

A Better Approach to Intellectual Property?: Lessons from the US-China Clean Energy Research Center

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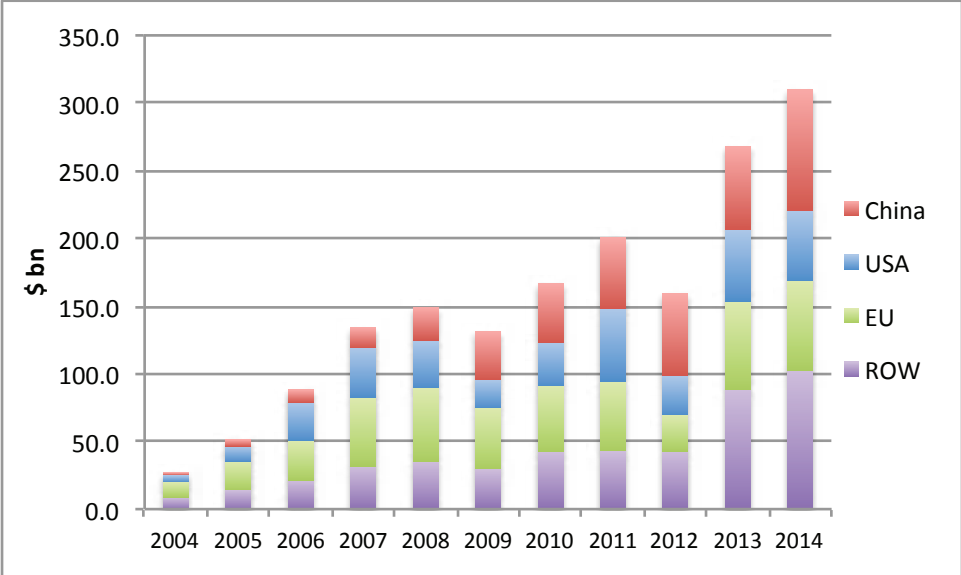
Cover Photo: Department of Energy

Introduction

The United States and China are increasingly important developers and deployers of clean energy technologies. In 2014, for example, both countries committed the largest investments in the world to clean energy research, development, and deployment (see Figure 1).¹ Indeed, while the United States had been a leading innovator in key clean energy technologies for decades, China is rapidly catching up as an innovator in this arena. As of 2011, China already ranked fifth globally, after Japan, the United States, Germany, and South Korea, in total renewable energy patent applications to the Patent Cooperation Treaty (see Table 1).²

Over the past six years, clean energy has emerged as a realm of cooperation between China and the United States and thus as a notable bright spot amid intensifying competition and tension between the two countries. In November 2009, Washington and Beijing signed seven new agreements on clean energy cooperation, covering energy efficiency, renewable energy, electric vehicles, advanced coal technologies, and shale gas. These agreements also launched the US-China Clean Energy Research Center (CERC), in an effort to facilitate joint research and development (R&D) on clean energy technology through cooperation among teams of scientists and engineers from both countries.

Figure 1. Clean Energy Investments Across Countries



Source: National Science Board, Science and Engineering Indicators 2014, NSB 14-01 (Arlington, VA: National Science Foundation, 2014); BNEF, “Rebound in Clean Energy Investment in 2014 Beats Expectations,” January 9, 2015.

Table 1. Patent Filings in Energy Generation from Renewable and Non-Fossil Sources

Rank	Country	Number of Filings
1	Japan	1,240
2	United States	1,130
3	Germany	675
4	Korea	423
5	China	266
6	United Kingdom	200
7	France	200
8	Denmark	149
9	Spain	137
10	Italy	111

Notes: Includes PCT filings only for 2011.
 Source: OECD Patent Database, 2015.

Clean energy cooperation appears to be intensifying. In President Barack Obama’s second term, the US government has worked with President Xi Jinping’s administration to sign several new agreements, building on this package of bilateral cooperation signed back in 2009. Central among these agreements were the establishment of a high-level Climate Change Working Group, which included five new initiatives focusing on emissions reductions from heavy duty vehicles, smart grids, carbon capture utilization and storage, energy efficiency in buildings and industry, and the collection and measurement of emissions data.

