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Hearing on China's Energy Consumption and Opportunities for US-China Cooperation to Address the Effects of China's Energy Use

Testimony of Wayne L. Rogers Partner, Sonnenschein Nath & Rosenthal¹

Mr. Chairman, Members of the Commission, I am pleased to appear before you today to discuss one of America's greatest challenges, and perhaps also its greatest opportunity, to engage China in a cooperative dialogue to address the global effects of China's increasing energy demand.

You have heard and will hear testimony concerning the breathtaking pace at which China is growing its economy and concomitantly its need for energy. Every 7 to 10 years the Chinese economy is doubling. The International Energy Agency anticipates the Chinese electrical demand to grow by 260% in the 2000 to 2030 period.

For the United States this presents strategic, economic and environmental concerns.

From a strategic perspective we will find ourselves increasingly in competition with China for energy resources. Between 2000 and 2005 China's oil consumption increased from 4.7 million barrels per day to nearly 7 million barrels per day, increasing imports to 43%. Projections show imports growing to over 75% by 2030. A generic mistrust of oil markets coupled with 85% of the world's traded oil being controlled by governments of producing nations, has led China on a path of securing concessions to "own" oil rather than purchasing it in the market. This has led to singular engagement by China with countries such as Iran and Sudan, where it could be euphemistically said that the United States has "issues".

From an economic perspective with the majority of China's GDP coming from manufacturing, and a US trade deficit with China at over \$600 million a day, the impact to the US economy of increased energy costs, either directly or indirectly through manufactured goods, is significant. Coal, oil and natural gas reserves per capita in China are 1/2, 1/10 and 1/20 of the global average, respectively. China recognizes it has a long term shortage of oil and natural gas. Increased demand/price competition for these commodities is inevitable.

From an environmental perspective over 75% of China's electricity is produced from coal power stations. China consumes more coal than the United States, Europe and Japan combined. It is predicted that Chinese air emissions will exceed those of the United States within 2 years. Significant progress on the issue of global warming will simply not be made without engagement of China on the issue.

It should be noted that the Chinese "get it." I have had meetings with senior management in the Chinese electric sector where they, without prompting, quote the number of grams of coal

¹ 1301 K St, NW, Suite 600E, Washington, DC 20005; 202-408-6478; wrogers@sonnenschein.com

needed to produce a kilowatt hour and improvements made, both in efficiency and emissions. The government is, however, faced with difficult problems. Energy is a basic requirement to build a better society. China recognizes that there are technology choices to protect the environment and to reduce atmospheric pollution, however, these are perceived as “costs” not “benefits.” China faces strategic requirements to adjust its energy structure, however, how can it be accomplished without jeopardizing security, modernization and economic development? The Premier has set 2010 priorities to include a 20% reduction in energy intensity (energy use/unit of GDP) and a 10% reduction in major environmental pollutants.

It is an easy thing for the developed world to say: 1) Reduce energy intensity in your manufacturing base; and 2) adopt new and expensive technologies for power generation, including renewable energy (and costly emission controls). However, we must recognize that we present an almost impossible goal for China to achieve: no country in the world has increased per capita GDP without increasing energy use per capita. Decreases in overall energy intensity have only accompanied large energy cost increases or recessionary economies (certainly not the Chinese case). Further, although China has foreign currency reserves in excess of \$1.2 trillion and companies in China are profitable and flush with cash, per capita income in the country is only \$1800 per year.

The announcement of a \$13 billion investment plan by the Chinese government in March on coal to oil projects was followed by a June announcement of the potential suspension of the program due to concern that projects would be too expensive and too energy-intensive.

For US-China Policy: Engage: we must; Lecture: we must not.

While in the short time available it is not possible to present the full panoply of options and issues in the energy sector, I will focus on three: 1) Renewable Energy (particularly windpower); 2) Venture Capital; and 3) Policy Engagement.²

Renewable Energy

The Chinese government understands that renewable energy development had not been raised to the needed strategic level. Prior policies lacked recognition that the technology cost of renewable energy is higher than gas, oil or coal and, therefore, direct cost competition is not possible. Investment and financing mechanisms required revamping and manufacturing capacity to support such systems did not exist.³

On February 28, 2005 a new Renewable Energy Law was issued by the Chinese People’s Congress and the President of China. The law became effective on January 1, 2006. The law is intended to remove market barriers for renewable energy, promote renewable development and establish a secure financing system.

Twelve major tasks for the formulation of regulations have been outlined. Of these, to date, about half have been completed.

² I recognize in selecting these that energy efficiency is omitted, which is a subject that could consume the entire time allotted.

³ Note that these discussions are not substantially different than US domestic policy discussions currently ongoing concerning renewable energy and portfolio standards.

China's 2020 renewable energy goals include a target of expanding hydropower from 35,000 MW to 300,000 MW; bio-power from 2,300 MW to 30,000 MW, photovoltaics from 70 MW to 1800 MW and implementing further penetration of solar hot water heaters, ethanol, biodiesel and energy efficiency.

