

## **Remarks by Zhang Guobao**

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### **“CHINA ENERGY 2020” on September 11, 2014**

Held at the Columbia Club in New York City

#### **Co-organized by the National Committee on U.S.-China Relations, China Energy Fund Committee and the Center on Global Energy Policy**

Good evening. It is my pleasure to be invited to speak at this forum. I prepared a paper about China and U.S. energy issues, but I didn't write it in English. I can speak some English but I think my Chinese is better, so please let me speak in Chinese, and the interpreter will help me. Tonight I want to talk about three topics. The first is to compare China's energy situation with that in the United States.

In the 35 years since China implemented its policy of economic reform and opening up, the Chinese economy has developed incredible quickly and continuously. Chinese energy usage has kept up at the same pace. In 1993, China became a net oil importer. In 2009, China transformed from a net coal exporter to a net coal importer. Since 2002, after we had recovered from the 1997 Asian Financial Crisis, energy supply and demand grew exponentially throughout the decade. In 2013, China's total energy consumption reached 3.76 billion tons of standard coal, which surpassed the U.S., making China the world's largest energy producer and consumer. Currently China represents 22.4% of the world's energy consumption compared with 22% for the U.S. China's population is more than four times that of the U.S., so on a per capita bases, China's energy consumption is only 2.7 tons of standard coal per year per capita – just slightly above the total global average at 2.6 tons. Another way of putting this is that our per capita usage of energy is still less than one-third of what the U.S. per capita uses is.

China's use of electricity has also been growing rapidly. In 2013, our total installed capacity of electricity reached 1.248 trillion watts, a little over the U.S. installed capacity of 1.2 trillion watts. But in terms of per capita usage, the per capita usage in the U.S. is about 13,227 kWh, ranking the seventh in the world (Iceland ranks first). On a per capita bases, China's electricity usage is 2,912 kwh per year, which makes China No. 32 in the world. American electricity usage per capita is 4.5 times China's usage. The previous figures include industrial use. If you look at household usage only, the gap between China and U.S is even larger.

As I mentioned, China became a net importer of oil in 1993, however we only imported 60,000 tons of oil that year. As of 2013, our net import of crude oil reached 280 million tons. China's dependence on foreign crude oil has reached 58%. In terms of natural gas imports in 2013, we imported 53 billion cubic meters, which included 17 million tons of LNG. In 2013, our dependence on foreign LNG was 31.6%. Natural gas only takes 4.8% in the

total energy mix (compared with 24% in the United States). However, China is already the third largest consumer of natural gas in the world. In 2013, China imported 270 million tons of coal, of which 5 million tons were imported from the U.S. During the 13 years that I acted as minister, I couldn't have imagined minerals such as coal being shipped across the Pacific to China. As David Sandalow and I discussed, it seems that people are concerned about China's primary energy self-sufficiency rate, while in fact, China's primary self-sufficiency rate is as high as 90%, with only 10% of total energy imported.

For the most part, China imports two products: petroleum and natural gas. There are big structural differences between the American and Chinese energy systems. As David just mentioned, the primary energy resource used in China is coal, accounting for 67.5% of total usage. In that sense, our energy structure is much closer to India than to the United States. Coal supplies less than 30% of total energy use in the U.S. Furthermore, nuclear power represents about 20% of total electricity generating capacity in the U.S., from a hundred nuclear power reactors. Currently nuclear power generated electricity in China counts for only 2% of total electricity generating capacity, from 28 nuclear reactors in operation. But what David said is also true – China is building half of all the nuclear power plants being constructed globally – out of 64 nuclear power plants being built throughout the world, 30 are in China. Therefore the U.S. has a much higher rate of clean energy production than China.

China's renewable energy sector has been developing quickly, especially in the field of wind and solar power production. In 2003 when I headed the energy ministry, China only produced 480 megawatts of wind power generated electricity. By 2013, the number exceeded 80 gigawatts, which roughly equals all of the installed wind power capacity in the U.S. China is also the largest producer of solar panels in the world. Our solar panel exports provide about 50% of the world's demand for solar panels today. However, we need to import a core material of solar panel – polysilicon – mostly from Dow Corning in the U.S. and Wacker in Germany. Elevated tariffs that were the result of anti-dumping investigations by the E.U and the U.S have been imposed on Chinese solar panels, and China, in turn, increased tariffs on polysilicon imports. These sorts of trade disputes may be dignified, but in substance I think they are merely trade protectionism. The long-term effect is that these measures only protect the interests of a few companies at the expense of the world's desire to continue developing clean energy. In fact these measures have done nothing to slow the exports of Chinese solar panels. In the first half of this year, Chinese solar panel exports increased by 18%. The four key sources of clean energy – hydro, nuclear, solar and wind power – make up 30% of China's electricity generation today, although most of the contribution is hydro-electric power. The U.S. and China are largely on a par in terms of total energy production and consumption, but our energy structure composition and pricing are very different.

