China's Role in the World: Is China a Responsible Stakeholder?

Statement by

Katharine A. Fredriksen
Principal Deputy Assistant Secretary
Office of Policy and International Affairs
United States Department of Energy

Before

U.S.-China Economic and Security Review Commission

August 4, 2006

Mr. Chairman, Madame Vice Chairman, and members of the Commission, I am pleased to appear before you today to discuss the Administration's policy perspectives on energy security issues and the impact of China's development on its energy demands.

China faces economic and energy challenges that are unprecedented for its policy makers. China has responded to its growing need for energy through domestic policies such as increasing domestic oil production, working to increase energy efficiency to maximize output from existing resources and increasing the use of renewable energy, but it has also sought to enhance its energy security by diversifying its energy supply through imports and by acquiring overseas assets.

As several key Administration officials have said, a peaceful and prosperous China is in America's—and the world's—interest. The United States has an important role to play in encouraging China to adopt responsible energy policies and strategies that place China in full accordance with international norms—thereby becoming a responsible stakeholder in the international system.

China's Energy Outlook

China has become the world's second largest energy consumer after the United States following two decades of rapid growth, especially in its consumption of petroleum. In 1980, China consumed approximately 1.8 million barrels per day. In 2004, China consumed approximately 6.4 million barrels per day—an increase of over 250 percent.

The most significant energy demand in China has come from the country's robust economic growth. Since 1978, China's economy has grown about 9 percent a year, fueled by freeing market forces, increased foreign investment, and exports. This has led to large increases in per capita incomes, significant poverty reduction, and growing integration into the global economy. China is now the world's seventh-largest economy, the world's third-largest trading nation, and a major destination for foreign-direct investment. To sustain that growth, China has had to become increasingly engaged with the rest of the world to secure the inputs it needs, and markets for its surging exports.

China's industrial sector, which is particularly energy intensive, has grown most rapidly in this period. In 2002, energy consumption for the secondary industries (manufacturing of finished goods or products) was 69.3 percent of total energy consumption. In contrast, energy consumption for primary industry was 4.4 percent, and service industry was 14.9 percent.

This rise in consumption has led to an increased dependency on imports. For example, in 1993 China became a net importer of petroleum products for the first time. Since that time, China's import dependence has been growing steadily each year. For example, in 1993 China only imported 2 percent of its oil from foreign sources. By 2004 approximately 43 percent of its oil was imported.

China's energy consumption will continue to grow. According to the latest figures from the 2006 International Energy Outlook by the Department of Energy's Energy Information Administration (EIA), China's oil consumption will grow at an average of 3.8 percent a year between 2003 and 2030. By 2030, China's oil consumption will reach approximately 15 million barrels per day. This means that in 2030, China's oil consumption will account for about 13 percent of the world's oil demand. In 2003, the share was 7%.

Yet, given its abundance and price competitiveness, coal will likely remain as the choice of fuel for China. China is the world's largest coal producer and consumer today. Per the 2006 International Energy Outlook, coal use in China's electricity sector will increase from 16.3 quadrillion Btu in 2003 to 50.1 quadrillion Btu in 2030, or at an average rate of increase of 4.2 percent per year. At the end of 2003, China had an estimated 239 gigawatts of coal-fired capacity in operation. If China were to meet the electricity demand that is expected to accompany its economic growth, an additional 546 gigawatts of coal-fired capacity (net of retirements) is projected to be brought on line by 2030. About 45 percent of China's coal use in 2003 was in the non-electricity sectors, primarily in the industrial sector. China's coal consumption for the industrial sector will grow from 11 quadrillion in 2003 to 23 quadrillion in 2015, and 37 quadrillion in 2030. Generally, through 2030, coal demand in China's non-electricity sectors is expected nearly to triple, increasing by 26.1 quadrillion Btu.

China's strong economic growth has brought about demographic changes. Currently 40.5 percent of the population lives in urban areas. There are 25 cities with populations over 1 million. Today, the average growth rates in urban areas are 1.4 percent per year. The percentage in urban areas will increase to between 55 percent and 60 percent by 2020. More importantly, these urban populations consume approximately 35 times more energy than rural populations, significantly contributing to rising energy demand. A rising middle class also means higher energy demand, as individuals demand higher living standards, more travel by air and more cars on the roads. In addition, ownership of air conditioners in households has increased from 11.6 percent in 1990 to 61.8 percent in 2003.

