 15 in 2009”).

⁶¹ Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12 (“Because China’s clean energy industry has relied so heavily on land deals and cheap state-supported loans, the industry could be vulnerable if China’s real estate bubble bursts, or if the banks’ loose lending creates financial problems of the sort that have plagued Western financial markets in recent years.”).

⁶² See, e.g., Richard Brubaker, *Chinese Employees are Going for More Frequent Walks*, ALL ROADS LEAD TO CHINA (July 19, 2010), <http://www.allroadsleadtochina.com/2010/07/19/employees-are-going-for-a-walk-more-frequently/>; Shaun Rein, *Three Big Trends Changing China for Multinationals*, FORBES (Aug. 24, 2010), <http://www.forbes.com/2010/08/24/china-multinationals-branding-leadership-careers-rein.html>.

⁶³ *Id.* (noting a “bias in favor of local sourcing” because “shipping wind power apparatus is heavy and awkward”); Trabish, *supra* note 60; *Chinese Wind Turbine Manufacturers' Global Expansion: The Dream and The Reality*, *supra* note 36.

⁶⁴ Wong, *supra* note 40, at 8; Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12 (“Many state and local governments in the United States have also built roads, installed power lines and made other infrastructure improvements that have increased the value of private land as part of programs to attract clean energy. Tax holidays for such businesses are common in the United States, as in China.”).

⁶⁵ *US Cleantech Trade Mission Heads to China to Boost US Exports*, ENERGY CHINA FORUM (May 18, 2010), <http://www.energychinaforum.com/news/35466.shtml>.

⁶⁶ Dan Harris, *Why China Won't Rule Tech.*, CHINA LAW BLOG (July 15, 2010), http://www.chinalawblog.com/2010/07/why_china_wont_rule_tech.html (stating that “[the] arguments are no different than the arguments that were being made about Russia in the 1960s and about Japan in the 1980s and neither country is really anywhere these days on the technology map”). See also Gady Epstein, *This Just In: China Economy Doing Better Than Japan*, REUTERS (Aug. 16, 2010, 1:47AM) (observing that “we should remember Japan’s seeming invincibility in the 1980’s and the stunning two decades of stagnation that followed when we look at China now”). It would hardly be surprising if objections to Chinese involvement in the United States looked remarkably similar to those of the 1980s regarding Japanese investment. One recent report claims: “nothing in the review of U.S. reactions to the boom in Japanese FDI suggests that the experience will not be repeated in the case of another formidable East Asian nation, particularly one that does not share many of the strategic, political and military common interests with the U.S. that muted and cabined the investment friction vis-à-vis Japan.” Curtis J. Milhaupt, *Is the U.S. Ready for FDI from China? Lessons from Japan's Experience in the 1980s*, in *INVESTING IN THE UNITED STATES: IS THE US READY FOR FDI FROM CHINA?* (Karl P. Sauvant ed., 2008), <http://www.vcc.columbia.edu/pubs/documents/MilhauptFinalEnglish.pdf>.

⁶⁷ Charlie McElwee, *Greentech Wars*, CHINA ENVTL. L. (Dec. 4, 2009), <http://www.chinaenvironmentallaw.com> (stating that “greentech war and competition metaphors . . . seem quite stale, unreflective, and insincere to me”).

⁶⁸ Kachan, *supra* note 50 (“China is making decisions quickly, and isn’t encumbered by democratic process.”); Todd Woody, *The Next Great Leap Forward: China Powers the Global Green Tech Revolution*, GRIST (Jan. 11, 2010), <http://www.grist.org/article/2010-01-11-china-powers-global-green-tech-revolution/> (“In a one-party state, a government official saying, ‘Make it so,’ can remove obstacles to any given project and allocate resources for its development.”); *10 Reasons Why China is the Greentech Leader*, SOLAR FEEDS (Aug. 27, 2010), <http://www.solarfeeds.com/green-chip-stocks/14040-10-reasons-why-china-is-the-cleantech-leader/> (“And unlike a western democracy, when China’s central leaders make up their minds, action follows quickly.”). As an example, the article *China Has Already Surpassed the U.S. in Cleantech* notes that “in less time than it took the U.S. DOE to do stage 1 of an application review for a 92 MW project in New Mexico, China approved, signed and is ready to begin construction this

year on a 20 times bigger project.” Kachan, *supra* note 50. See also Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12 (noting that the Sunzone firm obtained permits for and constructed a solar panel manufacturing plant in less than a year, far shorter than the process would taken in the United States).

⁶⁹ Martinot & Junfeng, *supra* note 34 (discussing impacts of recent policy changes).

