

How to Reach Global Accords on Energy, Climate and Development Policies: A China Perspective

Lin Bo Qiang
China Center for Energy Economic Research
at Xiamen University

I. Some Basic Facts about China Energy Sector

(i) Current Energy Demand and Production: The second largest energy producer and consumer in the world: the largest coal producer and consumer, about 32% of the World total; the second largest electricity producer and consumer; the second largest oil consumer and the third largest oil importer.

(ii) Energy Dynamics: In 2000, China consumed 1.3 billion tons of coal and in 2006; the coal consumption is expected to be 2.4 billion tons. In the same period, the electricity installed capacity will increase from 320 GW to 580 GW. For the last two years, China added more than 60 GW per year and this is expected for at least the next two years. Energy consumption increased by 15.3% in 2003, 16% in 2004 and 9.9% in 2005. In 2004 alone, the oil consumption increased by almost 16%.

(iii) Future Perspectives: Because of its large population, China's per-capita energy endowment is below the World average (2004 numbers): oil 7%, natural gas 6%, and coal 60%; and a very low level of per capita energy consumption, which is still less than half of the world average, and one tenth of that of the United States. With more than 10% GDP growth in recent years, the expectation for its energy demand is high and will continue until 2020. In 2004, China produced 5 million cars and the expected capacity will be 14 million by the end of 2007.

(iv) Energy Mix: In 2004, coal accounted for 67.7% of the total energy consumption and oil, 27.7%. 75% of electricity capacity was coal fired.

II. Why China Needs So Much Energy

(i). Growth pattern and Industrial structure

The main features of China's growth pattern have been investment driven and high economic growth. GDP growth has been 9.6% average for almost three decades and investment as percentage of GDP typically more than 40% and is close to 50% now. The heavy industry has long been considered as the most important industry in the economy. In 1985, the share of heavy industry accounted for 55% in the industrial GDP. The share went down to 50% in 1990, but in 2000, it again reached 60%, and then it was as high as 68% in 2004. The heavy industry experienced the fastest growth in recent years, fueled by a large-scale infrastructure development for economic growth and urbanization. In the year of 2003, the investments in automobile, aluminum, steel and cement have increased by 77.8%, 88.4%, 96.2% and 113.4%, respectively. In 2004, China produced 27% of the world total steel output, 30% of coal, and 50% of cement. Electricity, steel and cement accounted for 70% of coal consumption.

(ii) Urbanization Process

Why China needs so much energy intensive industries? By 2020, China's per-capita GDP is expected to reach \$3,000, and becomes a middle-income country. One main feature of a middle-income country is urbanization. Based on the urbanization process of other middle-income countries, if China wants to become a middle-income country in 2020; about 300 million rural populations will need to move into and work in cities. It is estimated that the energy consumption per capita of Chinese urban resident is about 3 times of that of the rural residents. Investment in urban infrastructure and housing will be needed to facilitate the urbanization process. This requires steel and cement that can only be produced domestically, because of large quantity. These industries are highly energy intensive. Therefore, as long as China's has a firm desire to quickly become a middle-income country, the continued growth of energy intensive industries seems to be inevitable.

Another aspect is that China also needs sufficient jobs to facilitate urbanization process. This leads to another China's growth

priority that requires competitiveness of consumer goods in the world market. The cheap consumer goods require both low labor and low resources costs. Low labor cost is not a problem given its current large labor surplus. In fact, despite several decades of high economic growth, labor cost is still relatively low in China. The low energy prices, however, require the Government's actively control, and through low resource tax and high energy and transportation subsidies. This not only seriously affects efficiency of energy industries but also energy efficiency in China.

(iii) Slow Energy Market Reforms

The energy industries in China are mainly state-owned monopolies and the energy issues are often socialized and politicized, leading to slow market reforms. The reforms on energy prices, including oil, electricity and coal, have been not completed until today, and may not be in place in the near future. For example, the power market reforms started in 2002 with very little progress up to today. It still requires the government approval for most of energy investments and the government sets power tariff, prices of oil products, and to certain degree, coal prices. With high concentration of SOEs and actively controlling energy prices, the State is in practice still monopolizing the energy industry.