The rising living standards have promoted energy consumption in the transport sector as well. The market for personal cars is growing strongly, at 50 percent to 60 percent annually. About 2.6 million automobile sedans were produced in 2004, about a 26 percent rise from 2003. The number of vehicles in China is expected to rise to between 120 million and 130 million by 2020. At the beginning of this decade, there were 20 million vehicles. Energy demand for all road transport is projected to grow by 4.6 percent per year from 2004 to 2030. According to the Lawrence Berkeley National Laboratory, transportation currently accounts for 38 percent of all oil demand. They further project that by 2020 transportation will account for nearly 50 percent of all oil demand, with personal cars growing from 2 percent of demand to approximately 10 percent of demand.

According to the Chinese government, energy efficiency in China is about 10 percent below that of the advanced world level. For example, the average efficiency of China's thermal power generation is about 33.8 percent, which is 6 percent to 7 percent lower than more advanced countries. This means that in the various phases of energy utilization (processing, storage, transport and transmission, etc) there are significant losses and wasting of energy. Further, energy consumption per $1 million of GDP (calculated using the 2005 exchange rate) is approximately 1300 tons of coal equivalent (tce) for China, 2.4 times more than the world average, while energy consumption per unit of product of eight major industries (electric power, iron & steel, nonferrous metal, petrochemical, building material, chemical light industry and textile industries) was on average 40 percent higher than the most advanced world level. In addition, energy consumption for space heating per building area in China is 2-3 times as much as in developed countries with similar climatic conditions. The gap in energy utilization between China and other countries indicates the existence of a huge energy savings potential as well as a potential reduction in overall energy demand.

Domestic Energy Strategies

In order to reduce demand and increase the supply of energy available domestically, the Chinese government has adopted specific policies that include increasing both the domestic production of traditional energy resources and improving domestic infrastructure; increasing energy efficiency to maximize energy output from existing resources; and increasing the use of renewable energy.

Efforts have been underway to increase the production level of oil, natural gas, and coal, as well as improve domestic refinery capacity and pipelines.

The Chinese government has taken several steps to increase domestic sources of oil. The Daqing oil field, inaugurated in 1967, accounts for about a quarter of China's total crude oil production today. Although it continues to be the largest oil field in China, Daqing peaked in the 1970s and its production level has been steadily declining in recent years.

In order to make up for this decline, China has contracted with several foreign firms to work to enhance oil recovery and extend the life of the second-largest producing field in northeastern China. In April 2004, Chinese authorities announced several new finds in the area of an existing field in the northeast, and oil production is expected to continue there. China has also opened up far western reserves. Local governments are pushing to increase production from these basins to 1 million barrels per day by 2010.

The Chinese government has also been focusing on increasing offshore production in order to reduce dependence on foreign oil. Nearly 85 percent of China's oil production capacity is located onshore. However, offshore production has been growing at an average of 15.3 percent per year, with production reaching about 570,000 barrels per day in 2004 and accounting for 16.2 percent of total domestic supply. The Chinese government hopes to make offshore production China's largest source of oil by doubling production to 1.34 million barrels per day by 2010.

The coal sector has shown some signs of trouble over the past few years, specifically in relation to transportation bottlenecks that have prevented the distribution of this abundant resource. With the rapid growth in many sectors of the economy, there are several competing uses for the railroad system – transporting iron ore, steel, grains, etc. – of which coal is only one. Coal supply shortages (and resulting power outages) have occurred in part because of insufficient railroad infrastructure that causes coal shipments to be stranded at mines.

Recently, China has started to investigate the possibility of increasing its use of coal as a direct substitute for oil by investing in coal liquefaction technology (which seeks to form petroleum products from coal). Currently China's central planners have proposals for about US$24 billion worth of large-scale coal liquefaction projects. Optimistically, if all of the proposed US$24 billion in liquefaction projects are realized, this process could replace up to one million barrels of oil a day.

