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I. Introduction

Thank you, Chairman and members of the Commission, for providing this opportunity for me to discuss with you the Department of Energy's engagement with China on energy issues.

This conversation takes place at a critical time in the bilateral U.S.-China relationship. Global energy demand is growing rapidly, as is the world's desire for cleaner and more environmentally sustainable energy development. These are not challenges the United States can face alone, and more importantly they are challenges that require the major economies of the world to work together every step of the way.

China's energy consumption patterns will continue to impact global energy markets and the environment over the coming decades. At this time, China is the world's second largest energy consumer. Indeed, China has already surpassed the United States as the world's leading carbon dioxide emitter. Chinese greenhouse gas emissions are projected to continue to grow to 28 percent of the world total in 2030, accounting for about 50 percent of global coal-related emissions, based on the DOE's Energy Information Administration assessment, which is consistent with International Energy Agency estimates.

China is thus, like the United States, constrained by ever-growing demands for energy resources and the need to balance its energy requirements with environmentally responsible policies. The size of our two countries and our combined impact on global energy markets inextricably link our energy security goals. Working cooperatively with the Chinese to both develop new energy technologies and increase the energy efficiency of our economies is a worthy goal that we believe will contribute to a stable bilateral relationship.

II. China's Energy Outlook

The International Energy Agency's *World Energy Outlook 2007* projects that between 2005 and 2030, China's energy consumption will increase from 25 percent less than U.S. consumption to 30 percent more.¹ In 2030, China's projected primary energy demand will be composed of 62.8 percent coal, 21.1 percent oil, 5.2 percent natural gas, and 8.1 percent renewables. Nuclear energy is projected to represent a 1.8 percent share of Chinese energy consumption.²

China has responded to its energy needs by expanding domestic production of oil and gas and adding renewable energy, energy efficiency, and overseas supply. In its 11th Five-Year Plan (2006-2010), China set aggressive goals for improving energy efficiency, increasing the use of renewable energy sources, and reducing energy consumption. Two priority goals are to reduce energy intensity by 20 percent between 2006 and 2010, and purchase renewable energy to cover 10 percent of the total electricity generation by 2010. China to date has only achieved a fraction of these goals. For instance, in 2006, China's energy intensity decreased by 1.2 percent, which missed the yearly national target of 4 percent. However, this decrease is a movement in the targeted direction since in the previous three years China's energy intensity grew by 4.9 percent, 5.5 percent, and 0.2 percent, respectively, from 2003 to 2005, year over year.

The IEA projections show coal continuing to play a major role meeting in China's energy demand. In fact, China's coal demand has nearly doubled since 2000.³ For the foreseeable future, China is forecast to continue to lead the world in both production and consumption of coal, using it primarily to fuel its industrial and electric power sectors. Between 2005 and 2030, China's electric power sector is projected to grow its coal demand at a rate of 4.9 percent per year, while its industrial sector is projected to increase its demand at an average rate of 2.1 percent per year.⁴

Civilian use of nuclear power is likely to increase globally due to increasing fossil fuel prices, dramatic growth in energy demand, and the environmental benefits of greenhouse gas emissions-free nuclear energy. Between 2005 and 2030, Chinese electricity production from civilian nuclear energy represented 2.1 percent of 2005 electricity production, and the IEA projects that it will increase to a 3 percent share by 2030, falling short of the Chinese government's recent projections.⁵

While China's 11th Five Year Plan calls for civilian nuclear energy production to account for 4 percent of China's total primary energy use by 2020, Zhang Guobao, Director of the newly formed National Energy Administration, recently stated that this percentage will

¹ International Energy Agency, *World Energy Outlook 2007: China and India Insights* (OECD/IEA, 2007) (hereinafter "WEO").

² WEO 287

³ WEO 119

⁴ WEO 344, 293

⁵ WEO 346

likely be increased to 5 percent instead. The IEA's World Energy Outlook projects China's nuclear energy production to fall short of the 4 percent goal.⁶

In addition to the industrial and electric power sectors, China's transportation sector is forecast to grow and require increasing amounts of energy. In 2006, China became the world's number two vehicle market, and number three vehicle producer, reflecting an annual growth rate of over 20 percent since 2004. In fact, by 2025, China is projected to have over 300 million cars on the road, compared to approximately 30 million today.⁷ Seven out of eight car buyers in China are buying their family's first vehicle.⁸ Oil consumption and carbon dioxide (CO₂) emissions associated with on-road transportation are rising dramatically from China's increasing vehicle population.