⁷⁰ The four trillion RMB (\$586 billion) package contained billions of dollars worth of incentives for green projects. CHINA GREENTECH INITIATIVE, *supra* note 25, at 50, states that \$31 billion of the stimulus package was for green investments. Caution about that figure is warranted. An analysis by Julian Wong shows that “All that Glitters is Not Green,” in that “bullish” estimates of which specific parts of the package would have green impact are overstated. Julian L. Wong, *How Green is China’s Stimulus Package*, GREEN LEAP FORWARD (Mar. 3, 2010), <http://greenleapforward.com/2010/03/03/how-green-is-chinas-stimulus-package/>.

⁷¹ Eisen, *supra* note 1; Wong, *supra* note 40, at 7 (noting that with respect to China’s greentech R&D programs, “while some of these programs have been in place for nearly two decades, it is not clear that they are yielding the hoped-for results”).

⁷² Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12.

⁷³ Pet. for Relief Under Section 301 of the Trade Act of 1974, as amended, 63. *Id.* at 66-83.

⁷⁵ Natalie Obiko Pearson, *Chinese Government ‘Confused’ by U.S. Probe of Green Aid, Trade Group Says*, BLOOMBERG, Oct. 27, 2010, <http://www.bloomberg.com/news/2010-10-27/chinese-government-confused-by-u-s-probe-of-green-aid-trade-group-says.html>.

⁷⁶ Joel Kirkland, *Tax Cuts, Renewable Energy Grants Attract Unlikely Allies*, N.Y. TIMES, Apr. 16, 2010, <http://www.nytimes.com/cwires/2010/04/16/16climatewire-tax-cuts-renewable-energy-grants-attract-unl-12659.html> (indicating that the largest program totals five billion dollars).

⁷⁷ CHINA GREENTECH INITIATIVE, *supra* note 25, at 104 (noting that “substantial policy divergence has occurred” in this area “at local levels across China”).

⁷⁸ Jim Bai & Aizhu Chen, *China Firms Offer \$0.108/kWh Feed-In Rate in Solar Tender*: SOURCE, REUTERS, Aug. 16, 2010, <http://www.reuters.com/article/idUSTRE67F2BJ20100816?type=GCA-GreenBusiness>.

⁷⁹ Pet. for Relief Under Section 301 of the Trade Act of 1974, as amended, 95-96.

⁸⁰ Wang Mingyuan, *Issues Related to the Implementation of China’s Energy Law: Analysis of the Energy Conservation Law and the Renewable Energy Law as Examples*, 8 VT. J. ENVTL. L. 225, 248 (2007) (observing that “[t]he lack of open, fair, regulated, and orderly market competition mechanisms in the energy sector is a fundamental hindrance to renewable energy development and to the Renewable Energy Law’s implementation”). SOEs continue to be an important part of China’s economic landscape. See Michael Wines, *China Fortifies State Businesses to Fuel Growth*, N.Y. TIMES, Aug. 29, 2010, <http://www.nytimes.com/2010/08/30/world/asia/30china.html>. For an intriguing analysis that China’s reliance on SOEs will eventually undercut its economic growth, see Paul Denlinger, *China’s Outdated Practice of Capitalism*, FORBES BLOGS (Aug. 24, 2010, 12:00 AM), <http://blogs.forbes.com/china/2010/08/24/chinas-outdated-practice-of-capitalism/?boxes=Homepagechannels>.

⁸¹ CHINA GREENTECH INITIATIVE, *supra* note 25, at 87.

⁸² See LI JUNFENG, SHI JINGLI, XIE HONGWEN, SONG YANQIN & SHI PENGFEI, A STUDY ON THE PRICING POLICY OF WIND POWER IN CHINA 1-2 (2006), <http://www.gwec.net/fileadmin/documents/Publications/Report%20wind-power-price-policy%20china.pdf>. Commenting on the report, Li Junfeng, Director of the China Renewable Energy Industry Association, observed that in China, “wind power is a new industry and it still needs support. The current pricing policy does not match the goal of supporting wind development, and it has to be changed.” *A Study on the Pricing Policy of Wind Power in China*, GLOBAL WIND ENERGY COUNCIL, <http://www.gwec.net/index.php?id=156> (last visited Oct. 6, 2010).

⁸³ CHINA GREENTECH INITIATIVE, *supra* note 25, at 44 (listing the agencies and their areas of responsibility).

⁸⁴ Eric Savitz, *Solar: China Feed-In-Tariff Could Be 2 Years Away*, BARRON’S BLOGS (Sept. 17, 2009, 2:43 PM), <http://blogs.barrons.com/techtraderdaily/2009/09/17/solar-china-feed-in-tariff-could-be-2-years-away/>. This projection was confirmed by the prevalence of ad hoc bidding over the next two years. See Jim Bai & Aizhu Chen, *China Firms Offer \$0.108/kWh Feed-in Rate in Solar Tender*: SOURCE, REUTERS, Aug. 16, 2010, <http://www.reuters.com/article/idUSTRE67F2BJ20100816>. See Wong, *supra* note 40 (noting that the mid-2010 bidding was the “latest indication that authorities are not quite ready with the idea of a national feed-in tariff for solar”).