Moreover, the Chinese government is placing a greater emphasis on constructing large-scale coal mines and upgrading small- and medium-scale coal mines. In addition, there is a greater interest in coal-bed methane and co-generation. Initial production of coal-based synthetic liquids in China is scheduled to commence in mid-2007 with the completion of the country's first coal-to-liquids plant, located in the Inner Mongolia Autonomous Region.

Historically, natural gas has not been a major fuel in China, but given China's untapped domestic reserves of natural gas and the environmental benefits of using natural gas, China has embarked on a major expansion of its natural gas infrastructure, most notably the construction of the West-to-East pipeline. This pipeline links natural gas deposits in northwestern China to major demand centers along the southern coast. China is also interested in the possibility of imports from Russia and Kazakhstan via the pipeline.

In addition to piped gas, many of the new power plants are to be supplied by imported liquefied natural gas (LNG). Imported LNG will be used primarily in China's southeastern coastal region. One LNG receiving terminal has been built at Guangdong. It received its first LNG cargo from Australia in May, and a start-up ceremony was held in June. There is also a receiving terminal under construction in Fujian and at least five others are being considered.

The major Chinese oil companies are also actively seeking to add to their refining capacity. A major issue for the Chinese downstream sector is the lack of adequate refining capacity suitable for heavier Middle Eastern crude oil, which will become a necessity as Chinese import demand rises in the medium-term. Several existing refineries are being upgraded to handle heavier and sourer grades of crude oil. With consumption of petroleum products rising so rapidly, interest has rekindled in the construction of more modern green-field refineries.

One of the most significant developments in its domestic energy policy arena is the establishment of strategic petroleum reserves. In 2004, China unveiled plans to construct

a strategic petroleum reserve (SPR) to hold state-controlled stocks of crude oil at the following four sites: Dalian, Qingdao, Zhenhai, and Zhoushan. China has expressed the intention to build stockpiles equivalent to 90 days of imports. The 90-day import standard is followed by members of the International Energy Agency even though China is not a member. The initial phase of stockpiling in China involves building storage tanks with a capacity of 100 million barrels of crude oil. However, in light of today's high crude price, it is uncertain how quickly this goal can be reached as the acquisition of oil may be put off in the hope that high prices recede.

The second pillar of China's domestic energy strategies is the improvement in energy efficiency. The Chinese government has begun launching some very aggressive efficiency initiatives. Under the latest Five-Year Plan (2006-2010), China calls for 20 percent reduction of energy consumption per unit of GDP by 2010.

The growing energy demand in the transport sector has led to a series of efforts in recent years. In October 2004, China introduced its first fuel-efficiency standards for passenger cars. By 2010, the Chinese government aim to reduce fuel consumption for new passenger cars by 10 percent from the 2005 level. Models approved by the Chinese government before July 2005 will have a one-year grace period for both phases.

Moreover, in April 2006, China raised taxes on large cars as part of efforts to lessen the country's dependency on imported oil and to promote energy efficiency in the transportation sector. Under the new tax structure, passenger cars sold in China will be taxed according to a six-tier scale between 3 percent and 20 percent, depending on the engine size of the vehicle, ranging from 1.5 liters to over 4 liters. Specifically, the new tax structure means passenger cars with an engine size of above 2.0L will face a greater tax burden than before, while cars with an engine size of 1.0-1.5L will enjoy a 2 percent-point drop in tax. Tax rates for other small cars remain unchanged. Previously, tax rates levied on cars had only three tiers: 3 percent, 5 percent, and 8 percent. The measure, however, is unlikely to have a huge impact on the market or the environment, given that large cars make up only a small proportion of the total market and their buyers tend not to be price-conscious.

Also, a massive building energy efficiency program is under way. Today, China is the world's biggest construction market, where half of the buildings built every year are said to be located. Under the leadership of the Ministry of Construction, China is looking to rebuild government office buildings in coming years. Initially, they plan to reconstruct ten central government ministry buildings, including that of the Ministry of Construction, to make them more energy efficient. If the initial reconstruction is successful, they hope to rebuild all central government ministry and provincial government buildings. Also, the Chinese government is calling for energy consumption by new urban buildings to be reduced by 50 percent by 2010. More specifically, the plan calls for a 65 percent reduction in big cities like Beijing; 15 percent reduction in mid-sized cities; and 10 percent in small cities.