Because of mass production of shale gas, the price of natural gas in the U.S. has dropped to \$5-6 per MBtu, whereas in China the price has increased to \$16-18 per MBtu. In other words, in China, the price for natural gas is roughly three times the U.S. price. It is also true that the price of industrial electricity is the lowest in the U.S., comparing to commercial usage and residential usage (residential price being the highest). The situation is the

opposite in China where the industrial price is the highest – 13 U.S. cents per kilowatt hour. The commercial price is in the middle and residential use is the cheapest – 7.25 U.S. cents per kilowatt hour. China's structure of electricity consumption is also very different from that of the U.S. In China, about 70% of electricity use goes into industrial, 13% goes into commercial use, 12% goes into residential use and about 5% goes to agricultural use. In the United States, commercial and residential usage combined is somewhere between 60% to 70% of total electricity consumption, whereas industrial consumption takes less than 30%.

I have less than one minute so I won't speak on my second topic. I am going to talk about my last topic, which is very important.

I believe there is a foundation for Sino-American energy cooperation, although there are differing opinions, but I do not feel there are any fundamental conflicts between the policies of our two countries. We are jointly the world's greatest producers and consumers of energy and we have the ability to make an impact in global energy issues. Influenced by the Cold War, some Chinese and some Americans see each other as adversaries, as imaginary rival states, and they see conflicts and competition even in the energy field. The truth is that historically and presently, the two countries have not competed with each other for energy or resources and have not directly clashed over energy. The first electric light that was ever lit in China was ignited in honor of President Wilson's visit to Shanghai, when lights were lit along the Bund to welcome him. In the nineteen forties, the then Kuomintang government signed an agreement with the U.S. to send 98 engineers from China to study at the Westinghouse Electric Corporation. Most of those people, after they returned, remained in the Mainland and did not move to Taiwan with the KMT. They became part of the backbone of the development of China's electric power infrastructure. Then, due to the Korean War and the Vietnam War, China and the U.S. halted diplomatic relations until the late nineteen seventies. After China opened up, we immediately introduced the 300,000 Kilowatts and 600,000 Kilowatts electricity power generators from the Westinghouse Electric Corporation, which are still major electricity power generators in China to this day. In recent years, China once again imported AP1000 3<sup>rd</sup> generation nuclear power reactor equipment from Westinghouse, which has become vital for Chinese nuclear energy development. In the early days of China's reform and opening up, Armand Hammer invested in Pingshuo coalmine in Shanxi Province. Gradually petroleum companies such as Exxon Corporation, Chevron and Conoco Phillips started to enter China for risk analysis in petroleum exploration. Furthermore, Enron, AES entered China to invest in electricity infrastructure. Although Chinese corporations have not invested in the U.S. energy arena as heavy as American corporations have invested in China, there has been a very positive trend in recent years.

For instance, CNOOC and China Shenhua both invested several billions of U.S. dollars in U.S. shale gas exploration. CIC recently made a 1.58 billion U.S. dollar investment and became the largest shareholder of AES (I am one of the board members). Furthermore, a number of Chinese private enterprises have now started to invest in U.S. wind and solar energy industries.

Other than the five million tons of coal I just mentioned, China and the U.S. have not been importing significant amounts of energy from each other. We didn't import oil and gas from the U.S and neither did the U.S. import oil or gas from us. Thus, in the international energy market, there haven't been direct conflicts between China and the U.S. because of energy competition. After the Iraq War, Chinese corporations worked with American companies in organizing oil fields contract bidding in Iraq. Currently, crude oil imported from the Middle East makes up to 50% of China's total import. On the other hand, the U.S. import of crude oil from the Middle East has dropped to about 28%. China has not faced any difficulties in importing from the Middle East because of the U.S. During the period of sanctions against Iran, though Sino-Iran oil & gas cooperation was effected, China insisted on abiding by U.N. resolutions and reduced Iranian oil imports and halted oil & gas investment in Iran.