Why is energy market reforms in China so slow comparing with the reforms of other sectors? Energy, as productive inputs and consumer goods, affects both growth and social stability. If you want me to sum up what is the most valuable lesson learnt of China's close to 9.5% average growth for more than tow decades, I would have to say that it has been the social and political stability that provided a relatively stable and predicable business environment. China has been able to obtain high economic growth by ensuring social and political stability and in turn, achieving social and political stability by the fast economic growth. For the Chinese government, social stability is absolutely a number one priority and all others are secondary, including efficiency.

III. Energy Situation

(i) Energy Supply and Demand

The energy consumption in China increased by 50% between 2002 and 2005. We estimated that if business as usual, China could possibly consume 3.5 billion tons of coal by 2015, and the oil dependency could reach 65%. Given its limited energy resources, it is argued that China could buy energy from other countries like many other countries that do not have enough energy. Although China in 2005 supplied about 93% of its energy consumption, given its size of demand, the rest of 7% could still make a significant impact on the world energy market.

Even with expectation of a long run energy shortage, short run energy surplus is a reality in China. This is mainly the result of high concentration of state owned enterprises in the energy sector (for example, 95% of the power industry). These SOEs' main objective was to become "bigger". This objective was often supported by local governments with clear GDP and taxes income incentives. The demand and supply condition could be interpreted according to their needs. Large domestic savings and state owned banks made this possible. Today we can see a large power surplus. There are still many SOEs willing to invest in power plants, if the central government is willing to approve them. After 4 years of power shortage, the power supply and demand has reached balance this year and is now expected to have a large surplus in 2007. Similarly, the coal supply is also heading for a surplus in 2007.

The recent surge in energy consumption lifted China's energy demand onto a higher level. Even a low growth rate of energy consumption could result in a large absolute incremental. China's high dependency on oil import has been considered a matter of national security that has led to many Chinese state-owned energy companies actively involving in cross-border mergers and acquisitions of energy assets.

(ii) Energy Prices

Not reflecting the energy scarcity and the environmental impact, energy prices in China are artificially kept below market prices, apparently for both social stability and economic growth. China's recent growth of heavy industry with large over capacities made

many people believe that energy consumption was “excessive” and was stimulated in part by low energy prices. Taking steel industry as an example: in the first half of 2005, the steel output increased by 26% year-on-year, and the half of the incremental was exported. The steel industry is energy-intensive. If the steel export could reflect China’s resource scarcity and internalize environmental impact and still make profits, it is good for China. However, with low energy prices and large environmental impact, the steel export could be “excessive” and a long term loss to China .

The low energy prices also led to inefficient use of energy. The energy efficiency of Chinese industries is usually substantial lower than that of developed countries. A survey of 8 high energy intensive industries indicates that Chinese firms consumed 47% more energy. Low energy prices encouraged Chinese firms to invest in cheaper equipments and technologies with lower energy efficiency. China’s export currently contributed about 37% to its GDP, but in a way of low value added and high resource intensity. Given its resource constraint, previous and present low energy prices policy that led to “excessive” energy consumption will lead to higher energy prices in future.

Kommentar [A1]: This does not seem to fit here.

The recent surge in energy consumption has been accompanied by a significant increase in energy prices in China, but the increases were not sufficient to reduce demand. The domestic coal price has increased by 29%, the largest increase in the China history. Electricity prices and prices of oil products have also been increased substantially, but still in the firm control of the Government. In the same period, the coal price in the international market increased by 79% and international oil prices have been more than doubled. China economic growth has been investment driven that often led to over capacity in industries. Low energy prices could be one of the main factors contributing to this.

IV. Environmental Condition

Energy production and consumption directly impact on all aspect of environment. The current growth pattern and industrial structure is highly energy intensive, leading to severe environmental pollution. Though it is difficult to quantify the impacts of environmental

pollution, some rough assessments on actual state of the pollution in China are shocking. According to China Environmental Protection Agency, in 2004, the environmental damage led to economic loss of \$64 billion or 3% of GDP. More than 400,000 people dead because of air pollution and 300 million people without clean drinking water.