Efforts are under way for the increased use of renewable energy, too. Renewable resources also have the potential to make a large contribution to decreasing China's demand for fossil energy. Currently, renewable energy resources only account for 6 percent of China's total energy consumption, but in February 2005, China's congress passed the Renewable Energy Law, which established the regulatory framework for renewable energy development, provides economic incentive and financial support for R&D, and promotes construction and utilization of renewable energy facilities. The Chinese government also views renewable energy as an integral part of its long-term strategy, with the plan to have 10 percent of energy consumption from renewable sources by 2010, 18 percent by 2020, 30 percent by 2030 and 50 percent by 2100. In order to help meet these goals, the Chinese government has secured financing from institutions like the World Bank ($87 million).

Continued growth in energy consumption will also force a growth in nuclear power generation and hydroelectricity. China is ambitiously developing its nuclear power industry, with some of the most aggressive development plans anywhere. China's total nuclear power generation capacity has increased dramatically in the past few years, from two giga-watts (GW) at the beginning of 2002 to 6.6 GW as of mid-2005. China plans to spend approximately US$50 billion on 30 additional nuclear reactors within the next 15 years. By 2020, China aims to have a total nuclear capacity of 40 gigawatts. This large capacity expansion will increase nuclear power from its current 1 percent to approximately 5 percent of the country's total energy requirements.

Hydroelectricity will also increase. China is constructing or planning many new, large-scale hydroelectric projects over the forecast period, including the 18.2-gigawatt Three Gorges Dam project, which is scheduled to be fully operational by 2009.

International Energy Strategies

China has been seeking to enhance energy security by diversifying its energy supply through imports and by acquiring overseas assets. As recently as 1996 China imported roughly half of its oil from two countries—Oman and Indonesia—and a total of 70 percent of its oil from only three countries (Oman, Indonesia and Yemen). By 2003, China had developed significantly more diverse import sources, including Saudi Arabia (16.8 percent of total imports), Iran (13.8 percent), Angola (11.2 percent), Oman (10.3 percent), Yemen (7.7 percent) and Sudan (4.7 percent).

The Chinese government has also sought to secure and diversify its energy supply through the construction of pipelines to transport oil from Russia and Kazakhstan. It hopes that these pipelines will help diversify supply away from Middle East and Africa, and provide for more secure transport routes, avoiding sea-lane choke points, such as the Straits of Malacca.

Moreover, in recent years, the Chinese have significantly increased the number and geographic distribution of energy assets and investments. Chinese national oil companies have invested in oil ventures in over 20 countries with bids for oilfield development contracts, pipeline contracts, and refinery projects in Iran, Sudan, Kazakhstan, Kuwait

and others. In addition, the Chinese have recently focused on broadening their equity stakes in North Africa, Central Asia, Southeast Asia, Latin America and most recently in North America.

In terms of sheer value and volumes, China's overseas petroleum investment is limited. Between the early 1990s and early 2005, China's cumulative overseas investment in oil and gas supply was $7 billion, averaging less than $600 million a year. The total equity oil secured mainly by Chinese oil companies is around 400 thousand b/d at present. This means, the total equity oil secured by China is equivalent to about 15 percent of the country's total crude imports, 11 percent of its domestic oil production, and 5 percent of its current oil consumption. This also amounts to only 2 percent of current U.S. oil consumption, and less than 0.5 percent of global oil production. Judged from this perspective, the impact of China's overseas petroleum investments on the global energy markets is limited.

Implications for the United States

The U.S. and the PRC are facing common serious energy challenges: increasing dependency on foreign sources of energy; high-energy prices, and increased environmental impacts as energy use rises. We believe that energy security of both countries will be advanced through international cooperation. The Department of Energy has a long and fruitful history of engagement with China on energy related cooperation dating back to the normalization of diplomatic relations between the U.S. and China on January 1, 1979. Much of the cooperation between the U.S. and China has focused on science and technology exchanges, exchange of scientists, training, demonstration programs, and collaborative visits. Under the current Administration, DOE has a robust engagement with China through bilateral and multilateral mechanisms. These bilateral mechanisms include the U.S.-China Energy Policy Dialogue, the U.S.-China Oil and Gas Industry Forum, the Peaceful Uses of Nuclear Technologies Agreement, and the Joint Coordinating Committee on Science and Technology.