III. Department of Energy Engagement with China

The Administration supports many of China's energy policies and its stated commitments in the Five Year Plan to diversify its energy resources, increase energy efficiency and improve its environmental protection. We are partnering with China multilaterally and bilaterally in a number of ways that help China achieve that goal while increasing opportunities for U.S. companies to demonstrate and sell technologies in a fair and transparent market, that can help meet the environmental challenges posed by the energy sector.

China's energy policies are important not just to itself but to the health and stability of global energy markets. One example of a policy that is worthy of greater focus is China's use of subsidies. Although subsidies are widely-used means for governments to exert influence, China must be cautious with its pricing control policy. Fuel price subsidies are unsustainable in the long-term. At the G8 plus China, India, and South Korea Energy Ministerial meeting in Aomori, Japan earlier this year, the world's top energy consumers agreed on the need to end fuel price subsidies. During the June meeting of the Fourth U.S.-China Strategic Economic Dialogue, Co-Chair Wang Qishan, a Vice Premier in China's State Council, agreed to reduce China's fuel price subsidy. While these are important steps towards the eventual "marketization" of Chinese fuel prices, we would encourage further actions on the Chinese side. Our engagement with China provides important lines of communication through which alternative policy options and lessons learned by both sides can be conveyed and studied.

An example of mutually beneficial cooperation involves China's Shenhua Group, which has developed a process that combines American, German, and Japanese technologies with its own innovations to construct a first-of-a-kind coal liquefaction plant in Erdos, China. Once commissioned later this year, the plant's operational experiences could contribute to U.S. clean coal technology development.

⁶ WEO 346

⁷ Projection of Chinese Motor Vehicle Growth, Oil Demand, and CO₂ Emissions through 2050 Energy Division, Argonne National Laboratory December 2006

⁸ www.chinadaily.com.cn/bizchina/2008-04/22/content_6635789.htm

China's global economic impact generates a concomitant global responsibility. As China's growing demand for energy increasingly affects the environment – both within and outside its borders – China's role as a global stakeholder becomes more pronounced. The U.S. continues to advocate that China, along with other investors, endorse the Extractive Industries Transparency Initiative (EITI) and other transparency and internationally accepted measures. EITI is an international effort by states, civil society, and industry to improve transparency and accountability by introducing disclosure standards for both extracting industries and governments, with the goal of reduce corruption and poverty. 11 nations currently support the effort, and there are 23 candidate countries. Such steps, particularly by China, would strengthen U.S. and international efforts in promoting good governance and increasing accountability to foster sustainable growth, particularly in developing countries endowed with oil, gas, and mineral resources.

The United States and China take part in several international cooperative mechanisms to help meet our shared energy challenges. Among these mechanisms are:

- Asia-Pacific Partnership on Clean Development and Climate (APP)
- Carbon Sequestration Leadership Forum (CSLF)
- Generation IV International Forum (GEN-IV)
- Methane-to-Markets initiative (M2M)
- International Partnership for the Hydrogen Economy (IPHE)

DOE has two principal bilateral vehicles of cooperation -- Strategic Economic Dialogue (SED) and the Energy Policy dialogue (EPD) to address our nations' intertwined energy security challenges and opportunities. We utilize these mechanisms to identify and track areas of mutually beneficial cooperation, and policies and practices that hinder or support our mutual goals.

U.S.-China Strategic Economic Dialogue (SED)

The Strategic Economic Dialogue (SED) is a bi-annual, Cabinet-level dialogue initiated in December 2006. It is a strategic management mechanism designed to promote stable, prosperous bilateral economic relations. It has been chaired for the United States by Henry Paulson, the Treasury Secretary, and for China by high-ranking members of the State Council. It was previously co-chaired by Vice Premier Wu Yi, and beginning with SED IV it is co-chaired by Vice Premier Wang Qishan.

The Third and Fourth U.S.-China Strategic Economic Dialogues were held this past December and June in Beijing, China and Annapolis, Maryland, respectively.

Based on discussions at SED III, a Memorandum of Understanding between the United States Departments of Agriculture (USDA) and Energy and the National Development and Reform Commission (NDRC) of the People's Republic of China on Cooperation in the Development of Biofuels was signed. Since then the DOE and USDA have been collaborating in a plan of work with the NDRC to develop mutually beneficial U.S.-

Chinese commercial and business opportunities as well as to support enhanced usage and production of biofuels.

