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Introduction

I am honored to be here today as this Committee discusses how clean technology can help achieve global climate solutions -- and how intellectual property rules can either facilitate or hinder the availability of innovative technologies in the developing world.

My testimony today will make the case that concerns about intellectual property rules are solvable problems that need not get in the way of strong climate policy. U.S. climate legislation will be a driver of technology innovation, which U.S. companies will be able to export as well as use at home, without compromising intellectual property protection. In the UN negotiations so far, intellectual property discussions display strong rhetoric but limited analytical basis. We need to continue monitoring developments for problems that may arise on either side of the debate – potential barriers to technology access, and potential infringements of IPR rights. Finally, cooperative approaches to technology development are a promising avenue to explore.

I. The most important driver of U.S. technology development and U.S. competitiveness is a strong domestic climate policy

This is a hearing about intellectual property rights, but really, I think we are talking about our economic competitiveness. The concern I hear, at a very basic level, is that we should not share our own clean tech overseas because our competitors might get ahead by stealing our secrets.

If only it were that easy. The truth is that while the integrity of our intellectual property is obviously important, our economic competitors don't need to steal our ideas to outcompete us in the new energy economy. They can do it in the standard way: our competitors can simply seize the opportunity first.

Demand for low-carbon technologies is soaring, globally, helped by policy decisions in the European Union, Japan, China, India, and other nations to cut pollution, increase energy security, and even gain advantage in new markets. At home, however, we're still debating the role we're going to play in this new economy. Are we going to adopt a cap on carbon, stimulating enormous domestic demand for the technologically advanced products that American firms are well-positioned to produce? Or are we going to sit on that idea for a few more years, and let our competitors use the time to open up an insurmountable lead in the race to supply the low-carbon economy?

Three years ago, New York Times columnist Thomas Friedman reported that China's seventh-richest man—Shi Zhengrong, a gentleman worth $1.43 billion—runs Suntech, a company that makes silicon photovoltaic solar cells. One of China's richest citizens is a low-carbon entrepreneur! As Mr. Friedman wrote at the time, "It should only happen in America."

The story on Mr. Shi wasn't a fluke. During 2008, China became the world's largest solar panel producer in the world, with 95 percent of its production destined for the export market.[1] Suntech, with a market capitalization of $3.6 billion, is now China's largest solar module producer.[2]

And what about intellectual property (IP) in this area, during that time? The following chart says it all:

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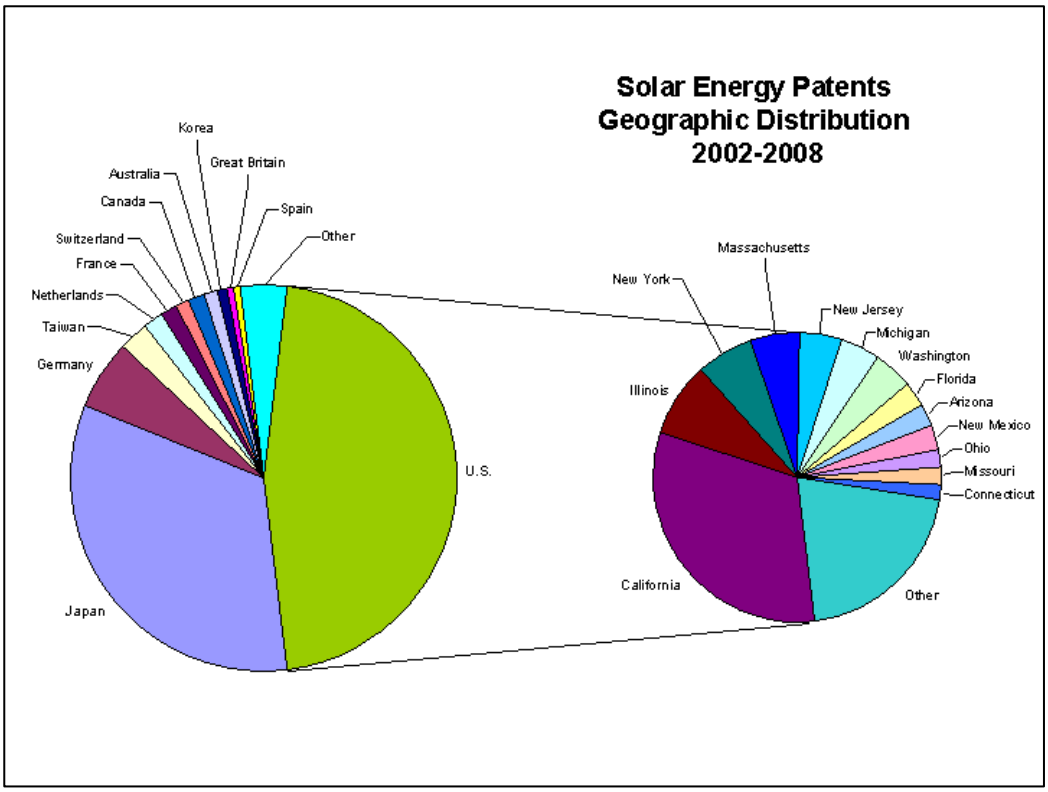
[1] United Nations Environmental Programme 2008, available for purchase at www.unep.org/publications/Annual_Reports.asp.