The U.S.-China Energy Policy Dialogue was established in May 2004 by then-Secretary of Energy Spencer Abraham and the Vice Chairman of the National Development and Reform Commission, which is China's premier planning agency. The Dialogue was launched to facilitate policy level discussions on a range of energy issues, including energy policy making, supply security, power sector reform, energy efficiency, renewable energy, and energy technology options. The Dialogue emphasizes that the United States and China share many common challenges and opportunities as the two largest energy consumers in the world and aims to promote greater cooperation to address concerns. Through the Dialogue, the Administration aims to

- Exchange views with China on each side's views of current and future national and international energy markets;
- Better assess the impacts of China's energy policies on U.S. energy security;
- Offer relevant U.S. experiences (positive and negative) in energy and related environmental policies and regulations to assist Chinese energy economic and

environmental policy makers as they develop and revise their policy, legal and regulatory framework;
- Mitigate the environmental affects of China's rising fossil energy consumption; and
- Assess trade and investment opportunities in each other's energy markets.

The first Dialogue was held at DOE headquarters on June 30, 2005. Key topics included supply security, domestic energy market forecast, electricity transmission grid expansion, increasing energy efficiency, and deploying renewable energy technologies. The United States delegation also stressed the importance of strategic petroleum reserves. While commending China's efforts to build the country's first state-owned SPR, we reiterated that the SPR should be used to address supply disruptions, and not to affect the global petroleum market. Also, we have continued to emphasis the importance of coordination with the International Energy Agency, whether or not China is a member. The second Dialogue is now scheduled to be held in China this September and we hope to make energy efficiency a key theme to help reduce the energy intensity of the Chinese economy.

Another bilateral forum where we have been promoting greater appreciation of the global energy market and respect for market principles is the U.S.-China Oil and Gas Industry Forum. Launched in 1998, the Forum serves to expose the Chinese to western business customs as well as to open the Chinese market to U.S. investment. The Forum also facilitates opportunities for government and industry leaders from both countries to have frank discussions about our respective needs in the oil and gas sector. U.S. industry is already the largest investor in China's petroleum sector and continues to seek greater investment opportunities there. The Departments of Energy and Commerce are co-hosts of the Forum on the U.S. side, and the National Development and Reform Commission (NDRC) is the Chinese host. The Sixth U.S.-China Oil and Gas Industry Forum met in New Orleans, Louisiana, in June 2005. There were important exchanges on oil and gas technology and market issues affecting both countries. Additionally, the U.S. delegation stressed the need for an effective, transparent reporting system to ensure that market mechanisms are working as intended in order to maintain the balance between supply and demand and to provide potential investors with accurate and reliable information for use in their decision making. The Seventh U.S.-China Oil & Gas Industry Forum will be held next month in China.

In the area of science and technology, DOE and the Chinese government agencies have been cooperating in the fields of high energy physics; fusion; fossil energy; energy efficiency and renewable energy; energy information exchange; Peaceful Uses of Nuclear Technologies; and clean energy development for the 2008 Summer Olympics Games. Through the range of science and technology cooperation, DOE seeks to:
- Accelerate development and deployment of new technologies, while reducing costs;
- Promote clean and advanced technologies to help China meet its energy and environmental challenges;

- Positively influence China's nuclear nonproliferation policy, export control, nuclear material security and nuclear safety; and
- Facilitate U.S. industry's investment in and trade with China.

DOE's cooperation with China has resulted in laws promoting renewable energy and energy conservation. For instance, in March 2005, China's Congress passed legislation calling for the government to adopt an array of policies that encourage the development and use of wind, solar, geothermal, and small-scale hydroelectric plants. Staff at DOE's Lawrence Berkeley National Laboratory and National Renewable Energy Laboratory helped to draft this so-called "Green Power Law." Additionally, in 1997, with assistance from DOE laboratories, China passed "The Energy Conservation Law," which was enacted in 1998.