⁸⁵ See, e.g., *Development Trend of China’s Administrative Accountability Study*, FREE PAPER DOWNLOAD CTR. (July 3, 2010), <http://www.hi138.com/e/?i72718>

(noting that “China has just begun the implementation of administrative accountability”).

⁸⁶ Mingyuan, *supra* note 80, at 249 (noting that “as China is a large country with unbalanced regional development, uniform national legislation often fails to consider local characteristics and is not specific or adaptable to local needs”).

⁸⁷ This marvelous bit of understatement is found in CHINA GREENTECH INITIATIVE, *supra* note 25, at 91.

⁸⁸ Mingyuan, *supra* note 80, at 237 (noting that “[s]ome localities and departments still compare expected growth rate goals, and only talk idly of energy conservation and environmental protection”).

⁸⁹ *Id.* at 245 (observing that “most thermal power projects are larger in scale, attract greater investment, bring about faster results, and are more profitable than renewable energy projects”).

⁹⁰ CHINA GREENTECH INITIATIVE, *supra* note 25, at 92.

⁹¹ See generally David Shambaugh, *China’s Propaganda System: Institutions, Processes, and Efficacy*, 57 CHINA J. 25 (2007), <http://web.rollins.edu/~tlairson/china/chipropropaganda.pdf>. Shambaugh describes the Chinese propaganda system as a “sprawling bureaucratic establishment, extending into virtually every medium concerned with the dissemination of information.” *Id.* at 27. “Xinhua” is the Xinhua News Agency, the official press agency of the People’s Republic of China, which, Shambaugh notes, “has always had a dual role: to report news and to disseminate Party and state propaganda.” *Id.* at 44. Many in the West cite stories from Xinhua without this important context.

⁹² Jamie P. Horsley, *China Adopts First Nationwide Open Government Information Regulations*, FREEDOMINFO.ORG (May 9, 2007), http://www.law.yale.edu/documents/pdf/Intellectual_Life/Ch_China_Adopts_1st_OGI_Regulations.pdf (discussing the Regulations of the People’s Republic of China on Open Government Information).

⁹³ A 2010 workshop on transparency in reporting of environmental information and accompanying report by the Natural Resources Defense Council found that there had been a “good start on open information” but that the system had a long way to go. Alex Wang, *Assessing the State of Environmental Transparency in China*, SWITCHBOARD: NAT. RESOURCES DEF. COUNCIL STAFF BLOG (June 7, 2010), http://switchboard.nrdc.org/blogs/awang/assessing_the_state_of_environment.html.

⁹⁴ Pet. for Relief Under Section 301 of the Trade Act of 1974, as amended, 78.

⁹⁵ RENEWABLES, *supra* note 31, at 59.

⁹⁶ REN21 RENEWABLE ENERGY POLICY NETWORK FOR THE 21ST CENTURY, RECOMMENDATIONS FOR IMPROVING THE EFFECTIVENESS OF RENEWABLE ENERGY POLICIES IN CHINA 7 (2009), http://www.ren21.net/Portals/97/documents/Publications/Recommendations_for_RE_Policies_in_China.pdf (noting that of the 586.7 terawatt-hours (“TWh”) of electricity generated from renewables in China in 2008, all but 22.0 TWh came from hydropower projects).

⁹⁷ David Biello, *The Dam Building Boom: Right Path to Clean Energy?*, YALE ENV’T 360 (Feb. 23, 2009), <http://e360.yale.edu/content/feature.msp?id=2119>.

⁹⁸ RENEWABLES, *supra* note 31, at 54 tbl.R2.

⁹⁹ See CHINA GREENTECH INITIATIVE, *supra* note 25, at 87-88 (discussing reasons for lower efficiency in earlier installed wind farms).

¹⁰⁰ RENEWABLES, *supra* note 31, at 55 tbl.R4. China did have more installed capacity per unit of gross domestic product, however. Wong, *supra* note 13.

¹⁰¹ CHINA GREENTECH INITIATIVE, *supra* note 25, at 36 fig.21; see also LI JUNFENG, WANG SICHENG, ZHANG MINJI & MA LINGJUAN, CHINA SOLAR PV REPORT 11 tbl.6 (2007), <http://www.wfchina.org/english/downloads/ClimateChange/china-pv-report-en.pdf> (comparing China’s goal to estimates of installed PV capacity in other nations).

¹⁰² RENEWABLES, *supra* note 31, at 55 tbl.R3.