During the Washington International Renewable Energy Conference, held in March 2008, DOE, USDA, and NDRC met to discuss a work plan to support the MOU, and in April the parties met to narrow the scope of their discussion on specific areas of potential collaboration, including biomass resource assessment, science and technology information exchange, and further bilateral dialogue. Collaboration continues between U.S. and Chinese scientists with the intention of beginning cooperative projects by fall 2008.

At SED IV, U.S. and Chinese leaders discussed a wide range of economic issues including: joint opportunities in energy and the environment; managing financial and macroeconomic cycles; investing in people; trade and competitiveness; and enhancing the bilateral investment environment. More importantly for energy and the environment, at SED III, U.S. and Chinese Ministers created a working group to develop a government-to-government framework for extensive U.S.-Chinese cooperation over the next ten years to address energy security, climate change, and environmental sustainability. At SED IV, the United States and China signed a Ten Year Energy and Environment Cooperation Framework (Cooperation Framework) and identified five initial Cooperation Framework goals. These goals are: clean, efficient, and secure electricity production and transmission; clean water; clean air; clean and efficient transportation; and conservation of forest and wetland ecosystems.

Cabinet agencies from both countries participate in the Cooperation Framework. The U.S. agencies are: the Departments of Energy, Treasury, State, and Commerce; and the Environmental Protection Agency. The Chinese agencies are: the National Development and Reform Commission (NDRC); the State Forestry Administration; the National Energy Administration; and the Ministries of Finance, Environmental Protection, Science and Technology, and Foreign Affairs.

The Cooperation Framework establishes five joint task forces focused on five functional areas, each coinciding with one of the Cooperation Framework's initial goals: : clean, efficient, and secure electricity production and transmission; clean water; clean air; clean and efficient transportation; and conservation of forest and wetland ecosystems. The Department of Energy is responsible for the task forces on electricity and transportation. Each of these task forces is developing action plans for concrete cooperation, with a goal to complete finalized and agreed-to plans in time for the SED V, due to be held in Beijing later this year.

The U.S.-China Energy Policy Dialogue (EPD)

The EPD was inaugurated in May of 2004 as a bilateral vehicle by which the United States and China can exchange energy security views, discuss mutual economic issues, and explore energy technology options. DOE has used this dialogue to underscore the

importance of market forces in determining energy product prices and appropriate supply distribution. The third EPD meeting was held in September 2007 in San Francisco.

One of the important outcomes of the third EPD meeting was that the Department of Energy and the NDRC signed the Memorandum of Understanding (MOU) Concerning Industrial Energy Efficiency Cooperation. It seeks to improve China's industrial energy efficiency, increase mutual energy security, reduce emissions, and provide opportunities to export energy efficient U.S. products and services to China. This cooperative mechanism allows us to demonstrate to the Chinese how the products, practices and services utilized in DOE's *Save Energy Now* initiative, help the U.S. manufacturing sector reduce its energy intensity and carbon dioxide emissions. The Chinese see this MOU as one means through which to pursue their goal of reducing energy use per unit of GDP by 20 percent between 2005 and 2010. Up to a dozen of China's most energy-intensive enterprises will be chosen for energy use audits. In September 2008, U.S. technical teams will demonstrate auditing practices at these enterprises. At the same time, a Chinese contingent will travel to the United States to attend energy efficiency training seminars and participate in site visits. The goal is to train Chinese auditors who can begin auditing plants and further train their own auditors and advance the implementation of energy efficiency practices in China's industrial sector. This activity is important because the global focus on industrial energy efficiency is increasing, promoted by the United States, the UN Industrial Development Organization (UNIDO), the International Organization for Standardization (ISO), the Asia Pacific Economic Cooperation, (APEC), and the G8.

Other Major Activities

Other important bilateral and multilateral activities include the United States-China Fossil Energy Protocol, the U.S.-China Oil and Gas Industry Forum (OGIF), the co-funded U.S.-China Energy and Environmental Technology Center (EETC), the Global Nuclear Energy Partnership (GNEP), FutureGen, and cooperation under DOE-NDRC agreement on the peaceful uses of nuclear technology (PUNT), discussions on strategic petroleum reserves, and fusion energy research.