R&D cooperation has the potential to accelerate the rate of innovation. And the joint development and deployment of clean energy technologies can

help ease bilateral trade tensions and potentially forestall the high levels of protectionism that have plagued many clean energy industries. According to China’s Ministry of Science and Technology (MOST), the number of cooperative research projects both inside and outside China involving Chinese partners has been rising steadily (Figure 2). So while much technology cooperation is commercially driven, the two governments have sought to step into a facilitating role.

But despite this apparently solid and growing record of collaboration between the United States and China, it is hard to see it reaching full potential unless the two countries can navigate the pivotal problem of protecting intellectual property (IP). Concerns over the sharing of IP have



been frequently identified as a real and serious barrier to more tangible and fruitful collaborations. In fact, IP protection is a particular concern among international researchers working with Chinese researchers.

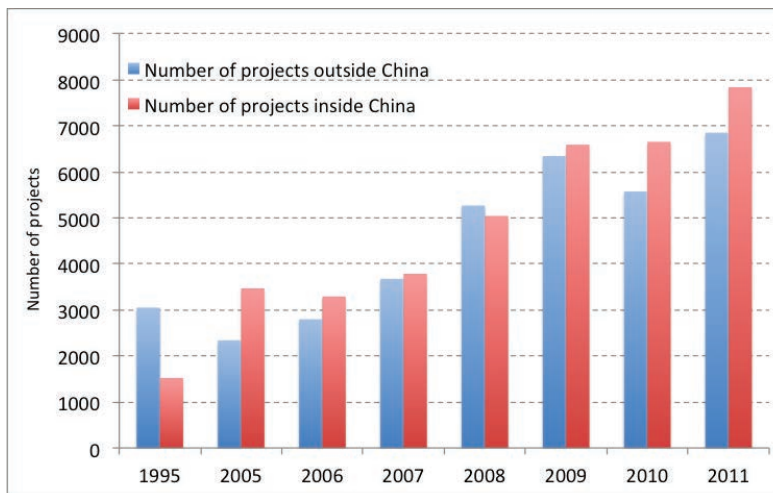
Different forms of international collaboration have adopted varied strategies to deal with IP rights. But what is uncontestable is that clarity in rights allocations and rules has been shown to be crucial for any technology partnership at the outset.

This points to a major challenge that this policy memorandum seeks to address: Joint R&D can provide a number of direct benefits to firms, including sharing of financing costs, reducing uncertainty, and realizing economies of scale and of scope.³ But joint R&D can also impose significant costs, wherever operational risks exist,

and in the clean energy area these can range from honest misunderstandings to blatant IP theft.

This memo examines a potentially promising solution to these thorny IP issues. It suggests that finding creative ways forward might lie in an existing vehicle for clean energy cooperation: the CERC. The CERC has already pioneered some novel ways of managing jointly developed IP, and these are described in detail below. So it is worth exploring whether the CERC model can be adapted more widely—outside the immediate CERC context—to achieve better and sensible protection of IP while buttressing collaboration in clean tech R&D between the United States and China, or in the context of other bilateral and multilateral technology partnerships.

Figure 2. International S&T Projects



Source: MOST, 2012 S&T Yearbook, Table 8-8, "International Cooperation Exchange for Science and Technology."

Navigating Broad US-China IP Challenges

Since 1978, China has sought to move away from what its policymakers argue is an over-reliance on foreign firms and foreign technology. In that context, the environment for international technology cooperation has become, and will remain, more complex.

That complexity stems from several related factors, all of them centered on the reality that China has simultaneously become a key competitor to the United States and other major economies in clean energy and an important collaborator in the same sector. In effect, the clean technology sector reflects a simple conundrum: China is both a major producer of “cleantech,” usually at lower cost than in the United States, but also one of the biggest markets in which US and other multinational firms seek to deploy their own clean energy technology globally.

In the collaboration column, for instance, rather than merely shifting manufacturing activities to China, multinational firms are also moving their own R&D activities into China. Although the IP rights regime in China lags that of most industrialized nations, it is evolving, particularly as China becomes a creator, rather than a mere digester

and deployer, of innovation. China still cannot compete with advanced economies in terms of cleantech inventions, yet it is playing an important role as a key collaborator and even becoming a source of clean technology transfer to other emerging economies.⁴

In the competition column, meanwhile, the relatively recent phenomenon of the rapid global expansion of Chinese clean energy firms has contributed to an increasingly competitive business landscape for multinationals. And it has yielded an increasingly challenging environment for cooperation as well.