¹⁰³ CHINA GREENTECH INITIATIVE, *supra* note 25, at 36 fig.21. The lower targets are contained in the Medium and Long Term Development Plan for Renewable Energy, and the higher figures are based on reports of new targets likely to be contained in the National Energy Administration’s ten-year plan. See, e.g., Kevin Mo, *Go with Wind: China to Dramatically Boost its Wind Power Capacity, Again*, SWITCHBOARD: NAT. RESOURCES DEF. COUNCIL STAFF BLOG (July 21, 2009), http://switchboard.nrdc.org/blogs/kmo/go_with_wind_china_to_dramatic.html. But see Charles McElwee, *A Mighty Wind*, CHINA ENVTL. L. (May 6, 2009), <http://www.chinaenvironmentallaw.com/2009/05/06/a-mighty-wind/#more-1697> (stating, “I’m not believing [new targets] until I see a formally amended copy of China’s Medium & Long-Term Renewable Energy Development Plan”).

¹⁰⁴ According to projections about increased 2020 targets, 300 GW of capacity—far more than wind and solar combined—would be in hydropower. CHINA GREENTECH INITIATIVE, *supra* note 25, at 36 fig.21.

¹⁰⁵ LI JUNFENG, WANG SICHENG, ZHANG MINJI & MA LINGJUAN, CHINA SOLAR PV REPORT 11 tbl.6 (2007), www.wfchina.org/english/downloads/ClimateChange/china-pv-report-en.pdf (listing predictions for 2020).

¹⁰⁶ RENEWABLES, *supra* note 31, at 28 (stating that Chinese asset financing was \$29.2 billion in 2009, up from \$22 billion in 2008 and nearly two times the U.S. figure of \$10.7 billion). *See also* Jeremy van Loon & Alex Morales, *China Surges Past U.S., Europe in Clean-Energy Asset Financing*, BLOOMBERG BUSINESSWEEK, July 13, 2010, <http://www.businessweek.com/news/2010-07-13/china-surges-past-u-s-europe-in-clean-energy-asset-financing.html>.

¹⁰⁷ THE PEW CHARITABLE TRUSTS, *supra* note 10.

¹⁰⁸ *Id.* at 7 fig.4.

¹⁰⁹ *Id.* (noting that “[d]omestic policy decisions appear to have shifted the competitive positions of G-20 member countries”).

¹¹⁰ *China’s Power Generation Goes Greener with Total Capacity up 10%*, XINHUA NEWS AGENCY (Jan. 7, 2010), http://news.xinhuanet.com/english/2010-01/07/content_12771880.htm (noting that coal-fired power accounted for 74.6% of the nation’s 874 million kW of electricity generation capacity in 2009); U.S. DEP’T OF ENERGY, ENERGY INFO. ADMIN., INDEP. STATISTICS AND ANALYSIS, COUNTRY ANALYSIS BRIEFS: CHINA (2009), <http://www.eia.doe.gov/cabs/China/pdf.pdf> (2006 data); Chunbo Ma & Lining He, *From State Monopoly to Renewable Portfolio: Restructuring China’s Electric Utility*, 36 ENERGY POL’Y 1697, 1698 (2008), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1290737.

¹¹¹ CHINA GREENTECH INITIATIVE, *supra* note 25, at 40 (noting that “even if China were to achieve its target of deriving 20% of energy from renewable sources by 2020, most of the non-renewable energy would still be derived from coal”); Ma & He, *supra* note 110, at 1707.

¹¹² CHINA GREENTECH INITIATIVE, *supra* note 25, at 32-33.

¹¹³ Shai Oster & Spencer Swartz, *World News: Beijing Disputes IEA Data on Energy*, WALL ST. J., July 21, 2010, http://online.wsj.com/article/NA_WSJ_PUB:SB10001424052748703720504575378243321158992.html (citing statistics from the International Energy Agency that China used 2.252 billion tons of oil equivalent in 2009 as compared to 2.17 billion tons of oil equivalent for the United States); *see also* Ann Carlson, *China’s Growth in Energy Usage Truly Alarming*, LEGAL PLANET: ENV’T L. & POL’Y BLOG (May 7, 2010), <http://legalplanet.wordpress.com/2010/05/07/chinas-growth-in-energy-usage-truly-alarming/>; Brian Rezny, *Chinese Energy Cleans Up Its Act*, SEEKING ALPHA (July 27, 2010), <http://seekingalpha.com/article/216784-chinese-energy-cleans-up-its-act> (citing the report and Chinese criticism that the “second largest consumer” story does not give enough weight to China’s greentech investments and carbon intensity targets).

¹¹⁴ CHINA GREENTECH INITIATIVE, *supra* note 25, at 40; *U.S. and China Vie for Clean Energy Leadership*, *supra* note 28.

¹¹⁵ CHINA GREENTECH INITIATIVE, *supra* note 25, at 38-39.

¹¹⁶ *Two Energy Giants: A Contrast in Approach*, INST. FOR ENERGY RES. (Apr. 22, 2010), <http://www.instituteforenergyresearch.org/2010/04/22/two-energy-giants-a-contrast-in-approach/> (illustrating, via tables, how Conventional Thermal Generating Capacity Additions in China outstripped all renewables additions—and far outpaced non-hydropower renewables—between 2005-2008).