[2] www.forbes.com/2009/07/16/china-green-energy-business-energy-china.html.



Source: Clean Energy Patent Growth Index, 4th Quarter, 2008, available at http://cepgi.typepad.com/heslin_rothenberg_farley

From 2002-2008 the United States led the world in solar energy patents. But our market share of production? About 9 percent as of last year. This isn't about IP theft: Japan, with about a third of the total patents, locked up over a third of the solar market production during the same period of time. Europe has about 28 percent of the market share, with a slightly smaller representation in patent filings.[3] Our good ideas just aren't translating into market share.

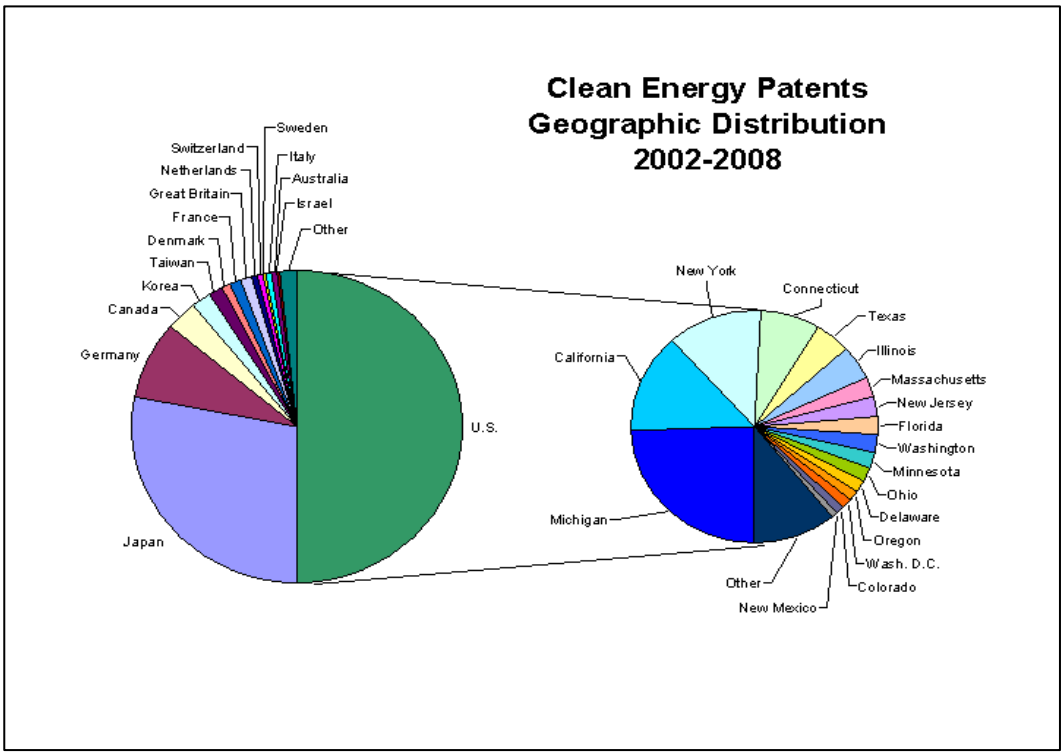
Recognizing that any market, including the clean tech market, is complicated, and that more than one factor goes in to a pattern like this, it's safe to say that the demand for these products is elsewhere, and so is the production. Since 2005, the United States has dropped from third to fifth in total global solar production. Nine of the ten largest photovoltaic manufacturers are foreign companies.[4] Our competitors are not beating us by stealing our ideas. Indeed,

[3] http://www.earth-policy.org/Indicators/Solar/2007.htm, and Clean Energy Patent Growth Index, http://cepgi.typepad.com/heslin_rothenberg_farley_/.

[4] www.earth-policy.org/Indicators/Solar/2007.htm.

intellectual property disputes in this area are infrequent, so far. They're beating us the old fashioned way, by investing in production and seizing market share.

I've used the solar industry to make the point, but to be clear, this is not an isolated circumstance in which we have the ideas but not the economic edge. At the aggregate level in the clean tech sectors, which include wind, solar, fuel cells, geothermal, and other clean renewable energy technologies, the picture is even starker. As the following picture shows, we clearly dominate the field in intellectual capital not just in the solar industry, but in the clean energy sector as a whole:



Source: Clean Energy Patent Growth Index, 4th Quarter, 2008. www.cepgi.com

Time and space do not permit me to break down each industry, but the trend represented by the solar industry example persists. We lag in these key areas, where our competitors are making big investments, while we struggle with a course of action. Valid concerns about IP do exist in some areas, and these must of course be addressed. But to focus on IP issues at the expense of the bigger picture—our failure to provide incentives crucial to developing a market for our domestic entrepreneurs—is to miss the forest for the trees. Intellectual property disputes in the clean tech area are not numerous; the sector doesn't compare to, say, pharmaceuticals with respect to IP disputes. It's much more that our competitors are making decisions—sometimes

controversial, but decisions nonetheless—that are boosting their production capacity, driving down prices, and capturing market share that will be difficult for us to regain. It's a classic story, albeit one in which our nation has traditionally been the victor.