U.S.-China Fossil Energy Protocol. Originally signed in 2000, and renewed for five years in 2005, the Fossil Energy Protocol between DOE and China's Ministry of Science and Technology (MOST) promotes cooperation in science and technology in the fossil energy sector. Through the Protocol, the United States can showcase its advanced technology, services, and commercial know-how in China while simultaneously encouraging cooperative research and development with viable commercial outcomes.

A Permanent Coordinating Group (PCG) manages the Protocol. The DOE Assistant Secretary for Fossil Energy chairs the PCG for the U.S. side, while the Secretary General of the MOST's High Technology Bureau chairs it for the Chinese. One solid success of this initiative is a feasibility study resulting in construction of a coal liquefaction facility in China utilizing advanced U.S. technology. It is the first commercial-scale facility of its kind in the world.

The U.S.-China Oil and Gas Industry Forum (OGIF). OGIF is jointly chaired by the Department of Energy's Office of Fossil Energy and the Department of Commerce, on the United States side, and by the NDRC on the Chinese side. The OGIF partnership has met annually since 1998 and is a public-private bilateral initiative bringing government and industry representatives of both countries together to discuss our common goals. These goals include development of secure, reliable and economic sources of oil and natural gas while facilitating investment in the energy industry. The eighth OGIF was held last fall in San Francisco, and the next one is planned for this fall in China.

The United States-China Energy and Environmental Technology Center (EETC). The EETC is an initiative centered at Tulane and Tsinghua Universities co-funded by DOE and MOST, three objectives of which are to: (1) provide training programs in environmental policies, legislation, and technology, as well as cost-effective approaches to these programs, (2) develop markets for U.S. clean coal technologies, and (3) help minimize the local, regional, and global environmental impact of China's energy consumption.

Earlier this year, a multimillion-dollar investment by U.S. and Chinese companies that will be coordinated by the EETC was announced. This joint venture will extract coal bed methane from coal mines in Henan Province. Methane from coal mines can cause more than 20 times the amount of global warming than CO₂. This venture has the capacity to greatly reduce the global warming potential of the participating coal mines.

Global Nuclear Energy Partnership (GNEP). GNEP is a global initiative that works toward the expansion of peaceful proliferation-resistant nuclear energy for greenhouse gas emissions free, sustainable electricity production. GNEP supports establishment of reliable, cost-efficient supply frameworks that reduce nuclear proliferation risks. China joined GNEP in September 2007 and is a full GNEP Partner and a Vice Chair of the GNEP Steering Group.

In September 2007, the Department of Energy and NDRC signed the U.S.-China Bilateral Civil Nuclear Energy Cooperative Action Plan. The Action Plan is intended to complement and reinforce multilateral collaborations being conducted under GNEP. The first technical working group meeting under the Bilateral Action Plan was held at Argonne National Laboratory on April 23-24, 2008. Both sides discussed four areas of proposed cooperation: 1) Separations Technology; 2) Fuels and Materials Development; 3) Fast Reactor Technology; and 4) Safeguards Planning. Additional discussions on these areas will be held in the coming months.

The second GNEP Steering Group meeting took place in Jordan on May 14-15, 2008. GNEP Partners, of which there are 21, include: Australia, Canada, France, Japan, Kazakhstan, Russia, and South Korea. At the meeting, 23 countries and three international organizations were invited to join GNEP as Observers. The next GNEP Ministerial will take place in Paris on October 1, 2008.

FutureGen. In 2003, the Department of Energy announced the FutureGen initiative. It is a plan to use clean coal technologies to demonstrate the possibility of developing a coal-based power plant that emits nearly zero greenhouse gases while producing both electricity and, as a by-product, hydrogen. In January of this year, a restructured FutureGen program was announced to employ carbon capture and storage (CCS) techniques in coal power plants to develop nearly emissions-free coal-based power plants. Federal funding will support multiple commercial demonstration plants, with the goal of reducing CO₂ output by up to 90 percent. These plants can be up and running by 2015. Taking advantage of research and development in CCS, integrated gasification combined cycle (IGCC), and pulverized coal technology, this approach will permit the demonstration plants to capture and sequester twice the carbon dioxide as the original 2003 FutureGen plan. Chinese entities, which participated in the FutureGen project as first proposed, are welcome to bid for participation under the current Funding Opportunity Announcement.