A major source of the problem is that the promotion of clean energy in China is anchored squarely in a broad-based national industrial policy.⁵ In its effort to develop high-technology industries, the Chinese government has gradually become more selective and restrictive in the type of imports and investments that it allows, preferring to leverage its own domestically-manufactured technology to foster and strengthen Chinese industries.⁶ As a result, tensions have flared in the clean energy industry, as reflected in a series of recent international trade disputes between the United States and China.⁷

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Despite the growing centrality of China in the global innovation ecosystem, it is clear that substantial challenges to international technology collaboration remain. Many foreign firms and governments have participated in successful technology partnerships in China that have contributed to new technical discoveries and generated new market opportunities. But others have failed for various reasons.⁸ These include simple cultural misunderstandings, of course, but also high-profile IP disputes or even outright theft that has led to economic losses or political repercussions in the United States and other countries.



Photo: Flickr

The AMSC Case

To illustrate, consider a well-known IP dispute between American and Chinese wind companies.

US-based AMSC entered the Chinese market through a partnership with the Chinese firm Sinovel, engaging in joint R&D of several new wind turbine models. But what AMSC had characterized as a successful partnership in the fall of 2009 soured publicly by April 2011, when a company press release updating investors on fourth-quarter financial results stated

that Sinovel had “refused to accept shipments of 1.5 MW and 3 MW wind turbine core electrical components and spare parts” that it had previously agreed to purchase. That release further noted that Sinovel has also failed “to pay AMSC for certain contracted shipments made in fiscal year 2010.”⁹

In June 2011, while servicing wind turbines in China, AMSC engineers discovered that Sinovel was using a version of AMSC’s low-voltage ride through software in a Chinese wind turbine that AMSC had neither sold nor licensed to Sinovel.¹⁰ This discovery led to legal proceedings before both

Chinese and US courts. AMSC has been seeking a total of more than \$1.2 billion in damages in the Chinese courts, alleging that Sinovel violated sales contracts and stole its technology.¹¹ AMSC further claimed that Sinovel bribed an AMSC systems integrator in Austria for source code and software that Sinovel then used to upgrade hundreds of its own wind turbines to meet proposed Chinese grid codes.

Interestingly, AMSC has so far been able to win in both the Chinese and US courts, as well as in Austrian courts (which had jurisdiction because the

AMSC employee involved was based in Austria). On June 27, 2013, the US Department of Justice also brought charges of IP theft against the Chinese turbine manufacturer, carrying prospective jail terms of more than 30 years and fines totaling \$4.8 billion if convicted.¹² In February 2014, China's Supreme People's Court also decided in favor of AMSC on the two software copyright infringement cases.¹³ (As of this writing, AMSC was still waiting for a hearing date for its \$450 million trade secrets case).¹⁴

Neither company has been performing well since the termination of the partnership. Sinovel has been forced to close down some of its overseas operations, including in the United States, Belgium, Italy, and Canada.¹⁵ The company has been investigated several times by the China Securities Regulatory Commission,¹⁶ and has offloaded several top executives since this dispute began.¹⁷ In April 2014, Sinovel's bonds were suspended from trading on the Shanghai Stock Exchange,¹⁸ and in January 2015 NASDAQ put AMSC on notice for potential delisting.¹⁹

The CERC Experience

The Sinovel and other cases demonstrate that continued uncertainty over the IP regime in China risk eroding collaborative potential in clean energy. But one solution to overcoming these challenges, at least as a first step, may lie with an existing vehicle.

The United States and China, for all their differences on IP and competition policies, have already launched arguably the most ambitious model of bilateral cleantech cooperation to date: The CERC focuses on innovation through joint R&D. And its particular emphasis on the collaborative *creation* of IP makes the CERC unique from previous US-China clean energy cooperation agreements, more than 30 of which have been signed over the past three decades.

As a result, the CERC merits examination not just as a platform for cooperation that engages both public and private sectors to advance the development of technologies, but also as the test bed for a novel arrangement to manage IP rights.²⁰

What is the CERC?