We, too, need to make some decisions. The incentive we are lacking is the clear policy signal that tells our entrepreneurs, our venture capitalists, our innovators, our market leaders that it's time to put their money down and invest the intellectual and material capital in reducing greenhouse gas emissions. This is not a problem that many of our chief economic competitors still have. Just to give you a sense of it: a little more than a year ago, China announced plans for 30 gigawatts of wind capacity by 2020.[5] Far from lagging on its ambitious goals, it appears that China will meet that goal far ahead of schedule – by the end of 2010.[6]

The companies in the countries we will have to catch up to are capitalizing on the rapidly increasing demand in Europe and Asia. They are building production at home, and doing business both at home and with our competitors. Suntech, the Chinese company I mentioned earlier, makes 90 percent of its product for export. India's Suzlon Corporation, one of the leading wind energy manufacturers in the world, makes its turbines for China and Europe. Where are our exporters? Back in the pack. Not where they should be.

Since signing the Kyoto Protocol in 1997, Europe and Japan have increased the number of clean-tech patents at a rate of 9 percent per year. There was no such increase in the United States, which has not ratified the Protocol, nor in Australia, which waited until 2007 to do so.[7] At home, until the President signs cap and trade climate legislation into law, we lack the clear market signal that creates innovation.

This isn't a theoretical possibility; we have seen it work before, in the case of the sulfur dioxide emissions that cause acid rain. Once we started requiring utilities to reduce their

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[5] http://blogs.wsj.com/environmentalcapital/2009/07/06/wind-power-chinas-massive-and-cheap-bet-on-wind-farms/.

[6] http://www.nytimes.com/2009/07/03/business/energy-environment/03renew.html?_r=2&pagewanted=2&ref=business .

[7] Dechezleprêtre, et al. Invention and Transfer of Climate Change Mitigation Technologies on a Global Scale: A Study Drawing on Patent Data. CERNA Research Programme on Technology Transfer and Climate Change, February 6, 2009.

emissions, the number of pollution control patents increased dramatically.[8] We gave innovation another shot in the arm when we adopted the path-breaking cap-and-trade system for sulfur dioxide in the 1990s. That program demanded results without restricting the technological means to achieve them. The result was to redirect R&D towards scrubbers that removed more pollution, while giving electric utilities a strong economic incentive to adopt more cost-effective scrubbers.[9] In many cases, the biggest changes spurred by cap-and-trade were not patented technologies at all, but process innovations that cut pollution at much lower cost than anyone had expected.[10]

Just a few weeks ago, John Doerr, a giant in the venture capital world and no stranger to the world of intellectual property, said this before the Senate Environment and Public Works Committee:

> "What do Amazon, Ebay, Google, Microsoft and Yahoo have in common? They are the five worldwide leaders in internet technology and they are all American. But when it comes to wind, the most mature of the clean energy sectors, of the top five manufacturers (Vestas, GE, Gamesa, Enercon and Suzlon) – only one is American.
>
> In a broader context, the U.S. is now home to only one of the ten largest solar PV producers in the world, one of the top ten wind turbine producers and two of the top ten advanced battery manufacturers. . .
>
> I am here to tell you that our government's energy and climate policies are our principal obstacle to success. To repeat: Our nation's current policies are the principal obstacle to creating even more new jobs in the next great industry, clean technology.
>
> - We have no long term market signal that tells companies and consumers that we value low carbon energy.
> - We have no policies to discourage sending hundreds of billions of dollars a year overseas for energy.

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[8] Margaret R. Taylor, Edward S. Rubin, and David A. Hounshell, *Effect of Government Actions on Technological Innovation for SO_2 Control*, Environmental Science and Technology 37(2): 4527-4534 (2003), available at http://pubs.acs.org/doi/abs/10.1021/es034223b.

[9] David Popp, *Pollution control innovations and the Clean Air Act of 1990*, Journal of Policy Administration and Management, 22(4): 641-60 (Fall 2003); Nathaniel O. Keohane, *Environmental Policy and the Choice of Abatement Technique: Evidence from Coal-Fired Power Plants*,, working paper (2005).

[10] Dallas Burtraw, *Innovation Under the Tradable Sulfur Dioxide Emissions Permits Program in the U.S. Electricity Sector*, Resources for the Future Discussion Paper 00-38 (September 2000).

> • We do not have adequate sustained R&D to be a serious competitor in this huge business.
>
> Believe me, today's policies stifle American innovation and competitiveness. But good policy can flip this dynamic around, and give our country and companies a fighting chance in the new global energy economy."[11]

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Doerr doesn't mention intellectual property.