Some other indicators could also be used to illustrate the seriousness of environmental condition in China: 90% of rivers near the cities have been seriously polluted and one third of China territory affected by acid rain. SO₂ and CO₂ emissions are the largest and second largest in the World, respectively. In 2004, 60% cities in China didn't meet the secondary air quality standard, and of the 10 most polluted cities in the World, six are in China.

The Chinese government has long been concerned about the impacts of its large population on the environment and natural resources, and the recent expansion of energy intensive industries added to this worry. In 2004, the coal utilization accounted for 90% SO₂ and 85% CO₂ emissions. However, China energy consumption will continue to be dominated by coal to maintain low energy cost. Though the Chinese Government has made great effort, but has been unable to fundamentally reverse the trend of ecological deterioration and environmental pollution.

By failing to factor resource scarcity and environmental costs in today's energy prices, China is adding an immense burden of clean up costs to the future generations. It was estimated that China needs \$36 billion or close to 2% of GDP to mitigate environmental damage caused in 2004. Given the fact that China's population is aging and assuming the one child policy continues, the China's work force is expected to start shrinking from 2020. If business as usual, it would be scary to imagine a future situation when a small labor force supports a large population with little resources (energy) left and large environment clean up costs. Further, current way of polluting environment is not sustainable in both domestic and international perspectives, as pollution has both domestic and international implications.

Another aspect of environmental concern is the way China rushing to meet high energy demand. From June 2002 to June 2006, China experienced a severe power shortage. People were impressed by China's ability to address the power shortage with an unprecedented rate of increasing power capacity. This however, in my view could be problematic. It was obvious that China did not expect the demand surge. Because of urgency of meeting power demand, the environmental aspects of power plants might not have been properly assessed. If a power plant should not be built, but was built. The negative impact could be there for 30 to 50 years or even longer.

V. What China Needs to Do

(i). Energy Intensity Target in China's 11th Five-Year Plan (2006-2010)

The Chinese Government clearly understands the issues and placed an ambitious energy intensity target in the 11th Five-Year Plan, which covers 2006 to 2010. The target requires energy consumption for per unit of GDP should be 20% lower than that of 2005. In fact, this is one of the few targets with specific numbers in the Plan, which demonstrates the willingness of Chinese Government to address energy and environmental issues. Even though people in China recognize that the current energy consumption and pollution in China is unsustainable, and improvement in energy intensity is a high priority, adjusting current pattern of economic growth might require slower GDP growth and slower urbanization process. Even if China is willing to do this, it is difficult to adjust industrial structure within five years. The Government is also actively promoting energy conservation activities. However, with low energy price policy and lack of energy market facilities at this stage, all energy conservation activities produce little results. Therefore, the energy intensity target in the 11th Five-Year Plan will be difficult to meet as all measures for reducing energy intensity take time to implement. In fact, China's energy intensity was actually higher, instead of decreasing during the first 8 month of this year.

(ii). Energy Market Reforms

The inadequacy in market reforms, particularly energy price reforms, certainly contributed to “excessive” energy demand in China. China is now facing a very difficult choice of a more efficient energy sector and higher energy prices. However, this choice needs to be made and needs to be made very quickly. In finding a suitable industrial structure or growth pattern in accordance with the China’s energy and environment realities, it has been proved in both theories and development experiences that the “invisible” hand of market will be more effective than the “visible” hand of government. If this accepted, there is a need to speed up market reforms in all energy subsectors and to reflect energy scarcity and environmental costs in energy prices. Without addressing energy market and pricing issues, promoting energy conservation and improving energy efficiency could not be achieved.

(iii). Energy Conservation and Energy Mix

Given certain industrial structure, energy intensity could be addressed through energy conservation, both from supply and demand side. The prospect of urbanizing 300 million people is both a huge challenge and an important opportunity. If those people could be provided with more efficient housing and transport than current standards, it would result in large savings in energy consumption. The Government can play an important role by raising and enforcing building design and energy efficiency standards based on international best practices. Planning cities and other urban areas for more efficient public transport is a further area of opportunity.