The November 2009 CERC protocol²¹ established a virtual center for joint research housed across multiple research institutions in the United States and China, capitalized with \$150 million in public and private funding evenly split between the two countries. The broad mandates of the CERC are to spur innovation of clean energy

technologies, diversify energy supply sources, improve energy efficiency, accelerate the transition to a low-carbon economy, and help avoid the worst consequences of climate change.²²

Other key aspects of the initial CERC agreement included:

(1) “equality, mutual benefit, and reciprocity”; (2) the timely exchange of information relevant to cooperative activities; (3) the effective protection of intellectual property rights; (4) the peaceful, non-military uses of the results of collaborative activities; and (5) respect for the applicable legislation of each country.²³

The CERC is governed by a steering committee that includes ministerial-

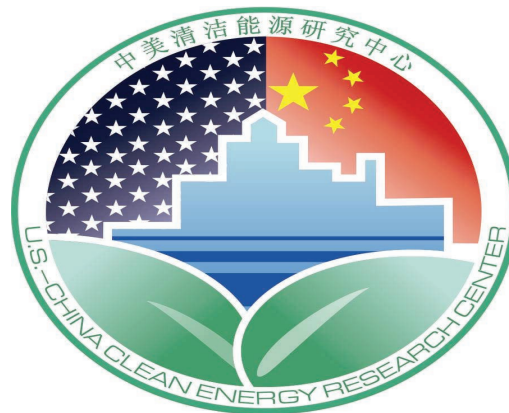


Photo: Department of Energy

level oversight from the relevant government agencies. From the United States, the lead agency is the Department of Energy (DOE). By contrast, China has no less than three different ministries playing a leadership role in the CERC, including the Ministry of Science and Technology (MOST), the National Energy Administration, and the Ministry of Housing and Urban and Rural Development. The CERC targeted three technology areas for initial cooperation: advanced coal technology, building efficiency, and clean energy vehicles.

Dealing with IP Inside the CERC

Each CERC consortium has agreed upon and signed a contract that details the IP rules for participation. The IP contract is called a “Technology Management Plan” (TMP).²⁴

The TMP addresses the key issues related to IP protection in conjunction with international, collaborative research—namely, by attempting to remove the risk associated with sharing *existing* IP, as well as the uncertainty surrounding the creation of *new* IP.

The TMP vehicle was established after months of negotiation between American and Chinese lawyers and the involved government agencies. All participants involved in CERC activities are subject to the provisions of the TMP, and any new participants that join CERC consortia must agree to its terms.

The TMP was specifically designed to clarify the joint ownership of IP resulting from collaborative research activities and invented jointly by signatories to the CERC protocol from the United States and China. If the IP of a project is invented by signatories from one territory only, then the TMP requires that participants agree to negotiate in good faith terms a nonexclusive license to participants from the other territory. There are also provisions in the TMP that encourage the sharing of data and information with the public, except

when there is a need to preserve confidentiality associated with a given project.²⁵

If disputes over IP arise in the context of CERC activities, then the TMP includes provisions for how these are to be resolved.

The TMP also sets overarching guidelines for background IP and licensing terms, while leaving room for CERC participants to negotiate contractual details as needed. The TMP does not add any new IP protections that the law does not otherwise provide. But still, it plays an important role in establishing a clear framework surrounding the ownership and protection of IP rights.

If disputes over IP arise in the context of CERC activities, then the TMP includes provisions for how these are to be resolved. For example, CERC participants with IP-related disputes are first supposed to try to work out a mutually agreeable resolution. If such a resolution cannot be reached, then the dispute is brought to an

arbitral tribunal in accordance with the applicable rules of international law as set forth by the United Nations Commission on International Trade Law (UNCITRAL). (UNCITRAL deals with dispute resolution, international contract practices, transport, insolvency, electronic commerce, international payments, secured transactions, and the procurement and sale of goods, as relates to the facilitation of international trade and investment).²⁶

The inclusion of such a provision for dispute resolution is rare in collaborative research efforts, which typically leave any disputes to the individual laws of the relevant countries to resolve. In theory an international arbitrator that is perceived to be neutral is preferable to domestic courts where an impression of preferential treatment being given to the home country party is easily formed, whether or not such treatment is actually given. UNCITRAL is well positioned, in principle, to handle matters of IP contractual disputes (although it has yet to arbitrate a dispute from the CERC participants).

Seeing Results?