II. National and International Regimes for Enforcement of Intellectual Property Rights

Of course, in some circumstances, IP protection is a central concern: it can be difficult for a firm to justify making costly investments to achieve technological breakthroughs if one's competitors can immediately exploit the resulting innovations. To solve this problem, the U.S. and most other countries have created national patent, copyright, trademark, and trade secret laws to enable inventors, authors, and other IP developers to enjoy certain exclusive rights in their creations. These laws give IP owners a limited set of exclusive rights, such as a 20-year term of protection for patentable inventions. And the national laws of most countries are woven together in a framework of international conventions, many of which are administered by the World Intellectual Property Organization (WIPO), based in Geneva.

Starting about 20 years ago, IP owners in developed countries led a successful effort to incorporate minimum IP standards into international trade agreements. The result was the 1994 Agreement on Trade-Related Aspects of Intellectual Property ("TRIPS"), which requires all members of the World Trade Organization ("WTO") to enact laws with relatively high certain levels of IP protection. Because membership in the WTO is important to countries that want to enjoy the benefits of low trade barriers for their own exports, the incorporation of TRIPS into the WTO has had a substantial impact on adoption of IP legal regimes.

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[11] Statement of John Doerr before the U.S. Senate Committee on Environment & Public Works, *Ensuring and Enhancing U.S. Competitiveness while Moving toward a Clean Energy Economy* (July 16, 2009).

The TRIPS Agreement sets minimum standards of protecting copyrights and related rights, trademarks, geographical indications, industrial designs, patents, integrated circuit layout designs, and undisclosed information. It also sets minimum standards for enforcement of IP property rights through civil suits, border actions, and, in some cases, criminal prosecution. By virtue of their membership in the WTO, more than 150 nations are also parties to the TRIPS Agreement. Among major GHG emitters, only Russia has yet to join the WTO. TRIPS does, however, give developing countries a period of time to bring their laws into compliance. TRIPS also allows countries to bring enforcement actions in the WTO against other countries for violation of their TRIPS obligations.

In the United States, Congress has directed the U.S. Trade Representative to seek to protect the IP rights of American companies by, among other things, publishing a "Watch List" and a "Priority Watch List" of countries in which piracy of IP is widespread.

III. How the House Climate Bill Deals with Clean Tech for Developing Countries

It is strongly in our national interest to help the developing world reduce its greenhouse gas emissions. All the countries of the world share a single atmosphere, and only with large reductions from all major emitters can the world avoid the most dangerous consequences of climate change. Ultimately, the cuts in emissions must be large, and collective.

Once America puts a cap on carbon, we can expect U.S. firms to play a leading role in developing low-carbon solutions for our own economy. The solutions will include both business innovations (such as third-party financing of energy efficiency) and technological breakthroughs (such as finding ways to get more kilowatts out of an hour of sunlight). And American firms can play a critical role in ensuring that developing countries have the tools they need to reduce their own emissions. Putting a price on carbon emissions in the developing world will create business opportunities both in those countries and for American firms that can help solve problems both here and there.

In crafting H.R. 2454, the American Clean Energy & Security Act, the House recognized the value of the United States helping developing countries reduce their heat-trapping gas emissions. Among other things, the bill allocates a small number of emissions

allowances to "international clean technology deployment." At the same time, the House bill calls on the Administration to ensure continued protection of the IP rights of American firms.[12]

IV. Do IP Rules Need to be Modified to Encourage Developing Countries to Reduce Emissions?

As developed countries have pushed for stronger protection of IP rights under international agreements, some developing countries, as well as some scholars (such as Prof. Joseph Stiglitz),[13] have criticized this trend. The biggest flashpoint has been pharmaceuticals, such as drugs for treating HIV/AIDs. While IP rights owners stress the need for exclusive rights to justify the high costs of research and development, critics have attacked pharmaceutical companies for insisting on pricing life-saving drugs at levels that are beyond the reach of most people in developing countries. In 2001, the WTO Ministerial Conference issued the Doha Declaration on the TRIPS Agreement and Public Health, which confirmed that developing countries have flexibility under TRIPS to take necessary steps to protect public health in their countries, including compulsory licensing in appropriate cases.

In the global climate discussions, some developing countries and various observers have raised concerns about IP barriers to their access to technologies for emissions reductions and adaptation, and likened the situation to that of essential medicines. There are, however, major differences between pharmaceuticals and low-carbon technology. On the pharmaceutical side, life-saving drugs are typically protected by patents, not only in developed countries like the United States but also in most or all developing countries. And these products often have no substitutes: there may be only one drug that can provide the medical benefit.

