The U.S., China and Global Energy Security

By

David Pumphrey
Deputy Director and Senior Fellow, Energy and National Security Program,
Center for Strategic and International Studies

U.S. Energy Security Policy and Interests

U.S. energy security has been a frequent topic in recent political and policy debates. The actual definition of energy security is often elusive however. For this paper, energy security is defined as having adequate and reliable supplies of energy to meet the needs of economic activity and personal lifestyles. Energy services are fundamental to the production and transportation of goods, personal mobility and tools for improved living standards in all countries. The production and consumption of energy is also a major source of pollutants that damage the environment at both the local and global levels and which pose risks to human health and welfare. Maintaining an energy infrastructure that will deliver reliable, affordably priced energy services while minimizing environmental damage is the essence of energy security.

Two critical energy security challenges face the United States. The first is the long standing concern about the availability of adequate supplies of petroleum to meet our petroleum needs, especially in the transportation sector. The second is the transformation of the energy sector from one that is dominated by fossil fuels, which are responsible for emitting significant quantities of heat trapping carbon dioxide, to one based on low carbon emitting fuels. Both of these challenges are global in nature and require international collaboration in addition to domestic policy.

*Oil Supply Security* – Oil plays a unique role in the U.S. energy system. The transportation sector, including light duty vehicles, heavy trucks and buses, airplanes and shipping, is dependent on petroleum for more than 95 percent of its energy needs. About 70 percent of the petroleum consumed in the United States is in the transport sector. This dependence creates a significant vulnerability to both short run disruptions in oil production in the international market as well as to longer term trends in the availability and price of oil.

While the political calls for energy independence continue, the U.S. is likely to continue importing crude oil from international markets. Imports currently account for about 55 percent of total consumption in the U.S. Recent forecasts by the Energy Information Administration indicate that dependence will decrease to about 40 percent by 2030 given recent policy and legal changes.

The longer term outlook for global oil demand and supply give rise to concerns about the sustainability of current trends. Absent major shifts in policy or major technological breakthroughs, global oil demand is projected to increase by about 25 percent between 2007 and 2030 according to the International Energy Agency. Developing countries are expected to account for nearly all of this increase spurred by population increases, GDP growth and individual wealth expansion. However, during this time frame oil supply is expected to become increasingly concentrated in the hands of a limited number of oil producers principally in the Middle East. Countries such as Saudi Arabia and Iraq will control the bulk of the world’s lower cost conventional crude oil and will develop these
resources at a pace that will fit their long term interests. Increasing concentration of production also increases the vulnerability of the international flow of oil and raises the risk of serious supply disruptions whether through actions in producing countries or disruption of strategic transit routes.

Oil resources outside the Middle East region are becoming increasing expensive to produce and some unconventional oil sources such as oil sands and coal to liquids raise concerns about the level of carbon emissions associated with the production techniques. The current economic crisis has caused a slackening in the global growth of oil demand but the underlying trends in oil demand and supply would imply that the international market will become increasingly uncertain and volatile.

Concerns about oil supply security have dominated U.S. energy policy-making since the Oil Embargo of 1973. U.S. policy has incorporated a mixture of supply and demand measures. To deal with the risks of supply disruption, the primary tool is the Strategic Petroleum Reserve which contains about 700 billion barrels which can be released during a supply emergency. The release of the SPR is coordinated internationally with other member of the International Energy Agency.

To deal with longer term oil market concerns, the U.S. has established automotive fuel efficiency standards to slow demand growth, subsidized the development of biofuels as an alternative to oil and supported research into advanced batteries for electric vehicles. A particularly sensitive political issue concerns the role of domestic oil production to provide supplemental supplies to the market. Internationally, the U.S. works with the IEA and other countries to support the diversification of oil supplies, development of alternative fuels and to advance battery and other technologies that will reduce the importance of oil in the energy sector.

**Transitioning to a Low Carbon Energy Economy** – The U.S. has joined the international consensus on the need to take steps to mitigate the effects of climate change resulting from increasing concentrations of greenhouse gases in the atmosphere. In order to reduce the risk of catastrophic impacts, recent scientific assessments have indicated that GHG emissions need to be stabilized at level that will contain average global temperature increase to no more than 2 degrees Celsius. Assessments by the International Energy Agency have shown that this could mean reducing the amount of CO2 released into the atmosphere in 2030 from a business as usual level of 40 gigatons to 26 gigatons.

The most important contributor to increasing concentration of GHG’s is the combustion of fossil fuels for energy production. Currently about 80 percent of the world’s energy is produced by fossil fuels. Achieving the reductions implied by the analysis by the IEA and other institutions will require radical transformation of the way in which energy is produced and consumed throughout the world.

The Obama Administration has said that it wants the U.S. to reduce its level of CO2 emissions by about 80 percent by 2030 (using 2005 as a base year). Achieving this target would require significant improvements in the efficiency of energy consumption and
massive shift in the technologies to produce energy. Because coal accounts for about 50 percent of electricity generation, nearly 33 percent of U.S. GHG emissions come from the power sector. The transportation sector represents another 35 percent of total emissions. The U.S. will have to radically transform the way electricity is produced by incorporating non-carbon emitting sources or adopting technologies that will capture CO2 and the transportation sector will have to shift away from nearly total domination by petroleum.

The policy framework being put in place to make this transition to a low carbon economy involves the establishment of a cost to emit carbon that will provide incentives for investment in efficiency and low carbon technologies. This price may be set through a system that caps the amount of carbon that may be released and then allows companies to trade credits to emit carbon or through a straight carbon tax. In order to accelerate the transformation, the government is planning to provide financial incentives for low carbon technologies and energy efficiency and to expand basic research into new technologies.

This transformation of the energy sector raises significant energy security concerns because the rapid change in the infrastructure for producing and consuming energy can raise issues related to the reliability and the cost of energy. Renewable energy sources such as wind and solar are dependent on weather conditions to provide electricity. The energy system will need to develop redundant generation capabilities or energy storage technologies in order to assure reliability. Establishing a carbon price will increase the cost of energy in the economy. There is a risk that this cost may be too high to support continued economic growth and job creation. The key to dealing with these concerns will be to support continued efforts to reduce the cost of low carbon technologies and to develop new technologies.

Taking action to reduce the level of GHG’s will be an international effort. Wide spread adoption of energy efficiency and low carbon technologies will have the greatest impact. In addition, research and development activities that are coordinated among countries should accelerate the adoption of new technologies.

**Areas for Cooperation between the U.S. and China**

Even though the United States and China are at different levels of development, they broadly share similar interests in energy security. For both countries, a reliable and affordable supply of energy is critical for economic health. Both countries also share similar interests in reducing the environmental consequences of energy production and use.

In the area of oil security, the U.S. and China are both significant importers of oil and vulnerable to disruptions in the free flow of oil in international markets. The two countries should work together to help maintain stability in oil producing regions and be prepared to cooperate in the event of oil supply disruptions by coordinating the release of their strategic oil stocks. China should consider ways to engage actively in the International Energy Agency, while the U.S. should stand ready to support changes to the IEA that may be required to gain China’s participation.
For longer term oil market stability, the two countries should work closely to develop international standards for vehicle fuel efficiency and to develop new automotive technologies.

To support the transition to a low carbon energy economy, the U.S. and China should work collaboratively on the development, demonstration and deployment of the new technologies that will be critical to finding the low cost path to a reliable, affordable low carbon energy infrastructure. The U.S. and China should deepen discussions on the type of international framework that will allow both countries to make commitments to reduce the carbon intensity of their economies while recognizing their different needs in terms of economic development.