Since its inception in 2009, the CERC has produced some tangible measures of clean energy technology cooperation between its US and Chinese partners. It has engaged 132 businesses and research organizations on 58 joint projects to date, encompassing the shared expertise of over 1,000 scientists. More than 20 patents or invention

disclosures have been filed in the United States and even more have been filed in China. Over 400 scientific papers have been published, and over 20 commercial technology products or software tools have been created.²⁷

That is surely an impressive track record. But while the CERC is indeed producing inventions, it is not yet producing inventions that were jointly developed by US and Chinese participants, nor is it yielding IP rights that are jointly held by entities in both countries. That is because many of the inventions were developed by national CERC consortia members from academia, research institutes, and industry, but not necessarily jointly. In some cases, to be sure, the co-filing of patents in both China and the United States has at least been encouraged.

In recent discussions, almost all of the US commercial participants across the three consortia noted that one of the biggest advantages of participating in the CERC was to gain leverage for technology demonstration projects.²⁸ Many have invested their own money in the collaborations under the CERC, far in excess of government support, because public sector involvement provided leverage for project approvals, and many CERC collaborations were perceived to have current or future commercial value.

On the Chinese side, there has been a discernable focus on producing tangible metrics with potential commercial

value, such as patents. And that, in turn, reflects the incentives put in place by the Chinese government agencies running the CERC. Indeed, this is also evident in the large number of patents that have been filed by Chinese CERC participants in contrast with a smaller number of filings by US participants.²⁹

In November 2014, as part of a broader inter-governmental agreement through which both countries pledged to reduce carbon emissions, Obama and Xi announced that the CERC would be renewed and expanded for another five years from 2016-2020. Their agreement includes renewed funding for the three existing technology tracks, while also launching a fourth track focused on the “energy/water nexus.”³⁰

The TMP experience does have the potential to shed light on the question of how IP can be better managed to promote cross-national technology cooperation in the clean energy sector. Many CERC participants have reported, for example, that they had initially joined the initiative because they believed the IP framework could be beneficial to their continued work in China, although they did not expect the TMP to solve all of their IP challenges.

Several private companies involved with the CERC have mentioned tangible results from their participation, including new business ventures, and newly generated IP. By mid-2013, all of the CERC consortia had reported inventions and IP that originated from CERC R&D initiatives.

What Can We Learn—and Apply to IP—from the CERC?

Different forms of international collaboration have included diverse strategies to deal with IP rights. But as noted, providing clarity in rights allocations and rules has been shown to be crucial from the outset in any technology partnership. The TMP was designed to provide precisely this clarity. For this reason, even if the CERC is not yet meeting all of its expectations with respect to IP creation, it has been a useful first step from the standpoint of the consortia participants.

The TMP has at least put forth a potential model for protecting IP in collaborative clean energy agreements. And this could be

applied beyond this type of bilateral cooperation. The experience of the CERC provides useful lessons for crafting cross-border technology cooperation and could be adapted for other agreements, such as the following.

Bilateral Agreements

The TMP model could have relevance for other bilateral agreements. Take, for instance, the US-India Partnership to Advance Clean Energy (PACE). The PACE with India is similar to the CERC with China in its mission of “accelerating the transition to high-performing, low emissions, and energy-secure

economies” through “joint efforts to demonstrate the viability of existing clean energy technologies, as well as identify new technologies that can increase energy access and security.”³¹

And like the CERC, the PACE focuses on engaging the private sector, including both a research component funded by US DOE and the Indian Ministry of Science and Technology called the US-India Joint Clean Energy R&D Center (JCERDC, also referred to as PACE-R), along with an interagency deployment

component (PACE-D).

In fall 2012, under the first joint Funding Opportunity

Announcement between DOE and a foreign government, the US and Indian governments awarded funding to the three PACE-R consortia in the areas of solar energy, energy efficiency of buildings, and second-generation biofuels. DOE and the Indian government have each committed \$25 million over five years to support PACE-R, while private consortia members have pledged an additional \$75 million.

Despite PACE-R’s R&D component, it thus far lacks a TMP-like agreement, which may be one reason for its somewhat modest progress in producing

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tangible outcomes to date. Most of the PACE's activities, however, focus on capacity building, which is also likely due to the overall gap in technical capacity in the clean energy space between India and China.

The most recent PACE progress report notes that "during two years of collaborative work and cross-country cooperation and innovation, researchers from national laboratories, universities and industry have submitted approximately 100 papers to journals and proceedings," but does not mention any patent or invention disclosures as a result of the PACE-R research activities. As PACE-R expands its R&D focus, it may want to consider a TMP agreement in an attempt to alleviate IPR concerns between the United States and India.