By contrast, many of the tools necessary to reduce carbon emissions and adapt to a warmer planet are not leading-edge, unique solutions, but existing technology unprotected by patents even in the developed world. To the extent there are patents on the relevant tools in developed countries, they usually cover "add-on" technologies, and there are often a variety of

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[12] H.R. 2454 at 1219 (Section 444, "Determination of Eligible Countries"). The "findings" and "purposes" sections of Subtitle D, "Exporting Clean Technology," also strongly urge protection of IP. H.R. 2454 at 1212 (Section 441) (findings), and at 1216 (purposes).

[13] Joseph Stiglitz, *Scrooge and intellectual property rights* (1996), available at www.bmj.com/cgi/content/full/333/7582/1279.

different companies offering similar products. Finally, according to a recent study (discussed below), firms often do not even apply for patent protection in developing countries, presumably because the benefits are not seen as worth the cost, and therefore the firms could not enforce rights they had not acquired.

Energy experts tell us that, unlike for some diseases, there is no single technical fix (or "miracle drug") that will result in a massive reduction in carbon emissions, whether in the United States or abroad. Rather, as the famous "wedges" analysis by Professors Socolow and Pacala shows, there are many different steps that people and businesses will need to take to reduce their carbon emissions.[14]

At the broadest level, there are three principal ways of reducing greenhouse gas concentrations in the atmosphere: (1) improving energy efficiency, (2) generating energy in ways that produce fewer (or no) carbon emissions, and (3) sequestering carbon in plants or the soil.

The first – energy efficiency – is not usually a high-tech proposition; rather, the task is typically to put up insulation, caulk air holes, install more efficient windows, use more efficient heating and cooling equipment, install more efficient appliances and lighting, install programmable thermostats and motion sensors, paint roofs white, and the like. Few, if any, of these activities require IP licenses. Nor, unlike HIV/AIDS medications, do the prices of the relevant products (such as insulation material or energy-efficient furnaces) reflect substantial IP components. It seems unlikely, therefore, that IP protection is a significant barrier to adoption of energy efficiency in developing countries. That does not mean there are no barriers to energy efficiency in the developing world – and it is in our interests to help overcome the real barriers that do exist. (One important way is through collaborative development.) The point here is simply that IP rights do not appear to be significant obstacles in this area at this time.

The second way of reducing emissions – clean energy production – likewise does not appear to be significantly hemmed in by patent protection. Many companies in different countries compete to offer the equipment needed to generate energy using photovoltaic (PV) solar, concentrating solar, wind turbine, and geothermal technology. In the most recent year for which data are available, at least 20 different firms, scattered in many countries, competed to sell

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[14] S. Pacala and R. Socolow, *Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies*, Science, Vol. 305, at 968 (2004).

wind turbines.[15] And a recent market research study found 47 different companies manufacturing solar panels.[16] When a technology depends crucially on a single patent – such as for a drug to treat HIV/AIDS – this does not happen. And in looking at these industries, Wall Street analysts, like John Doerr in his testimony, typically do not mention IP as a limiting factor.[17] The analogy to pharmaceuticals – where a single pharmaceutical company may sell a unique life-saving product at a price far in excess of the costs of producing and distributing the drug – therefore appears weak.

To be sure, some cutting-edge clean energy technologies may, over time, raise concerns about whether IP protection is a barrier to widespread adoption of a clean energy technology. Some have raised concerns that capturing carbon dioxide at power plants and factories, and burying it underground – carbon capture and sequestration, or CCS – could be one such area. And others have raised concerns that broad patent claims on synthetic biology products could stymie the development of cellulosic biofuels. Those concerns appear speculative at this point, however: CCS can be implemented at this stage using a variety of competing tools and techniques, and commentators raising concerns about biofuels do not cite actual enforcement efforts.

Finally, the third tool – sequestering carbon in farms and forests -- similarly appears to pose few IP constraints. The House bill, H.R. 2454, includes in Section 503, a list of potential agricultural offset activities. A review of that list reveals few, if any, activities that raise IP issues. To our knowledge, there are no exclusive rights, for example, in planting more trees, flooding rice paddies less often, or using less fertilizer.

Because some degree of climate change is inevitable even if the world takes immediate steps to reduce carbon emissions, both developed and developing nations will need strategies and

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[15] Environmental Leader, *Wind Turbine Market Share Revealed*, www.environmentalleader.com/2009/03/05/wind-turbine-market-share-revealed/.

[16] Photovoltaic Reports, *Worldwide Solar Cell Manufacturing Facilities & Production Capacity 2007 – 2013* (August 2008), summarized at www.photovoltaics-reports.com/products/fuji71793-solar-cell.html.

[17] *E.g.*, Seeking Alpha, *Solar Stocks: Citi Says Still Too Early to Buy* (2009), http://seekingalpha.com/article/124616-solar-stocks-citi-says-still-too-early-to-buy (summarizing Citigroup report); Economic Times, *Merrill Lynch puts Rs 103 target on Suzlon* (2009), http://economictimes.indiatimes.com/Markets/Stocks/Stocks-in-News/Merrill-Lynch-puts-Rs-103-target-on-Suzlon/articleshow/4210768.cms.

technologies for adaptation to climate change's effects. In some instances, these methods may raise IP issues (e.g., specially-engineered crop varieties). In most cases, though, it appears that adaptation will require financial and human resources, and currently available technologies, to a much greater extent than protected IP. For example, the major ways of adapting to change in agriculture, forestry, and fisheries include changing sowing dates, planting different species, adding irrigation systems, managing forest fires, and using different inputs (such as changing fertilizer or field operations).[18] These methods seldom implicate patented technology.