Wind Power

Wind is the fastest growing renewable energy source in the world. The Chinese government has set a goal of 30,000 MW of wind capacity by 2020. This will require an investment on the order of \$50 billion. The wind industry believes that the potential in China is much higher. With the right conditions it is estimated that on the order of 170,000 MW could be achieved by 2030.

During 2006 China installed more electric capacity than the total installed electric capacity of the UK and Thailand combined. China installed 90,000 MW of coal-fired generation but only 1,334 MW of wind capacity. Increasing coal use now represents over three quarters of China's electric capacity. In contrast, in 2006 India installed 1,836 MW of wind capacity in a total system capacity of 130,000 MW. Said another way, China installed coal stations equal to two thirds of the total installed power capacity of India in a single year. In contrast, India installed nearly 40% more wind capacity in 2006 and total wind capacity is nearly 2.5 times that of China, while having a fraction of the total installed power capacity. In 2006, Europe installed 7,624 MW and the US 2,556 MW. The power of the right policy framework is clear.⁴

The Renewable Energy Law ("REL") is a tremendous step forward, however, wind developers, investors and manufacturers have serious doubts about the current framework's ability to foster rapid development of the technology.

Prior to the REL there were successive rounds of bidding for wind concession rights. Payment was set to the rate of the winning bid up to 30,000 hours and then falling to the level of the average electricity price. Requirements for domestic manufacture of equipment were included (despite the lack of globally competitive domestic equipment manufacturers). The winning bid went to those who quoted the lowest price and the highest proportion of local content. In later rounds requirements for domestic manufacture were increased to as much as 70%. Focus on price has led to successful bidders being state owned enterprises committing to prices that are lower than a sustainable market level. Further, due to this combination of factors, many private sector enterprises were discouraged from participating.

The anticipation was that the REL would change this process. It was hoped that a fixed price tariff system would be utilized, similar to policies in other countries. By 2005, in Europe over 90% of the installed wind capacity (40,000 MW) was the result of policies incorporating a fixed purchase tariff. The industry was disappointed with the retention of the price bidding system.

Without the recognition of the total costs of coal-fired generation, including those to the environment and health care, it is not possible for wind power facilities to compete directly with the unallocated "price" of coal stations.

⁴ Note that Europe has over 4 times the installed wind capacity of the United States, another demonstration of the effectiveness of public policy.

Grid connection standards have also been cited as an area which acts as a barrier to entry. Work on a common grid standard could improve access by wind facilities (and other renewable technologies).

Globally, the rapid expansion of wind energy has resulted in a shortage of available wind turbines. This presents a global opportunity in the area of wind turbine manufacturing. China has made some initial steps in this area, however, is not anticipated to become globally competitive until 2012. Technology transfer and work on the establishment of wind turbine manufacturing could lower the price of wind energy in China and worldwide.

The private sector, both domestic and international, is very keen to engage in the renewable energy sector in China. Enhanced policy frameworks are the key to opening the market.

US engagement to create win-win situations with China and the United States in the area of renewable energy is a viable and needed option.

Venture Capital

Private sector involvement in the bringing about of new technology can be advanced through expansion of venture capital interest in China. Venture capital generally brings the seed funding to allow new enterprises and technology to flourish. It brings the cash to fund fledgling enterprises to allow them to grow. As a threshold matter it should be noted that the Chinese economy is mainly focused on fixed asset investment and exports. HSBC has reported that Chinese companies depend on the stock market for only 6 percent of their outside investment capital. Further, many Chinese companies are very profitable and make investment from internally generated cash. Chinese companies are in the position to be able to buy technology so overall venture capital must be taken in context. The availability of the Chinese government to establish what is anticipated to be a \$200 billion equity fund and its pending \$3 billion investment in the US Blackstone private equity firm is a comparative data point when considering off-shore venture capital flows to China.

Obtaining accurate data on venture capital flows in China is somewhat difficult and is subject to variation. With that caveat the following is the status of venture capital in China in 2007.

In the first quarter 2007, 67 enterprises received a total of \$419 million of venture capital investment. This amount represented a nearly 26% increase from first quarter 2006.

For calendar year 2006 total venture capital investment in China was approximately \$1.8 billion. Of that amount 82% was foreign investment.

The United States is by far the largest venture capital investor in China. The US represents 89% of foreign venture capital investment in China and 66% of the total China investment pool in 2006.

Over 90% of companies funded were either shipping product or achieving profitability. This is a marked difference from traditional venture capital investment.

The energy sector is just beginning to come into its own. Dow Jones/Ernst & Young reported no venture deals in the energy sector in 2001 or 2002. 2003 saw two deals with a total investment of \$3.56 million. 2004 saw one deal and \$3.58 million in investment. In 2005 a single deal, Suntech Power, received \$80 million to further develop its silicon solar cells and photovoltaic systems.