Multilateral Agreements

Another area where IP rights has been a consistent obstacle to constructive action on clean energy technology transfer is in climate change negotiations. Global climate change negotiations have made progress in the area of technology transfer in general, but discussions on the role of IP have remained particularly divisive.³² Such a contentious debate has yielded a stalemate on how to address the IP issues when transferring technology in the context of climate change.

Years of technology transfer negotiations under the UN Framework Convention on Climate Change have

produced a Technology Mechanism consisting of two components: a Technology Executive Committee (TEC) and a Climate Technology Center and Network (CTCN). The TEC is an advisory body, while CTCN is the operational arm. However, both of these entities are still struggling to find a useful function. A virtual climate technology center has been established, comprised of "a network of institutions capable of responding to requests from developing countries related to climate technology development and transfer."³³ It can certainly be useful to strengthen the capacity of developing countries to identify technology needs, but implementing actual projects is far more difficult, not least because of poor IP protection regimes.

Patent landscaping studies demonstrate that clean energy patenting is dominated by a handful of industrialized countries. But when developing countries point this out, industrialized countries and their businesses often interpret this as "a push by emerging economies, such as China and India, to undermine their technological dominance to the benefit of Chinese and Indian firms, which are seeking to climb the technology ladder and boost their technological capacities."³⁴

Of course, several recent high-profile IP rights disputes, such as the AMSC/Sinovel lawsuit discussed above, further reinforce this concern. But for this very reason, the TMP could be integrated into the Technology Mechanism

to facilitate bilateral and perhaps multilateral low carbon technology transfer and cooperation.

Domestic Investment Regimes

A third area where some version of the TMP model could prove useful is where Chinese firms seek to invest directly in the American innovation engine and R&D ecosystem, including through early stage technology development and collaborative R&D partnerships with US firms. Chinese firms have participated in 115 energy deals in the United States to date, totaling \$12 billion.³⁵ But such investments remain contentious and are much debated.

Many have noted, for example, increasing concerns about a lack of reciprocity to markets in China, and further complain that Chinese firms receive unfair advantages in global competition.³⁶ In the United States, there have been calls to expand the scope of CFIUS, or to establish new regimes that would have the practical and functional effect of blocking certain forms of Chinese investment.³⁷

It is increasingly evident, therefore, that resolving these concerns will be essential to the future of the US-China investment relationship. To the extent that IP concerns are at the core of many of these US concerns and complaints, an expanded TMP-type agreement could play a broader role in creating an environment more conducive to Chinese investment in the United States, particularly in high-tech sectors.

As bilateral technology partnerships expand, it will be essential to deal head-on and forthrightly with IP issues and their implications for competition policy. The TMP model could serve as one useful way to navigate some of these concerns. All of the above suggestions would require further examination in the context of specific business models, but they can at least serve to provide some concrete illustrations of how a model for IP management may be emerging from the CERC and could ultimately be applied to a broader range of IP-focused collaborative ventures, including but not limited to China.

Endnotes

¹ According to BNEF, clean energy investment in China was up 32% to a record \$89.5 billion, and in the US was up 8% to \$51.8 billion (its highest figure since 2012). BNEF, “Rebound in Clean Energy Investment in 2014 Beats Expectations,” Bloomberg New Energy Finance, January 9, 2015, <http://about.bnef.com>.

² “OECD Patent Database,” Organization for Economic Co-operation and Development, 2013, <http://stats.oecd.org>.

³ Becker, Wolfgang and Juergen Peters, “Innovation Effects of Science-Related Technological Opportunities-Theoretical Considerations and Empirical Findings for Firms in the German Manufacturing Industry,” Discussion Paper Series (Universitaet Augsburg, Institute for Economics, 2002), <http://ideas.repec.org/p/aug/augsbe/0226.html>; Camagni, Roberto, “Inter-Firm Industrial Networks,” *Journal of Industry Studies* 1, no. 1 (1993): 1–15; Robertson, Paul L. and Richard N. Langlois, “Innovation, Networks, and Vertical Integration,” *Research Policy* 24, no. 4 (July 1995): 543–62.

⁴ Lewis, Joanna I., *Green Innovation in China: China’s Wind Power Industry and the Global Transition to a Low-Carbon Economy*. (New York: Columbia University Press, 2013).