¹¹⁷ Woody, *supra* note 68; *see also* *Two Energy Giants*, *supra* note 116 (“The size and scope of [China’s] investments in conventional forms of energy dwarf their commitment to ‘green energy.’”).

¹¹⁸ Charlie McElwee, *China Starts Construction on 13.6GW Coal-Fired Power Base*, CHINA ENV’T L. (Aug. 10, 2009), <http://www.chinaenvironmentallaw.com/2009/08/10/china-starts-construction-on-136gw-coal-fired-power-base/>. One Chinese professor claims that provincial governments have stronger incentives to build conventional plants than greentech facilities. Mingyuan, *supra* note 80, at 244-45 (“[E]ven though the State has made clear that renewable energy exploitation and utilization is an area of high priority and that key public and private actors are encouraged to be involved, some local governments are enthusiastic about, and spare no effort in, starting thermal power plants, while renewable energy generation projects are often ‘pending discussion.’ The objective cause of this phenomenon is that most thermal power projects are larger in scale, attract greater investment, bring about faster results, and are more profitable than renewable energy projects.”).

¹¹⁹ 2010 [National Energy Board Held the First Half of 2010, the Economic Situation of the Energy Conference], [National Development and Reform Commission], http://nyj.ndrc.gov.cn/ggtzt/20100721_362050.htm (last visited Oct. 6, 2010).

¹²⁰ Keith Bradsher, *China Outpaces U.S. in Cleaner Coal-Fired Plants*, N.Y. TIMES, May 10, 2009, <http://www.nytimes.com/2009/05/11/world/asia/11coal.html>.

¹²¹ *See, e.g.*, Press Release, Bloomberg New Energy Finance, *Joined At The Hip: The US-China Clean Energy Relationship: Bloomberg New Energy Finance Study Debunks Myths About US-China Clean Energy Relationship* (May 19, 2010), <http://bnf.com/Download/pressreleases/116/pdffile/> (referencing a com-

ment by Michael Liebreich, CEO of Bloomberg New Energy Finance, that “[j]t is easy to paint clean energy trade between the US and China in terms of winners and losers, but the relationship defies simplistic assumptions”).

¹²² *See, e.g.*, Wong, *supra* note 47, at 11 (noting that “the ‘clean energy race’ is not a zero-sum game”).

¹²³ Bradford Plumer, *Should We Start a Solar Panel Trade War with China?*, NEW REPUBLIC BLOG (Sept. 9, 2010, 4:10 PM), <http://www.ntr.com/blog/77566/should-we-start-solar-panel-trade-war-china/> (“a far more effective way to strengthen the U.S. clean-energy industry would be to boost domestic demand . . . than through a solar-panel trade war”).

¹²⁴ *See China and Climate Change*, PEW CTR. ON GLOBAL CLIMATE CHANGE, http://www.pewclimate.org/policy_center/international_policy/china.cfm (last visited Oct. 6, 2010) (providing fact sheets on specific issues and strategies).

¹²⁵ China’s President, Hu Jintao, stated in September that China’s next five-year plan would include a new goal to reduce carbon intensity—CO₂ emissions per unit of GDP—from 2005 levels by 2020 by a “notable margin.” Julian L. Wong, *China’s Carbon Intensity Plans and its Impact on Climate Progress*, GREEN LEAP FORWARD, <http://greenleapforward.com/2009/09/25/chinas-carbon-intensity-plans-and-its-impact-on-climate-progress/> (last updated Sept. 30, 2009). In November 2009, it announced that number was a reduction of forty percent from 2005 levels by 2020. Edward Wong & Keith Bradsher, *China Joins U.S. in Pledge of Hard Targets on Emissions*, N.Y. TIMES, Nov. 26, 2009, <http://www.nytimes.com/2009/11/27/science/earth/27climate.html>. There are already signs that this goal will be difficult to meet. In early fall 2010, China was poised to miss a target set by the 11th Five-Year Guidelines, CHINA GREENTECH INITIATIVE, *supra* note 25, at 39, for reducing the energy intensity of its industries between 2005 and 2010 by twenty percent. *China Closes Factories as Green Deadline Looms*, ENERGY CHINA FORUM (Aug. 24, 2010), <http://www.energychinaforum.com/news/39598.shtml>. According to one consultant quoted in this article, “[i]f Beijing fails to hit the 2010 target by a wide margin, its credibility on climate change commitments will be subject to a great deal of international scepticism.” *Id.* (quoting Damien Ma of the Eurasia Group consulting firm).