In addition, it's important to remember that patents, unlike copyrights, can generally be obtained only by pursuing a time-consuming and often costly application process in each individual country. Thus, unless an inventor has taken the necessary steps to obtain a patent in a particular country, he or she will have no patent rights to enforce there. A recent study requested by the European Commission, in which the authors looked for patents relating to seven emissions-reducing energy technologies, concluded:

> "[P]atent rights can not possibly be an obstacle for the transfer of climate change technologies to the vast majority of developing countries: there are hardly any patents on these technologies registered in these countries. A relaxation of the property rights regime for the relevant technologies in these countries would not improve technology transfer to these countries."[19]

To date, therefore, there is not a substantial body of evidence of current IP barriers to development of clean energy, implementation of energy efficiency, or deployment of adaptation responses in developing countries. That could change, of course, and perhaps proponents of altering IP arrangements for climate-friendly technology will make a stronger case in the future. Should a new "must have" technology emerge, some fraction of the funds available under H.R. 2454 to help developing countries reduce their carbon emissions could be used to acquire necessary IP rights in the marketplace.

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[18] FAO International Working Group on Climate Change, *Adaptation to climate change in agriculture, forestry and fisheries: Perspective, framework and priorities*, available at ftp://ftp.fao.org/docrep/fao/009/j9271e/j9271e.pdf.

[19] Copenhagen Economics A/S and The IPR Company Aps , *Are IPR a Barrier to the Transfer of Climate Change Technology?* (Jan. 2009) (commissioned by the European Commission), available at www.eurosfaire.prd.fr/7pc/doc/1236588421_climate_change_ipr.pdf.

Finally, it is difficult to reconcile the contention that IP rights are blocking development of clean energy technology with China's extraordinary progress over the past few years in developing wind and solar power. According to a recent *New York Times* article, "China has built the world's largest solar panel manufacturing industry" and is "now building six wind farms with a capacity of 10,000 to 20,000 megawatts apiece."[20] To put this in perspective, as of April 2009, the entire state of Texas had about 8,000 megawatts of wind capacity.)

V. Intellectual Property and Technology Transfer in the UN Climate Negotiations

IP rights issues arise frequently in the UN climate negotiations, in the context of technology transfer to developing countries. In the most basic terms, developing nations need help from industrialized nations to accelerate their transition to low-carbon economies -- and industrialized nations may be reluctant to share their most promising technological developments on terms they fear will lead to IP losses.

Disagreement on how to address IP rights ("IPR") has the potential to significantly impede the negotiations, in part because of spillover from earlier disputes over costly medicines, and also because of the prominence of the broader issue of tech transfer, of which IPR is but a part. Indeed, the issue of tech transfer is central to resolving negotiations on a global climate agreement that is itself instrumental to effectively reducing global emissions and averting dangerous climate change. Fortunately, this issue can be addressed in a way that helps the developing countries reduce their emissions and creates market opportunities for our innovative companies without compromising their intellectual property.

First, what do we mean by "technology transfer"? There is no single definition, but it is generally understood to refer to the transfer of systematic knowledge for the manufacture of a product, for the application of a process, or for the rendering of a service.[21] Importantly, it refers not just to the physical sharing of a given technology's hardware, but also more broadly to the process of ensuring that those on the receiving end have the skills and know-how to effectively

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[20] Keith Bradsher, *China Builds High Wall to Guard Energy Industry*, New York Times, (July 13, 2009), available at www.nytimes.com/2009/07/14/business/energy-environment/14energy.html.

[21] Draft International Code on the Transfers of Technology, 1985. http://stdev.unctad.org/compendium/documents/totcode%20.html.

use the technology and scale it up within their country. Thus, capacity building, training, and access to technical information about the technology are as important as financing acquisition of the hardware itself, or access to its IPR.

From most developing countries' perspective, the world is long overdue in addressing tech transfer for climate change. Since 1992, in the UN Framework Convention on Climate Change (UNFCCC) itself, developed countries – including the United States – committed to "take all practicable steps to promote, facilitate and finance, as appropriate, the transfer of, or access to, environmentally sound technologies and know-how" to developing countries, and to "support the development and enhancement of [their] endogenous capacities and technologies."[22] The Kyoto Protocol, agreed in 1998, echoes this commitment.[23] Parties have taken decisions to promote the development and transfer of environmentally sound technologies at each annual Ministerial meeting, but over the years little has in fact been done to fulfill that commitment.