⁵ Simon, Denis Fred, “China’s New S&T Reforms and Their Implications for Innovative Performance,” Washington, D.C.: Testimony before the US-China Economic and Security Review Commission, May 10, 2012, <http://www.uscc.gov/sites/default/files/5.10.12Simon.pdf>.

⁶ “State Council Decision on Accelerating the Development of the Strategic Emerging Industries (国务院关于加快培育和发展战略性新兴产业的决定: 国发2010, 32号),” State Council, October 18, 2010, http://www.gov.cn/zwggk/2010-10/18/content_1724848.htm.

⁷ Lewis, Joanna I., “The Rise of Renewable Energy Protectionism: Emerging Trade Conflicts and Implications for Low Carbon Development,” *Global Environmental Politics* 14, no. 4 (2014).

⁸ Lewis, *Green Innovation in China: China’s Wind Power Industry and the Global Transition to a Low-Carbon Economy*.

⁹ Ibid.; American Superconductor Press Release, “AMSC Issues Update Regarding Its Anticipated Fourth Quarter and Fiscal Year 2010 Financial Results,” April 5, 2011, www.amsc.com.

¹⁰ Beyer, Justin K., “AMSC/Sinovel Industrial Espionage Thriller Takes a Procedural Detour, Threatening US Criminal Prosecution | Lexology,” Lexology, September 9, 2013, <http://www.lexology.com/library/detail.aspx?g=c06d91c6-1d63-4fb0-a1a7-d803bf90ef60>.

¹¹ Doom, Justin, “China Supreme Court Ruling Favors AMSC in Two Sinovel Suits,” *Bloomberg*, February 20, 2014, <http://www.bloomberg.com/news/2014-02-19/china-supreme-court-ruling-favors-amsc-in-two-sinovel-suits-1-.html>.

¹² McKenna, John, “US Issues IP Theft Charges against Sinovel Totaling \$4.8 Billion,” *Windpower Monthly*, June 28, 2013, <http://www.windpowermonthly.com/article/1188128/us-issues-ip-theft-charges-against-sinovel-totaling-48-billion>.

¹³ Lifang and Partners, “China’s Supreme Court Decides in Favor of AMSC on Jurisdictional Matters,” Lexology, February 26, 2014, <http://www.lexology.com/library/detail.aspx?g=935dfb7-7287-419d-8cca-c98e5f9b8a3c>.

¹⁴ Lee, Andrew, “\$450m AMSC-Sinovel IP Case Gets China Court Date,” Rechargenews.com, April 24, 2015, <http://www.rechargenews.com/wind/1397912/usd-450m-amsc-sinovel-ip-case-gets-china-court-date>.

¹⁵ “China’s Sinovel to Divest Overseas Units After US Indictment,” *Bloomberg*, July 1, 2013, <http://www.bloomberg.com/news/2013-07-01/china-s-sinovel-to-divest-overseas-units-after-u-s-indictment.html>.

¹⁶ Chenxi, Wang and Mao Pengfei, “Sinovel Investigated for Second Time in Eight Months,” *Windpower Monthly*, January 13, 2014, <http://www.windpowermonthly.com/article/1226815/sinovel-investigated-second-time-eight-months>.

¹⁷ Qi, Wu “Sinovel Loses Second Chairman in Two Months,” *Windpower Monthly*, May 14, 2013, <http://www.windpowermonthly.com/article/1182220/sinovel-loses-second-chairman-two-months>.

¹⁸ Jianxiang, Yang and Patrick Smith, “Sinovel Bonds Suspended on Second Yearly Loss,” *Windpower Monthly*, April 30, 2014, <http://www.windpowermonthly.com/article/1292454/sinovel-bonds-suspended-second-yearly-loss>.

¹⁹ Kessler, Richard A., “AMSC-Sinovel Legal Row Still a Focus for US, China-McGahn,” Rechargenews.com, February 9, 2015, <http://www.rechargenews.com/wind/1391130/amsc-sinovel-legal-row-still-a-focus-for-us-china-mcgahn>.

²⁰ Lewis, Joanna I., “Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration: The Case of the US–China Clean Energy Research Center,” *Energy Policy* 69 (June 2014): 546–54.