In 2006 it is clear that venture capital in the energy sector dramatically increased. It is difficult to clearly differentiate the publicly available information on the energy sector to determine exact flows into “clean energy”, “clean tech” and “other energy” and the exact number and detail of deals completed. To illustrate this issue, according to Dow Jones/Ernst & Young, by close of third quarter nine cleantech deals invested \$74 million in China. The Cleantech Group reported that investors placed \$420 million into 26 cleantech deals in China in 2006. It is unlikely that a fourth quarter was so robust as to explain the discrepancy, but most likely it is definitional and illustrates the informational difficulties. As another data point, Zero2IPO reported for 2006 six deals in “clean energy” totaling \$39.7 million and another six ventures in “other energy” for an additional 37.4 million.

Energy investment is still small in terms of the number of deals (2% of the 2006 deals), however, the magnitude of investment is dramatically increasing. There is tremendous growth potential as even using the Cleantech numbers of \$420 million in Chinese cleantech deals in 2006, the comparable investment in the US was \$2.9 billion.

Suntech Power is a good example of the potential in China. Suntech was founded in 2001 as a China-based photovoltaic manufacturing company, producing panels converting sunlight into electricity. Originally backed by \$6 million in local Chinese government/corporate funding, the companies revenues went from zero in 2001 to \$14 million in 2003, to \$226 million in 2005, to \$598 million in 2006 (with a EBITDA of \$113 million). In May, 2005, venture capitalists financed the exit of the state shareholders with an \$80 million investment. In December, 2005 the company went public on the NYSE and is now valued at more than \$5 billion. Dr. Shi, the founder, has a fortune in excess of \$1.7 billion, the largest fortune of anyone living in Mainland China. The company combined first-world technology, developing-world prices, venture capital access and open markets to achieve stellar success. It is now the world’s third largest solar company with 90% of its revenues coming outside China.

This month Yingli Green Energy Holding, a vertically integrated solar manufacturing company, debuted on the NYSE with a \$319 million offering. China has now passed the United States in becoming the worlds third largest producer of solar panels (behind Germany and Japan).

The US, as China’s largest venture capital investor, can engage with China on the policy front, to increase venture capital flows in the clean energy sector. Venture capital in China faces a difficult dilemma. China essentially has no real protection for intellectual property. If venture capital develops technological advances, its transfer to China will almost certainly result in counterfeit reproduction that will substitute for the original technology at a lower price. If venture capital stays out of China, it closes off the opportunity for an enormous market and global reach for products. From a US policy perspective, rapid deployment of clean energy technology, at an affordable cost, is a global goal.

The US should continue to engage China to institutionalize the instrumentalities of private sector confidence: Corporate governance, legal structures, market access, transparency and rule of law (particularly intellectual property).

Policy Engagement

The US has been engaging China in the area of policy. In April, 2007 I went to China as part of the first US-China Clean Energy Trade Mission. The dialog was under the auspices of the Asia Pacific Partnership, working to find market solutions to issues surrounding global climate change and clean energy production.

In addition to policy engagement in renewable energy and private sector instrumentalities outlined previously, other “outside the box” and win-win solutions should be sought, either directly by the US or in concert with other countries. As has previously been recommended by the US-China Commission an energy strategic working group, focused on on-going dialogue and solutions, should be formed. This group should include private sector participants as well as government.

The Chinese government recognizes that the environment is becoming a key driver in public policy. The need for power drove many small power projects to be constructed in China outside the normal permitting and approval process. The central government in reaction shut down nearly 120,000 MW of non-permitted projects (nearly equal to the entire power generation capacity of India). Many of these plants re-opened due to power shortages, but it illustrates the fact that the Chinese government is making strides.

The Kyoto Protocol created the Clean Development Mechanism (CDM), where companies in first world nations were able to invest in clean energy projects in developing countries to meet their Kyoto compliance obligations. China is one of the largest markets in the world for CDM projects, representing nearly half of the worlds tradable carbon credits. Investment in clean energy projects under CDM allows the gap to be closed between the higher cost of green energy and the market cost of brown energy.

The US is not a participant in the Kyoto Protocol and its overall future is uncertain. The Chinese have recently issued their own national plan to combat climate change. However, China has emphasized that although they are committed to dealing with global warming, western nations bear an “unshirkable responsibility” to work on the problem. The US should either bi-laterally with China develop mechanisms, including US incentives to invest in Chinese clean energy projects, or via a multi-lateral, world-wide CDM-like discussions to develop multi-lateral mechanisms. These initiatives can increase private sector penetration in the energy sector, further increase the rapid deployment of clean energy technologies, and further the cooperative relationship with China.

Confucius said “*Do not impose on others what you yourself do not desire*” and further guided that “*A superior man is modest in his speech but exceeds in his actions.*” It is important that we engage China in positive dialogue to solve shared problems, the neglect of which will have global consequences. Thank you for the opportunity to appear today.