¹²⁶ Studies by the McKinsey consulting firm and the United Kingdom’s Tyndall Centre find that under alternative scenarios of projected growth, China must take drastic measures to reduce greenhouse gas emissions or suffer considerable increases by 2030. TAO WANG & JIM WATSON, SUSSEX ENERGY GROUP & TYNDALL CTR. FOR CLIMATE RESEARCH, *CHINA’S ENERGY TRANSITION: PATHWAYS FOR LOW CARBON DEVELOPMENT* (2009), http://www.sussex.ac.uk/sussexenergygroup/documents/china_report_forweb.pdf; MCKINSEY & CO., *CHINA’S GREEN REVOLUTION: PRIORITIZING TECHNOLOGIES TO ACHIEVE ENERGY AND ENVIRONMENTAL SUSTAINABILITY 11* (2009), http://www.mckinsey.com/locations/greaterchina/mckonchina/reports/china_green_revolution_report.pdf.

¹²⁷ *See, e.g.*, CTR. FOR AM. PROGRESS, *A ROADMAP FOR U.S.-CHINA COLLABORATION ON CARBON CAPTURE AND SEQUESTRATION 12* (2009), http://www.americanprogress.org/issues/2009/11/pdf/china_ccs.pdf (observing that “[i]f these two countries cannot find a way to come together to jointly address the problems caused by these emissions, it is highly unlikely that the world will be able to agree on a strategy for effective mitigation any time soon”).

¹²⁸ ENERGY INFO. ADMIN., U.S. DEP’T OF ENERGY, *ANNUAL ENERGY REVIEW 343 tbl.11.19* (2008), <http://www.eia.gov/FTP/ROOT/multifuel/038408.pdf> (noting that in 2006, China emitted 6,018 million metric tons (“MMT”) of CO₂ compared to the United States’ 5,903 MMT).

¹²⁹ “China is on track to overwhelm the global effort to address climate change.” *Challenges and Opportunities for U.S.-China Cooperation on Climate Change Before the Sen. Committee on Foreign Relations*, 111th Cong. 16 (2009), <http://www.hsdil.org/?view&doc=113654&coll=0> (referencing a statement of Elizabeth Economy, C.V. Starr Senior Fellow and Director, Asia Studies, Council on Foreign Relations).

¹³⁰ Bradsher, *On Clean Energy, China Skirts Rules*, *supra* note 12 (citing comments of Zhao Feng, Sunzone’s general manager, that “the world should appreciate the generous assistance of Chinese government agencies to the country’s clean energy industries. That support has made possible a sharp drop in the price of renewable energy and has helped humanity address global warming”).

¹³¹ McElwee, *supra* note 67.

¹³² *See, e.g.*, Press Release, Bloomberg New Energy Finance, *supra* note 121 (“The two nations may be in competition, but the big win for both of them would be to drive the cost of a clean power generation below the cost of fossil fuels.”); Christina Larson, *America’s Unfounded Fears of a Green-Tech Race with China*, YALE ENV’T 360 (Feb. 8, 2010), <http://e360.yale.edu/content/feature.msp?id=2238> (quoting Shanghai-based American entrepreneur Richard Brubaker’s statement that “[t]he clean-tech war is overblown from the start” and discussing how “the green-tech ‘race’ is not one that one side wins and the other loses, but a scenario

where partnerships are sought out and the final equation doesn't have to be a zero-sum game"); Wong, *supra* note 47, at 11.

¹³³ CHINA GREENTECH INITIATIVE, *supra* note 25, at 35.

¹³⁴ The website of the United Nations Framework Convention on Climate Change contains a wealth of information on global responses to climate change, including the Kyoto Protocol, Copenhagen Accord, and many more documents. See UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, <http://unfccc.int> (last visited Oct. 6, 2010).

¹³⁵ See, e.g., *BRIC Countries' Think-Tanks Discuss Climate Change*, CHINA.ORG.CN (Apr. 15, 2010), http://www.china.org.cn/world/nuclear_bric_summits/2010-04/15/content_19823233.htm.

¹³⁶ There are many books, articles, and studies that analyze the U.S.-China relationship, and it would take an entire bookshelf to list them all. See, e.g., Dan Edwards, *New China Books Roundup*, BEIJING BLOG (Aug. 26, 2010, 12:00 PM), <http://www.thebeijinger.com/blog/2010/08/26/New-China-Books-Roundup>. A useful starting point for a list and brief discussion of the issues between the two nations is KERRY DUMBAUGH, CONG. RESEARCH SERV., RL33877, CHINA-U.S. RELATIONS: CURRENT ISSUES AND IMPLICATIONS FOR U.S. POLICY (2007), http://assets.opencrs.com/rpts/RL33877_200711221.pdf. One recent flashpoint has involved censorship and the Internet. See, e.g., Jessica Guynn, *Google Takes a Side Step in Censorship Dance with China*, CHI. TRIB., Mar. 22, 2010, http://articles.chicagotribune.com/2010-03-22/business/sc-biz-0323-google-20100322_1_google-china-hong-kong-china-s-internet.