²¹ US Department of Energy (DOE), Ministry of Science and Technology (MOST), and National Energy Administration (NEA), US-China Clean Energy Research Center (CERC) Protocol, November 17, 2009, in English: http://www.us-china-cerc.org/pdfs/US/US_China_CERC_Protocol_and_IP_Annex_English_17_Nov_2009.pdf; Chinese: http://www.us-china-cerc.org/pdfs/China/US_China_CERC_Protocol_and_IP_Annex_Chinese_17_Nov_2009.pdf.

²² Marlay, Robert C., “US-China Clean Energy Research Center Overview, US Department of Energy,” June 2011.

²³ Ibid.

²⁴ DOE, MOST, and NEA, “US-China Clean Energy Research Center Technology Management Plans (TMPs),” US-China CERC, 2011, http://www.us-china-cerc.org/Intellectual_Property.html#tmps.

²⁵ Baird, Stacy, “The CERC TMP and Project Contracts, Presented at the First Joint Workshop on Intellectual Property in the US-China Clean Energy Research Center,” CERC IP Workshop, Haikou, China, March 5, 2012, http://www.us-china-cerc.org/participants/downloads/IPWorkshop_BAIRD_Stacy.pdf.

²⁶ United Nations Commission on International Trade Law, “About UNCITRAL,” UNCITRAL, 2015, http://www.uncitral.org/uncitral/en/about_us.html.

²⁷ US-China CERC 2013-2014 Annual Report, MOST and DOE 2014, http://www.us-china-cerc.org/CERC_Annual_Report_2013-2014.html.

²⁸ Lewis, Joanna I., “First Joint Workshop on Intellectual Property in the US-China Clean Energy Research Center,” Haikou, China: Prepared for the US-China Clean Energy Forum and DOE, June 2012, http://www.us-china-cerc.org/pdfs/2012_03_CERC_IP_Conference_Report.pdf.

²⁹ Lewis, “Managing Intellectual Property Rights in Cross-Border Clean Energy Collaboration.”

³⁰ “US-China Joint Announcement on Climate Change,” White House Press Office, November 12, 2014, <http://www.whitehouse.gov/node/307541>.

³¹ “US-India Energy Cooperation,” DOE 2015, <http://energy.gov/ia/initiatives/us-india-energy-cooperation>.

³² Abdel-Latif, Ahmed, “Intellectual Property Rights and the Transfer of Climate Change Technologies: Issues, Challenges, and Way Forward,” *Climate Policy* 15, no. 1 (January 2, 2015): 103–26, doi:10.1080/14693062.2014.951919.

³³ “Climate Technology Centre and Network,” UNFCCC 2014, http://unfccc.int/ttclear/templates/render cms_page?TEM_ctcn.

³⁴ Abdel-Latif, “Intellectual Property Rights and the Transfer of Climate Change Technologies.”

³⁵ “Chinese Investment Monitor,” Rhodium Group 2015, <http://http://rhg.com/interactive/china-investment-monitor>.

³⁶ Rosen, Daniel H. and Thilo Hanemann, *High-Tech: The Next Wave of Chinese Investment in America*, Rhodium Group and Asia Society, April 2014, <http://rhg.com/reports/high-tech-the-next-wave-of-chinese-investment-in-america>.

³⁷ Ibid.

About The Paulson Institute

The Paulson Institute, an independent center located at the University of Chicago, is a non-partisan institution that promotes sustainable economic growth and a cleaner environment around the world. Established in 2011 by Henry M. Paulson, Jr., former US Secretary of the Treasury and chairman and chief executive of Goldman Sachs, the Institute is committed to the principle that today's most pressing economic and environmental challenges can be solved only if leading countries work in complementary ways.

For this reason, the Institute's initial focus is the United States and China—the world's largest economies, energy consumers, and carbon emitters. Major economic and environmental challenges can be dealt with more efficiently and effectively if the United States and China work in tandem.

Our Objectives

Specifically, The Paulson Institute fosters international engagement to achieve three objectives:

- To increase economic activity—including Chinese investment in the United States—that leads to the creation of jobs.
- To support urban growth, including the promotion of better environmental policies.
- To encourage responsible executive leadership and best business practices on issues of international concern.

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The Institute's programs foster engagement among government policymakers, corporate executives, and leading international experts on economics, business, energy, and the environment. We are both a think and "do" tank that facilitates the sharing of real-world experiences and the implementation of practical solutions.

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