

**George Bush China-U.S. Relations Conference:
Development, Energy, and Security
October 22-25, 2007
Washington, D.C**

FORUM FINAL REPORT

Forum Title: *China-U.S. Energy Forum: Global Transition to a Secure Energy Future*

Session Summary: As an essential component of the 2007 George Bush China-U.S. Relations Conference: Development, Energy and Security, the China-U.S. Energy Forum focused on identifying the mutual interests and challenges between China and the U.S. in energy supply, utilization, diversification, and related environmental issues. The forum laid the foundation for decision-makers in both countries to exchange lessons learned and to identify barriers and opportunities for future collaborative initiatives involving government, industry, and academia. Invited panelists at the forum spoke on behalf of government, industry, and academic sectors of both countries. Represented organizations included the U.S. Department of Energy, China National Petroleum Corporation, Chevron Texaco, Westinghouse, China National State Nuclear Power Technology Corporation, Princeton University, Texas A&M University and Peking University. The invited panel speakers reviewed and discussed the current situation, practice, perspectives, and cooperation opportunities in energy policy, energy supply, and diversification. Speakers also touched on the environmental impact of energy growth, highlighting energy saving opportunities in hydrocarbon production and delivery, electric power, and transportation, as well as specific strategies for addressing greenhouse gas emissions, for instance, through various carbon capture and sequestration scenarios. Through the lens of their own experiences, participants also discussed common practices and issues in China-U.S. collaborations in commercial and academic settings.

The U.S. Assistant Secretary of Energy, Ms. Karen Harbert, delivered the keynote speech at the forum. She focused on the global energy challenges, especially those challenges that the U.S. and China are facing together, and proposed innovative, environmentally-responsible, and technology- and market-driven solutions to address these challenges. In order to meet vigorously increasing energy demand in the foreseeable future, she underscored that the world needs a healthy and open global investment climate to foster continuous investment in fossil fuels--especially non-conventional hydrocarbon resources--as well as in energy diversification by expanding alternative and renewable resources that will help relieve pressure on conventional resources. She emphasized that the U.S. and China need to work together to promote increased energy efficiency and conservation measures to capture the “new” energy that is wasted every day. In addition, the U.S. and China need to work together to protect global energy supply infrastructure to avoid major energy supply disruptions. The two countries also need to work together to protect our environment, by setting high environmental standards to encourage innovative technologies such as clean coal technology in reducing pollution and emissions intensity. As the result of the Third U.S.-China Energy Policy Dialogue, Assistant Secretary Harbert and Vice Chairman Chen Deming of China’s National Development and Reform Commission (NDRC), the U.S. Department of Energy and China’s NDRC signed an Industrial Energy Efficiency Memorandum of Understanding (MOU) that will help China improve energy efficiency and serve as a conduit to export advanced energy-efficient U.S. products and services to China.

All these aspects represent the necessity of and opportunities for cooperation between the U.S. and China on government, business and academic levels. As the two of the world's largest energy consumers and significant producers, the U.S. and China need to make it clear to the world the need to work together to ensure access to affordable, clean, and secure sources of energy that will underpin sustainable economic growth and protect our environment.

Following Assistant Secretary Harbert's opening remarks, the invited panelists reviewed and discussed energy supply and diversification, energy efficiency and saving, and related infrastructure and environmental impacts in the context of U.S.-China relations.

Although the world's uses a variety of energy sources today, oil and gas now provide nearly 60 percent of world primary energy, and they will remain indispensable to meeting the projected growth in energy demand. A growing world economy will require large increases in energy supplies. At the same time, it is becoming more difficult to extract hydrocarbons, as conventional reservoirs are depleting quickly with no new major reserves identified. It is crucial to new technologies to enhance oil recovery and develop unconventional reservoirs.

Nuclear power contributes six percent of world energy today. Although nuclear energy faces concerns about safety, security, and management of radioactive waste issues, its deployment is expected to expand as one of the major alternative energy sources. The nuclear power industries in the U.S. and China have distinct features. The U.S. has developed advanced nuclear power technologies and its nuclear power industry will mainly focus on maintaining its technology advantages. Nuclear energy in China, compared with developed countries, is underdeveloped and nuclear energy is underutilized. China is moving forward with plans to construct 40GW of nuclear capacity by 2020. There is also an expectation that 33-38 new plants will be built in the U.S. There are opportunities for China and the U.S. to work together in advanced nuclear technology transfer and nuclear industry professional development. The partnership between China State Nuclear Power Technology Corporation (SNPTC) and Westinghouse is one recent example of U.S.-China collaboration in transferring Westinghouse advanced nuclear power technologies to help China's nuclear industry. Universities in the U.S. and China are actively discussing the potential for collaboration at the academic level in nuclear professional training and education. Both industry and academia need to work together in developing nuclear waste disposal strategies and technologies.