So really there have been no direct conflicts between the U.S. and China relating to energy issues (although some media outlets and individuals have exaggerated circumstances or come up with conspiracy theories). On the contrary, China and the U.S have commenced broad collaboration in new energy fields – we established the U.S-China Clean Energy Research Center and signed the U.S-China Nuclear Energy Cooperation Agreement. From my observation, both China and the U.S. leadership have kept clear of politics to preserve Sino-American cooperation. This should be the center of our ongoing collaboration in the energy industry. I know I went overtime, but I think this issue is so important that I had to finish my thoughts. It has been a precious opportunity to speak with you. Thank you very much.

中国自实行改革开放政策 35 年来，经济持续高速增长，能源生产和需求也持续高速增长。1993 年，中国变成石油净进口国。2009 年，又从煤炭的出口大国变成了煤炭净进口国家。特别是从 2002 年，克服了亚洲金融危机以后，连续 10 年能源生产和需求高速增长。2013 年，能源消费达到 37.6 亿吨标准煤。这个数字超过了美国，使得中国成为世界上最大的能源生产国和消费国。中国能源消费占全世界能源消费的 22.4%，

22%，所以中美两国是世界上最大的能源生产国或消费国。但是由于中国的人口是美国的四倍多，所以人均年能源消费为 2.7 吨标准煤。这个数字略微超过世界人均年能源消费 2.6 吨标准煤的水平。中国人均消费还不到美国年人均消费量的三分之一。中国的电力也快速增长，2013 年中国的电力总装机容量已经达到 12.48 亿千瓦，略微超过美国 12 亿千瓦的总装机。但人均用电水平，美国人一年用电 13227 千瓦时，在全世界排名第七位，第一位是冰岛。而中国人均年用电是 2912 千瓦时，在世界上排名 32 位。美国人均用电是中国的 4.5 倍。之前讲的数据包括工业用电，而人均生活用电，美国比中

国就更高了。

中国从 1993 年变成净进口国，但是那年只进口了原油 6 万吨。但是到了 2013 年，中国净进口原油 2.8 亿吨。原油的对外依存度达到了 58%。天然气 2013 年进口了 530 亿立方米。其中，进口液化天然气 1700 万吨。天然气的对外依存度达到了 31.6%。天然气在中国的能源结构中只占 4.8%，美国的天然气在能源结构中占 24%。但是中国已经成为世界上第三大的天然气消费国。2013 年，中国进口了 2.7 亿吨煤炭，其中还从美国进口了 500 万吨。我当了 13 年部长都不敢相信，像煤这样的地质品怎么跨过太平洋进口到中国来。但是中国的一次能源自给率，从大卫桑德罗和我的介绍中，大家看到的是一片紧张的局面，实际上，中国一次能源的自给率仍然高达 90%，只有 10% 是进口的。

中国的进口能源主要是油和气。中国的能源结构和美国有很大不同。中国的煤炭占一次能源消费的 67.5%，正如刚才大卫先生所说的。中国在这一点上和印度的能源结构差不多，印度的煤炭大概也占这么大比例。而美国的煤炭在能源结构中只占不到 30%。美国的核电占总发电量的 20%，有一百个核电反应堆。而中国核电只占发电量的 2%，现在中国只有 28 个核反应堆在运转。但是刚才大卫桑德罗先生说，中国在建的核电站占世界的将近一半，这是真的。因为中国现在在建的核电站有 30 个，全世界只有 64 个核电站在建。所以美国的能源结构与中国相比，清洁化的程度远远比中国好。近年，中国的可再生能源发展迅速，风能和太阳能发电异军突起。2003 年，我当中国能源部长的时候，那年中国的风力发电只有 48 万千瓦。但是到了 2013 年，中国的风力发电已经超过了 8000 万千瓦，和美国的风力装机容量大体上差不多。中国是世界上最大的太阳能电池板生产国，正如刚才大卫桑德罗先生所说的，出口占世界太阳能板贸易量的 50%。但是中国生产太阳能电池的原材料——多晶硅，需要进口，而且主要是从美国的道康宁和德国的瓦克公司进口。但是由于欧盟和美国对中国的太阳能电池进行“双反调查”，提高关税，引发了贸易争端，中国也对进口的多晶硅提高了关税。这种贸易摩擦虽然有冠冕堂皇的理由，但是本质上我认为还是贸易保护主义在作怪。我认为其结果只是保护了少数公司的利益，而损害了世界上清洁能源的事业。事实上也并没有能够阻止中国太阳能电池的出口，今年上半年，中国太阳能电池出口还是增加了 18%。中国现在在水电、核电、风力发电、太阳能发电这四种清洁能源的发电量已经占了全部发电量的 30%，但是这主要是水电做出的贡献。中国和美国在能源生产和消费总量上大体上差不