Given certain level of energy consumption, environmental pollution can also be addressed through a cleaner energy mix. However, China’s energy sector will continue to be characterized by a high level of coal consumption, a large requirement for coal production and transportation, and an extensive coal infrastructure. A significant shift away from coal in the medium term is unlikely due to the limited oil and gas reserves and potential for further development of its hydropower resources. However, China is not anywhere near reaching the end of its clean energy options, including nuclear power and other renewable.

(iv) Building Consensus

Energy conservation and environmental protection also depends on people's understanding and awareness of energy and environmental problem. Two areas require close attention in building consensus. The first is to establish an effective mechanism for energy conservation and environmental protection. Between 1980 and 2000, China's was able to achieve an annual 4% decline in energy intensity. However, after more than two decades of industrialization, in most areas, China's has completed modernization of its traditional industrial processes. Therefore, comparing to its early stage of development, it is now more difficult for China to lower energy intensity. The energy conservation will need to cover both supply and demand side for it to be effective. Fortunately, Chinese people now understand better of the idea of energy crisis and environmental protection. It is important to establish an applicable system to internalize the environmental costs, strictly enforce environmental standards, and make those who cause environmental damage accountable, legally or financially.

The second is to avoid the development strategy of growth first and environmental protection later, which is still popular at local levels. When discussing about GDP, the local governments are usually explicit. However, when citing energy intensity, the targets are usually ambiguous. Though there are still poor in China, poverty is not longer a major development issue. China is on the way to become a middle-income country at an unprecedented pace, and the poverty should not be an excuse for postponing environmental protection.

VI. How Other Countries Can Help?

(i) Good Understanding of China Energy Demand and Its Impact

The demand for energy in China will continue to increase. With projected 9% growth rates, a large population and low level of per capita energy consumption, an emerging high rate of motorization in the transport sector, and a rapid urbanization process to accommodate about 20 million rural emigrants a year, the energy demand is expected to be strong and will continue until 2020. The central government in China now is very defensive about impact of its

energy demand, particularly in the international market. The worry is that the people at local levels might take it as a signal that the energy is not a problem for China. For this, positive dialogue and cooperation can help to put this in a right perspective. On the other hand, negative propaganda and less cooperative attitude will strengthen China's defensiveness and worsen the prospects for addressing World energy and environmental issues. Similarly, it would be a mistake to think that the Chinese government does not take energy and environment seriously. The difficulty is that it has to make choices without a clear understanding of possible outcomes. For example, large coal fired power plants will pollute the environment. But what other choices could China have to maintain low energy prices to fuel a 9% economic growth and preserve social stability? Would higher energy prices affect social stability? It is also not realistic to assume that people with per capita income of \$1300 will value environment as people with a per capita income of more than \$35,000 in the developed countries.

(ii) Promoting Energy Efficiency and Clean Technology

Giving it time, China may be able to resolve these problems in its growth process. However, would it be too late? Can we imagine the impact when China burns 4 billion tons of coal a year? We can not tell China not to burn coal for its economic development. However, we can persuade China to burn less and in a more efficient and cleaner way. Since coal is presently the dominant energy in China and the situation will continue for a long time, it is important to encourage the usage of clean coal technology by providing assistance and technology. Even there are no technical difficulties to cleanly utilize coal, it requires a political will to promote and enforce it. In searching for clean energy, some financial incentives could be provided. There are many other things could be done in this area. For example, the Government can be encouraged to more strictly enforce energy efficiency and technical standards of industries, buildings standards and pollution emission standards. Considerable strengthening of monitoring and enforcement mechanism will also be necessary.

(iii) Provide Assistance in Addressing Reform Issues

More assistance is needed by demonstrating successful international experiences to convince China that good and faster energy market reforms are not necessary leading to instability. Through market reforms, the government can be more focused on macro aspects of energy production and consumption, such as system planning and resource allocation, and let market to play a more important role in micro energy investment decisions.

Helping China to meet energy and environmental challenge is helping ourselves, as in the end we are all in this together.

For more information

China Center for Energy Economic Research at Xiamen University

bqlin@xmu.edu.cn

Fax: 86-592-218-6075

Tel: 86-592-218-6076