DOE actively engages with China through multilateral fora, too. China is an active member economy in the Asia Pacific Economic Cooperation's (APEC) Energy Working Group. The APEC Energy Working Group has hosted many workshops on timely energy issues, including one on liquefied natural gas best practices. In July 2005, DOE hosted a workshop on oil stockpiling under the auspices of the APEC Energy Working Group. This workshop aimed to examine progress toward APEC best practices in those economies like China that have already chosen to establish strategic stockpiles, as well as to encourage new commitments by economies that have not yet decided to establish such strategic stockpiles. The workshop served as an important opportunity for the United States to reiterate key principles of SPR management and discourage the use of stockpiles for price manipulation.

Although China is not member of the International Energy Agency (IEA), key Chinese officials have been invited to IEA Ministerial meetings in recent years. DOE has been a key participant at workshops on natural gas and strategic petroleum stocks, among others, held in China by the IEA to assist the government of China in reforming and opening the gas sector and in deciding to create a national strategic oil reserve.

The U.S. and China have been working together through international science and technology initiatives. For example, China is among the charter members of the International Partnership for a Hydrogen Economy (IPHE), which the President envisages as helping to bring hydrogen-based vehicles to market worldwide. China has been an active member since its inception. In May 2004, China hosted the IPHE Steering Committee meeting in Beijing. In January 2006, China hosted the fifth IPHE Implementation–Liaison Committee meeting in Shanghai. Another potentially transforming technology initiative is the Carbon Sequestration Leadership Forum (CSLF). Given their potential technical contributions as well as the importance of their future markets, the Chinese have been important partner in the CSLF, as well.

China is also a member of the Asia-Pacific Partnership for Clean Development and Climate, officially launched in January 2006. This initiative will help Partner countries to focus on steps that will create new investment opportunities, build local capacity, and remove barriers to the introduction of clean, more efficient technologies. This

partnership, pursued in close collaboration with the private sector, will help each member meet the challenges of improving energy security, reducing pollution, and addressing the long-term challenge of climate change. We look forward to China's active participation in this critical initiative.

Moreover, China is a member of the "international ITER partnership" that will construct the first fusion reactor capable of creating a sustained burning plasma. ITER is expected to be the penultimate step to a fusion power plant which could begin to supply electricity to the grid by around mid century if the technology proves to be both technologically feasible and economic.

Additionally, we are encouraging China's greater involvement in FutureGen, a U.S.-led initiative that seeks to realize the world's first near-zero emissions power plant that will produce electricity and hydrogen from coal while capturing and storing carbon dioxide (i.e., geologic sequestration). FutureGen is a ten-year, $1 billion investment that will include cost sharing from the industry partners and foreign governments. In October 2005, China Huaneng Group became a member of the FutureGen Industrial Alliance, the public-private partnership part of the FutureGen initiative. China Huaneng Group is China's largest coal-fired power generator. We continue to encourage the Chinese government to join the FutureGen Government Steering Committee.

In the future, China will likely play a more active role in international nuclear technology initiatives. In July 2006, Generation IV International Forum (GIF) Policy Group voted in favor of China's accession to the GIF membership within a year. The Forum, established in January 2000, aims to investigate innovative nuclear energy system concepts for meeting future energy challenges. The Forum's members include Argentina, Brazil, Canada, Euratom, France, Japan, South Africa, South Korea, Switzerland, United Kingdom, and United States, with the OECD-Nuclear Energy Agency and the International Atomic Energy Agency as permanent observers. The Forum serves to coordinate international research and development on promising new nuclear energy systems for meeting future energy challenges.

Conclusion

The United States and China face a similar set of energy challenges, including dependence on the Middle East oil and high oil prices. While there are notable difference in our approaches, cooperation between our two countries will promote greater energy security in our respective countries, as well as in the world.

Accordingly, DOE has engaged China on a number of significant issues, including nonproliferation cooperation, emergency response cooperation through the strategic petroleum reserve, and energy sector reform. It will be in the interest of the United States and of the international community at large for China to embrace energy security and nonproliferation principles that are in accordance with the international norms. China has considerable potential to be a responsible stakeholder and we do see some encouraging

signs. We plan to continue our engagement with China and work with Beijing in a collaborative fashion to advance our mutual interests.

Mr. Chairman, we are committed to continue our efforts in illuminating China's path towards becoming a prosperous nation and a responsible stakeholder in the international system.