多，但是结构有很大的不同，在能源价格上也有很大的不同。

美国由于页岩气大量的生产，天然气价格现在每个 MBtu 只有 5 到 6 美金，而中国的价格高达每个 MBtu 16 到 18 美元。所以中国的天然气价格是美国天然气价格的三倍。另外，美国的工业电价是最便宜的，其次是商业用电，居民用电是最贵的。而中国刚好倒过来，工业用电是最贵的，大概一个千瓦时要 13 美分，其实是商业用电，居民用电是最便宜的，大约一个千瓦时 7.25 美分。电力消费结构也很不同，中国工业用电占 70%，商业用电占 13%，居民生活用电占 12%，农业用电占 5%。而美国的商业和居民生活用电比例高达 60%到 70%，工业用电不到 30%。

刚才他已经提醒我了，我还有不到一分钟，所以第二个题目我就不讲了。我要讲最后一个题目，但是这个题目很重要，可能我要超过一分钟。

中美能源合作我认为是基调，虽然有杂音，但是没有根本的利害冲突。中美两国是世界上最大的能源生产国和消费国，在世界能源事务当中举足轻重。由于长期受冷战思维的影响，中国和美国国内都有一些人把对方作为竞争对手，甚至是假想的敌国。在能源领域也渲染相互争夺和竞争。其实从历史和现状仔细分析，中美两国能源合作是基调，并没有相互争夺能源和资源，也没有因为能源争夺引发争端，甚至于战争。中国在 19 世纪点燃的第一盏电灯，是为了迎接美国总统威尔逊访问上海，在上海外滩点燃的。在四十年代，当时的中国国民党政府与美国签订了协议，派了 98 名工程技术人员到美国的西屋公司参加培训和学习。这些人最后大多数都留在了中国大陆，没有去台湾，成为新中国发电设备制造企业的骨干。在五十年代和六十年代，因为朝鲜战争和越南战争，中美两国交恶，两国中断了交往。到了七十年代，两国恢复了外交关系，中国对外开放，首先就引进了美国西屋公司的 30 万和 60 万千瓦的发电设备基础。至今仍然是中国发电设备的主力机型。近年来，中国又引进了西屋公司的 AP1000 第三代的核电技术，是中国核电的重要机型。在中国改革开放初期，美国的哈默就投资建设了山西的平朔煤矿。美国的埃克森、雪佛龙、康菲等石油公司都进入中国进行油气风险勘探，美国的安然、AES 都在中国进行电力投资。中国企业在美国能源领域的投资虽然没有美国企业在中国那么多，但是近年来也呈迅速增长的态势。例如，中海油、神华公司都投资了美国的页岩气开采产业。中国的中投公司入股 15.8 亿美元成为美国 AES 公司最大的股东，我也是这个公司的董事。还有一批民营企业投资美国的风能和太阳能产业。

而且中国和美国彼此都没有从对方国家进口大量的能源，除了我刚才讲的五百万吨

煤以外，我们也没有从美国进口油气，美国也没有从中国进口油气。所以在国际能源市场当中，中美之间并没有因为争夺能源而发生争斗。伊拉克战争结束以后，中国在伊拉克的油田招标当中也是和美国的企业进行合作。中国从中东进口的原油占进口量的50%，相反美国从中东进口原油所占的比重已经下降到进口量的28%。中国也并没有因为美国的存在，从中东进口石油遇到什么困难。在对伊朗核问题进行制裁的时候，尽管影响了中国和伊朗的油气合作，但中国顾全大局，十分克制，严格遵守联合国的协议，减少了从伊朗进口石油，并且中断了在伊朗的油气投资。

所以纵观世界其他地方，中美独没有因为能源事务引发争端，往往都是（部分）媒体和一部分人在渲染和炒作。这些人凭空想象了阴谋论，相反中美两国在新能源领域开展了广泛的合作，成立了中美清洁能源中心，也签订了和平利用原子能协议。

据我观察，中美两国的政治领导人都保持了清醒的政治头脑，维护中美两大国家的合作关系，这才是两国在能源领域合作的主流。我还没有讲完，但是他已经举了很多次（计时牌）了，因为我觉得这个问题太重要，所以我觉得即使超时我也要把它讲完。因为你们给我这个机会也不容易，谢谢你们！