Tech transfer to developing countries was in fact a primary purpose of the Kyoto Protocol's Clean Development Mechanism (CDM). The CDM allows a developed country (or regulated entity within it) to satisfy its own emissions reduction obligation by financing emissions reduction projects in developing countries that lack emissions reduction obligations of their own. The CDM has not, unfortunately, lived up to expectations. Establishing whether, on a project-by-project basis, certain activities indeed reduce emissions below what would otherwise have happened has been cumbersome. Also, while many CDM projects have served a useful purpose, they have managed to deliver neither emissions reductions nor clean technology at anywhere near the scale required, and they have mostly been limited to a small number of countries (China, India, Brazil, and South Africa). Especially going forward, when all major emitters need to contribute equitably to addressing climate change, new mechanisms and incentives must be developed for the major GHG-emitting developing countries. Governments are currently debating exactly these questions, as CDM reform is one element of the UN climate negotiations.

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[22] UNFCCC Article 4.5.

[23] Kyoto Protocol Article 10.c

Technology transfer's centrality to the Copenhagen climate negotiations is by virtue of it being one of the four "pillars" of the Bali Action Plan, the negotiating roadmap that countries agreed to in December 2007. The Bali Action Plan calls for negotiations on the issues of i) mitigation (emissions reductions), ii) adaptation to the effects of climate change, iii) technology transfer, and iv) financing of mitigation, adaptation, and tech transfer for developing countries. In particular, it calls for enhanced action on technology development and transfer, including "effective mechanisms and enhanced means for the removal of obstacles to, and provision of financial and other incentives for, scaling up of the development and transfer of technology to developing country Parties," as well as "[w]ays to accelerate deployment, diffusion and transfer of affordable environmentally sound technologies."[24]

Most of the current focus in the UN negotiations is on how to accomplish tech transfer, through financing and other means. So far the bulk of proposals on finance have come from developing countries. This has contributed to tension between the factions, with developing countries objecting that they are being pressed to address the top concern of industrialized nations, namely direct emissions reductions, without those industrialized nations' serious engagement in return on the developing countries' top priorities. To complicate things further, developed countries are being pressed for financing and other assistance in the face of the worst global economic crisis in decades. Despite these challenges, however, there have recently been encouraging signs of progress. Developed countries participating in the U.S.-led Major Economies Forum (MEF, consisting of the 17 major GHG emitters, both developed and developing) have engaged more seriously on financing issues. And President Obama, host of the upcoming G-20 finance ministers' meeting in Pittsburgh in September, has called on the G-20 to bring climate financing proposals to that forum, filling a void in industrialized nation engagement in this issue.

Statements and written submissions by the parties to the international negotiations reflect sharply divergent perspectives regarding the role IPR plays in the tech transfer negotiations. Many developing countries, most notably those comprising the negotiating block known as the G-77, have long argued that IPR acts as a barrier to their access to climate-friendly technology.

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[24] UNFCCC CP.13 Decision: Bali Action Plan Article (1)(d) (i)&(ii).

Representative of developing country views is a joint submission by China and the G77 on tech transfer, which calls for compulsory licensing, and more: "All necessary steps shall be immediately taken in all relevant fora to mandatorily exclude from patenting climate-friendly technologies held by Annex II countries which can be used to adapt to or mitigate climate change."[25] (Annex II countries are those 24 industrialized Parties, including the United States, that have undertaken financial obligations under the UN Framework Convention on Climate Change.) Developing countries have also called for the adoption of a Declaration on IPRs and Environmentally Sound Technologies in relevant fora; the use of the full flexibilities contained in the TRIPS Agreement, including compulsory licensing, to access technologies with IPR protections; steps to ensure sharing of publicly funded technologies and related know-how; and the creation of a "Global Technology Pool for Climate Change" that ensures access to technologies, including on royalty-free terms.[26]

Developed countries (in particular, Japan, Canada, Australia, Switzerland and the US) have responded to these substantial proposals with a strong defense of robust IPR regimes and opposition to compulsory licensing. They have also resisted the developing countries' calls for new institutional arrangements, in particular, the G77 and China's proposed "global technology pool."

In evaluating the developing countries' proposals on IPR, it is important to keep in mind that countries are in the midst of what has finally ripened into an actual negotiation, with parties ramping up their rhetoric and staking out strong positions in anticipation of future compromise.

Much of the discourse around IPR and climate contains echoes of the controversy that surrounded TRIPS' effect on developing countries' access to essential medicines, and that led to the 2001 Doha Declaration on the TRIPS Agreement and Public Health described above. Some countries (such as Bolivia), and some interested observers, are calling for an analogous UN climate Ministerial Declaration, and otherwise asserting that climate change is a public

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[25] Proposal by the G77 & China for a Technology Mechanism under the UNFCCC (2008) available at http://unfccc.int/files/meetings/ad_hoc_working_groups/lca/application/pdf/technology_proposal_g77_8.pdf.