Peaceful Uses of Nuclear Technology (PUNT) Agreement. In 1998, DOE and China's State Development and Planning Commission, the predecessor of the NDRC, signed the PUNT Agreement to exchange information and to cooperatively address mutually defined nuclear concerns. In 2002, a Joint Coordinating Committee (JCC) and three Joint Working Groups (JWGs) under the JCC were established. Since 2004, U.S. and Chinese nonproliferation cooperation under the PUNT Agreement has achieved significant progress on topics ranging from: export controls; material protection, control and accounting; safeguards; and emergency management, among others. U.S.-Chinese PUNT meetings have proven to be effective nonproliferation confidence building measures. For example, during the 4th JCC in May 2007, both sides endorsed the proposed establishment of a group to focus on nuclear emergency management and a sub-group on radiological source security. The next meeting of the JCC is planned for winter 2008.

Strategic Petroleum Reserves (SPR). The United States has asked the Chinese to explore maintaining an SPR to improve its energy security and to alleviate energy supply shortages in the energy market. The United States joined with the IEA in both 2002 and 2006 in holding stockholding workshops in China. These workshops assist the Chinese in their planning for building and holding strategic petroleum reserves. China is building an SPR in three phases, which are said to be scheduled for completion by 2020. Reports on China's progress in stocking these reserves conflict, so it is difficult to ascertain China's state of readiness to participate with other nations, including IEA member states, in a severe oil supply emergency. The Chinese are reluctant to divulge information about their SPR, as they view it as a sensitive issue of national security. Meanwhile, through such mechanisms as the EPD and SED, the United States engages China in meaningful dialogue about the importance of developing an SPR and the vital role that transparency plays in this process.

The Chinese have also been invited by the IEA to participate in its Emergency Response Exercises, which simulate IEA and oil market responses to global oil supply emergencies. China participated in the IEA exercises in 2004, but could not participate in the June 2008 exercise due to its earthquake response efforts. China has also attended meetings of

the IEA's emergency planning and oil markets committees, and there are plans to continue encouraging Chinese participation there, with the goal of familiarizing the Chinese with market-sensitive energy security policies and measures.

In a related development, we see China's commitment to participate in the Joint Oil Data Initiative (JODI) as a positive sign in this regard. In a statement following the June 2008 G8+3 Energy Ministers meeting in Aomori, Japan, China joined the G8 countries, India, and South Korea, in committing to participate fully in the JODI. Complying with JODI requires participants to provide timely, reliable and complete data to the initiative. By joining the United States and its international partners in JODI, China is taking an important step in alleviating oil supply uncertainty.

U.S.-China Collaborative Programs on Fusion. The United States and China have been collaborating on fusion energy research. If successful, fusion energy could offer an abundant, economical and clean source of energy. The primary focus of this collaboration has been U.S. support in the design and operation of a plasma control system for the Experimental Advanced Superconducting Tokamak (EAST) facility at the Academy of Sciences Institute of Plasma Physics (ASIPP) in Hefei. EAST became operational in September 2006. In return for U.S support for EAST, China has provided support for the D-IIID tokamak device located in the United States.

The main collaborative activity involving the United States and China (as well as five other members – the European Union, Japan, Russian Federation, Korea, and India) is the multi-billion dollar ITER experiment that is under construction in Cadarache, France. ITER will be the first fusion science facility capable of producing sustained burning plasma. The mission for ITER is to demonstrate the scientific and technological feasibility of fusion energy for peaceful purposes. With its participation in ITER and a growing domestic program, the Chinese appear ready to strongly pursue the development of fusion as a potential future energy source.

IV. Conclusion

The Department of Energy is committed to advancing solutions, together with our international partners, that address global energy challenges and support both U.S. and international energy security. The United States is committed to playing a leadership role in reducing the impact of energy on the environment.

The United States recognizes that energy security, a sustainable environment, and economic prosperity are important for both the United States and China. How each of us addresses these challenges will have global ramifications. The engagement between our two countries that I have described above, conducted with good will and mutual respect on both sides, allows us to identify common goals and define solutions beneficial to both countries. Because we are the world's largest carbon dioxide emitters and the largest consumers of coal and the largest oil importers, the United States and China have an obligation to show responsible leadership in beginning to address tomorrow's energy

challenges today. Working together, we will both be more effective in meeting these challenges.

That concludes my statement Mr.Chairman, and I would be happy to respond to any questions you or the other members may have. Thank you.