¹³⁷ For general discussions of these meetings, see Michael Wines, *In China, Pelosi Calls for Cooperation On Climate*, N.Y. TIMES, May 28, 2009, <http://www.nytimes.com/2009/05/28/world/asia/28pelosi.html>; *U.S. Experts Welcome China's Pledge on Carbon Emission Cuts*, XINHUA NEWS AGENCY (Nov. 27, 2009), http://news.xinhuanet.com/english/2009-11/27/content_12549647.htm.

¹³⁸ *U.S.-China Strategic and Economic Dialogue*, U.S. DEP'T OF TREASURY, <http://www.ustreas.gov/initiatives/us-china/> (last updated June 10, 2010). See CHINA GREENTECH INITIATIVE, *supra* note 25, at 58, for a discussion of S&ED activities.

¹³⁹ See *Leaders' Statement: The Pittsburgh Summit*, PITTSBURGH SUMMIT, <http://www.pittsburghsummit.gov/mediacenter/129639.htm> (last visited Sept. 6, 2010).

¹⁴⁰ See *Major Economies Forum on Energy and Climate*, U.S. DEP'T. OF STATE, <http://www.state.gov/g/oes/climate/mem/> (last visited Sept. 6, 2010).

¹⁴¹ See, e.g., Andrew C. Revkin, *China and U.S. Pledge Climate Teamwork*, N.Y. TIMES DOT EARTH BLOG (July 28, 2009, 6:19 PM), <http://dotearth.blogs.nytimes.com/2009/07/28/china-and-us-pledge-climate-teamwork/> (describing the July 2009 memorandum of understanding); Press Release, White House, Office of Press Sec'y, U.S.-China Joint Statement (Nov. 17, 2009), <http://www.whitehouse.gov/the-press-office/us-china-joint-statement> (section "V. Climate Change, Energy and Environment" of "U.S.-China Joint Statement" following President Obama's trip to China in November 2009).

¹⁴² CHINA GREENTECH INITIATIVE, *supra* note 25, at 58 (discussing the importance of the S&ED in this regard).

¹⁴³ Hugh Gusterson, *Secrecy, Authorship and Nuclear Weapons Scientists*, in *SECURITY AND KNOWLEDGE PRODUCTION* 57, 69 (Judith Reppey ed., 1999), http://www.einaudi.cornell.edu/peaceprogram/publications/occasional_papers/occasional-paper23.pdf (discussing the "intense secretiveness of the Soviet state").

¹⁴⁴ Plumer, *supra* note 123.

¹⁴⁵ Michael Levi, *The Downside to Made in the USA*, COUNCIL ON FOREIGN REL., Sept. 9, 2010, <http://blogs.cfr.org/levi/2010/09/09/the-downside-to-made-in-the-usa/>.

¹⁴⁶ China has "associated with" (agreed in principle to) the Copenhagen Accord. On the other hand, it believes "it is neither viable nor acceptable to start a new negotiating process," a stance which would reverse years of international work. Arthur Max, *China, India Join Copenhagen Accord, Last Major Emitters To Sign On*, HUFFINGTON POST (Mar. 9, 2010, 2:24 PM), http://www.huffingtonpost.com/2010/03/09/china-india-join-copenhag_n_491640.html (comments of Premier Wen Jiabao).

¹⁴⁷ See, e.g., Mark Lynas, *How Do I Know China Wrecked the Copenhagen Deal? I Was in the Room*, GUARDIAN (Dec. 22, 2009), <http://www.guardian.co.uk/environment/2009/dec/22/copenhagen-climate-change-mark-lynas>. Lynas' argument was criticized by many who believed it unwise to ascribe sole blame to the Chinese.

¹⁴⁸ CHINA GREENTECH INITIATIVE, *supra* note 25, at 34 (noting that if China develops at its current pace, "international concerns over global warming would increasingly be directed toward China").

¹⁴⁹ Wong, *supra* note 47 (noting that "[t]he United States risks falling behind not just China, but other Asian and EU countries, because of its failure to create a national long-term vision for clean energy development, and a supporting stable policy framework to realize that vision").

¹⁵⁰ *Id.* (noting that "the United States has been tremendously successful in inventing many important clean energy technologies, but has fared [sic] less well in mass production and commercialization relative to the size of its economy").

¹⁵¹ See, e.g., David L. Levy, *The Political Economy of Renewable Energy in the US and Europe*, ALL ACAD. RES., http://www.allacademic.com/meta/p_mla_apa_research_citation/0/7/2/5/7/pages72573/p72573-1.php (last visited Oct. 6, 2010) (observing that "[renewables] policy in the US is characterized by fragmentation, uncertainty, lack of coordination, a lack of substantive taxes or subsidies, and the absence of a meaningful overall emissions reduction target").