Both the U.S. and China have extensive coal reserves, and coal remains the primary source of energy in China. It is predicted that China will account for 40 percent of coal-related energy emissions by 2030. The development of clean coal conversion techniques is necessary to make up for the deficits of uncertainty in the price and availability of oil and gas in the future. Biomass is today's largest non-fossil energy source. The challenge of biomass energy is that it is very hard to achieve large-scale production at a reasonable financial and energy cost. Technology does not yet exist to convert biomass economically using cellulosic feedstock. Wind and solar energy are growing rapidly, but also face economic and land-use considerations among others. Although the share of each energy source will not change much in the near future, there will be dramatic increases in each of them due to the increase in total energy consumption, with corresponding opportunities for the introduction of cleaner technologies.

The U.S. imports sixty percent of its oil, two-thirds of which are consumed by transportation. Transportation will likely remain the primary use of liquid fuels in the U.S. China has over 30 million passenger cars on the road today but is projected to have as many as 300 million by 2025. The National Petroleum Council study shows that if the fuel efficiency of light duty vehicles can be improved by 100 percent by the year 2030, light-duty vehicle fuel consumption

will be lowered by three to five million barrels per day. Many options for future transportation technologies were reviewed in the forum, including technologies that would increase energy efficiency, reduce environmental impacts and diversify the fuel supply. “Dual-mode” transportation was described as one potential solution and area for collaboration between China and the U.S.

The forum provided an overview of greenhouse gas emissions trends, and described how increasing emissions associated with expanded energy use is expected to potentially cause warmer temperatures and disturbances to the global climate system. Seventy percent of the U.S. greenhouse gas emissions are energy related. The U.S. policy on climate change is focused on lowering emission intensity of GDP growth, which (it is hoped) will continue at a moderate pace. China’s rapidly growing economy will undoubtedly bring more and more environmental problems, especially in power generation, since coal will remain the primary fuel of choice. The Chinese government is becoming more and more concerned about environmental issues. Sustainable development has been increasingly emphasized in the decision-making process and Chinese government has launched robust policy to tackle the environmental challenges. One example is China National Petroleum Corporation (CNPC). CNPC has realized that the company is not only a major energy producer in China but also an energy-intensive consumer. CNPC has launched energy efficiency and saving initiatives to improve the company’s energy efficiency, as part of its commitment to its mission of corporate social responsibility to help reduce environmental impact. Dealing with greenhouse emissions requires a strategy for both emission reduction and carbon capture and sequestration. The forum fostered in-depth discussion on the carbon capture and sequestration strategy in terms of technologies, common practices and potential capital investment that requires government coordination through policies and incentives.

Findings/Recommendations: In summary, the forum concluded with the following recommendations:

1. A healthy and open global investment climate needs to be established to help secure the energy supply and promote diversification, energy efficiency, clean energy infrastructure, and environmental protection. This effort requires the global cooperation of governments, industries, and academia. As the largest energy consumers, significant energy producers and greenhouse emitters, U.S.-China collaborative efforts will play a critical role in advancing these goals.
2. An increased investment is required in the oil and gas sector in enhanced oil recovery, in non-conventional hydrocarbon resource and, more importantly, in explorations that can potentially increase hydrocarbon production in a diversity of geographical locations.
3. There are huge collaboration opportunities in the nuclear power industry between the U.S. and China in terms of advanced technology transfer, nuclear waste disposal, and professional development.
4. Both the U.S. and China have extensive coal reserves. As coal will remain a major energy resource in Chinese power generation, there are huge collaboration opportunities for the U.S. and Chinese coal industries in developing clean coal technologies to reduce the level of greenhouse emissions.
5. Technology innovation needs to be encouraged in developing the alternative and renewable energy resources. A venture capital investment mechanism and intellectual property rights protections will play an important role in promoting innovation.
6. The government policies, incentives, and regulations will play an important role in encouraging clean development strategies, but implementation presents a major challenge. Exchange of best practices in the regulatory and policy areas, either at a

national or regional level, may help to increase the coordination and effectiveness of environmental policies.

Future Collaborations: The forum will first develop a white paper to state its findings and provide recommendations. If the white paper generates strong interest from stakeholders in the U.S. and Chinese governments, industry, and academia, the organizers will work with them to develop collaborative programs designed to address energy-related challenges and their role in U.S.-China relations.

Point of Contact: Dr. Guan Qin
Texas A&M University
Suite 612, MS 3404
College Station, TX 77843-3404
Phone: (979) 862-2716
Fax: (979) 845-5827
E-mail: guan.qin@tamu.edu