[26] Sangeeta Shashikant, *Developing countries call for no patents on climate-friendly technologies,* Third World Network, Bonn News Update No. 15, June 11, 2009; available at www.twnside.org.sg/title2/climate/news/Bonn03/TWN.Bonn.update15.doc.

emergency – akin to a disease epidemic – justifying special treatment under the rules.[27] But for the reasons outlined in section III above, it is not clear that IPR has yet presented problems for climate-friendly technologies that would support such action.

The 2001 Doha Declaration is, despite a healthy debate on its effectiveness, an encouraging sign that the IP regime contains a fair amount of flexibility for responding to special circumstances. This bodes well for the discussions over tech transfer in the climate negotiations. Indeed, the TRIPS agreement itself recognizes the need for balance between the protection of intellectual property and the transfer of technology for public welfare purposes. Specifically, Article 7 of TRIPS states that the objective of the protection and enforcement of IP should be to contribute "to the promotion of technological innovation and to the transfer and dissemination of technology, to the mutual advantage of producers and users of technological knowledge and in a manner conducive to social and economic welfare . . . ." And Article 8 of TRIPS recognizes that measures "may be needed to prevent the abuse of intellectual property rights by right holders or the resort to practices which . . . adversely affect the international transfer of technology." TRIPS also requires developed country WTO Members to "provide incentives to enterprises and institutions in their territories for the purpose of promoting and encouraging technology transfer to least-developed country Members." (TRIPS Article 66.2)

While the case remains to be made for climate-specific modifications or reinterpretations of the IPR rules, the importance to us all of widely – and quickly – disseminating climate-friendly technologies means we must continue to monitor the situation. Policymakers on both sides of the debate would need to respond swiftly if it became apparent that IPR rules, in some narrow but important circumstances, were blocking effective tech transfer. Should that happen, the other fora (WIPO, the WTO TRIPs Agreement), with their flexibility provisions and the requisite expertise and mandates, appear better positioned than the UNFCCC to address the issue.

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[27] For a good discussion of this issue, see Frederick Abbott, *Innovation and Technology Transfer to Address Climate Change: Lessons from the Global Debate on Intellectual Property and Public Health*, ICTSD Global Platform on Climate Change, Trade Policies and Sustainable Energy (2009), available at http://ictsd.net/downloads/2009/07/innovation-and-technology-transfer-to-address-climate-change.pdf.

VI. Linking Tech Transfer and Emissions Reductions Abroad

In the context of the climate talks, countries have tabled numerous proposals designed to facilitate tech transfer, such as capacity building, joint R&D, and technology clearinghouses, and of which IPR is but a small part. But an essential driver of tech transfer to developing countries is the domestic emissions reduction policies that those countries themselves adopt at home. Demand for clean technology cannot be mandated from abroad; it must be created from within. Thus, an integral component of tech transfer will be the emission reductions plans, or "nationally appropriate mitigation actions" (NAMAs), that developing countries commit to undertake as part of the Copenhagen agreement, and the amount of tech transfer that actually takes place will be linked to – and depend on – the level of those commitments' ambition.

The Bali Action Plan calls for developing countries' NAMAs to be "supported and enabled by" developed country technology, financing, and capacity building. It is widely recognized that the vast bulk of financing in this area will need to occur through developing country participation in private enterprise, including the global carbon market.

The Waxman-Markey bill's carbon market is an excellent example of how this can work: the international allowances and offsets provisions create the opportunity for those developing countries that commit to emissions reductions (e.g., a cap on total emissions for one or more sectors of their economies) to sell carbon credits to U.S. regulated entities. And the developing country's emissions reduction commitments will, in turn, generate domestic demand for the clean technologies needed to achieve those reductions. It is the push-pull of these incentives, more than flexible IPR rules or technology clearinghouses or government-sponsored capacity building workshops, which will achieve the emissions reductions we need by getting the technology to where it is urgently needed.

I would like to mention, before concluding this discussion, that cooperative research and development can play a crucial supporting role in tech transfer, and that developing countries' proposals for such cooperation in the UN negotiations should be carefully considered. For all the focus on existing technologies, leading-edge innovators around the world are pursuing breakthrough solutions and should be spurred forward. Important progress can and should be made collaboratively between the best minds in the industrialized and developing worlds. An

example of the sort of clean technology cooperation worth expanding came during Energy Secretary Steven Chu's recent trip to China, where the U.S. and China announced a jointly funded $15 million research center and directed it to increase research on CCS.[28] Such cooperation helps set the stage for constructive UN negotiations toward the end we must achieve – a global deal to reduce greenhouse gases from all major sources.

Conclusion

Mr. Chairman and members of the Committee, I thank you for the opportunity to speak to you today. The issue of intellectual property protections is an important component of what will ultimately become a global agreement to move our world to a more stable climate. I hope I have expressed to you that this issue, while it is important, is also manageable and need not delay or hinder our active engagement in crafting a global solution to climate change. I welcome your questions on my testimony.

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[28] Saqib Rahim, *China: Will meaningful actions follow ambitious new carbon policies?* (July 24, 2009), ClimateWire.