¹⁵² The National Renewable Energy Laboratory and the Pew Center on Global Climate Change, among many others, have issued numerous publications on the link between governmental policies and promotion of renewables. See *NREL Publications*, Nat'l Renewable Energy Laboratory, <http://www.nrel.gov/publications/> (last visited Oct. 6, 2010); PEW CTR. ON GLOBAL CLIMATE CHANGE, *supra* note 124. A recent noteworthy report in the author's home region is Marilyn A. Brown et al., *Renewable Energy in the South: A Policy Brief* (Ga. Inst. of Tech., Sch. of Pub. Pol'y 2010, Working Paper No. 58, 2010), <http://www.spp.gatech.edu/faculty/workingpapers/wp58.pdf>.

¹⁵³ FRED SISSIN, CONG. RESEARCH SERV., RS22858, *RENEWABLE ENERGY R&D FUNDING HISTORY: A COMPARISON WITH FUNDING FOR NUCLEAR ENERGY, FOSSIL ENERGY, AND ENERGY EFFICIENCY R&D* (2008), <http://www.nationalaglawcenter.org/assets/crs/RS22858.pdf>.

¹⁵⁴ See Amanda Ruggeri, *What the Stimulus Package Does for Renewable Energy*, U.S. NEWS & WORLD REP. (Mar. 6, 2009), <http://politics.usnews.com/news/energy/articles/2009/03/06/what-the-stimulus-package-does-for-renewable-energy.html> (noting that the package contained "about \$50 billion in spending and \$20 billion in tax provisions"); Daniel J. Weiss & Alexandra Kougentakis, *Recovery Plan Captures the Energy Opportunity*, CTR. FOR AM. PROGRESS (Feb. 13, 2009), http://www.americanprogress.org/issues/2009/02/recovery_plan_captures.html (linking to a comprehensive spreadsheet detailing individual programs and provisions); see also Joe Romm, *The Entire American Economy, Including Renewable Energy, Benefitted from the Stimulus Bill*, CLIMATE PROGRESS (Aug. 25, 2010), <http://climateprogress.org/2010/08/25/the-entire-american-economy-including-renewable-energy-benefitted-from-the-stimulus-bill> (discussing the impact of the stimulus package on the economy, including promotion of green-tech).

¹⁵⁵ See Zachary Shahan, *Fossil Fuels Get Tons More in Subsidies than Renewable Energy*, CLEAN TECHNICA (July 31, 2010), <http://cleantechnica.com/2010/07/31/fossil-fuels-get-tons-more-in-subsidies-than-renewable-energy/> (noting that governments devote more than ten times as much to subsidizing fossil fuel industries than to solar and wind).

¹⁵⁶ Romm, *supra* note 154 (discussing the potential for tax incentives to expire at the end of 2010).

¹⁵⁷ Candace Lombardi, *U.S. Wind Energy Popular, But Lacks Investment*, CNET NEWS (July 28, 2010), http://news.cnet.com/8301-11128_3-20011926-54.html?tag=mncol:mlt_related.

¹⁵⁸ AM. WIND ENERGY ASS'N, AWEA MID-YEAR 2010 MARKET REPORT 3 (2010), http://www.awea.org/_cs_upload/learnabout/publications/5085_1.pdf.

¹⁵⁹ Angelique van Engelen, *Obama Addresses Climate Change in Program Styled on 1960s Space Race*, GLOBAL WARMING IS REAL (May 5, 2009), <http://www.globalwarmingisreal.com/blog/2009/05/05/obama-addresses-climate-change-in-program-styled-on-1950s-space-race/>.

¹⁶⁰ Wong, *supra* note 47.

¹⁶¹ David Roberts, *On the Death of the Climate Bill*, GRIST MAGAZINE, July 22, 2010, <http://www.grist.org/article/2010-07-22-on-the-death-of-the-climate-bill/>.

¹⁶² *Id.*

¹⁶³ See, e.g., Wong, *supra* note 47, at 10 (noting that "[i]nstead, what the United States has is a patchwork of differing state and local policies, and federal policy tools that are temporary and unpredictable").

¹⁶⁴ For descriptions of the wide variety of state programs, see *U.S. States & Regions*, PEW CTR. ON GLOBAL CLIMATE CHANGE, <http://www.pewclimate.org/states-regions> (last visited Oct. 6, 2010), and JONATHAN L. RAMSEUR, CONG. RESEARCH SERV., RL33812, *CLIMATE CHANGE: ACTION BY STATES TO ADDRESS GREENHOUSE GAS EMISSIONS* (2007), <http://ncsconline.org/NLE/CRSreports/07Dec/RL33812.pdf>.

¹⁶⁵ See Lincoln Davies, *Power Forward: The Argument for a National RPS*, 42 CONN. L. REV. 1339, 1397 (2010); Joshua P. Fershee, *Changing Resources, Changing Market: The Impact of a National Renewable Portfolio Standard on the U.S. Energy Industry*, 29 ENERGY L.J. 49, 61 (2008).

¹⁶⁶ Engelen, *supra* note 159.

¹⁶⁷ *Id.* at 3.