China's Energy Reforms

Professor Xing-guang Ling
Fukui Prefectural University
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Since the latter half of 1996, China's coal market has endured a supply glut. In 1997, electric power became oversupply as well. Spurred by the situation, an energy reform program, which swept Japan in the 1960s, is underway in China.

Let's look at the coal industry first. At a coal working task meeting held in November of 1998 the government decided that in order to reduce oversupply, many inefficient coal mines, most of them are small sized factories, would be closed down from 1998 to 1999. And as the result the annual output of 250mn ton of coal would be reduced. More specifically, it was decided that total coal production, which stood at 1.36 billion ton in 1997, should be reduced to 1.1 billion ton. Moving steadily towards this target, total coal production fell to 1.23 billion tons in 1998, and annual output for 1999 is expected to drop to 1.03 billion tons, along with the closure of 25,800 mines.

As for electric power, in 1998 power-generation facility capacity totaled 250 million kilowatts, and the amount generated for the year was 1.16 trillion-kilowatt hours. For the five years from 1994 through 1998, the amount of power generated grew at a rate of 6.2% per year. However, with demand for energy showing little signs of growth, the deficit in the electric energy supply changed to a surplus in 1997. Given these conditions, policymakers decided to close down all thermal power generation facilities producing less than 100,000 kw by the year 2000 since these operations had low efficiency rates and caused environmental pollution. By 1998, 2.84 million kw had already been taken off line and in 1999 another 1.8 million kw are expected to be removed from the grid.

The administrative measures taken to close China's small coal mines and to take smaller thermoelectric power plants off-line were the result of a series of market-oriented economic reforms to liberalize the coal pricing system and to weed out inefficient sectors under a relaxed supply and demand market. Reforms in state-owned enterprises are also in process parallel to the above mentioned changes. However, unlike past administrative measures, these steps are of long-term significance.

The oversupplied energy sector indicated that the bottleneck that has plagued China's energy sector for years has finally been eliminated. It also showed that the government's market-oriented energy policies will have a revolutionary effect on the following three areas: energy industrial structure, coal usage method, and the internationalization of supply and demand balance. Given these movements, China's energy reform seems to be well underway.

The structure of China's energy industry will be altered by a rapid shift from coal to natural gas. Currently, China relies on coal for 74% of its energy needs, causing the inefficient usage of energy resources and environmental pollution. To fundamentally

change this situation, national policy calls for the replacement of natural gas, hydroelectric power, nuclear power, wind power, and other clean energy sources for coal.

China's Energy Production Structure (Million tons of standard coal; %)

	1952	*1980*	*1997*
Total Production	48.7	637.4	1,319.9
Coal	96.7	69.4	74.3
Gasoline	1.3	23.8	17.4
Natural Gas	--	3.0	2.3
Hydroelectricity	2.0	3.8	6.0

Source: China Statistical Yearbook, 1998 Edition, p. 251

Interest in natural gas exploitation is high in China today. Extensive geological surveys have discovered a succession of natural gas fields. Although proven reserves amount to only 1.5 trillion cubic meters, estimated reserves stretch to 50 trillion cubic meters. Among the world's advanced economies, the former figure currently stands at 37-42% of the latter figure. In China, however, proven reserves account for a mere 3% of estimated reserves (The Macro Economy Research Institute of the State Development Planning Commission, Research on a Vast Blueprint for the New Century, China Commodity Publishing Company, 1996, p. 240). Chances are that continued geological surveys over the next ten years could increase the amount of proven reserves in tenfold measure. In addition, estimated reserves of coal gas could go as high as 50 trillion cubic meters.

Natural gas production in 1997 amounted to 18.25 billion cubic meters. Most of this gas was produced in the Sichuan gas field, the Daqing and Liaohe oil fields, the Shengli and Dagang oil fields, the Tarim field in Xinjiang, the Qaidam oil fields in Gansu province, and the Shaan(xi)-Gan(su)-Ning(xia) gas fields. The largest reserves are the four gas fields located in western China (Sichuan, Tarim, Qaidam, and the Shan-Gan-Ning fields), that are said to have 26 trillion cubic meters. The natural gas derived from these fields exceeds the demand in western China. Transporting natural gas to the coastal economic development areas has become a major issue, and steady progress is being made in the installation of gas pipelines.

Projects to transport natural gas from west to east are undergoing some major improvements. By 2002, two new gas pipelines connecting Sichuan, Wuhan and Shanghai, and connecting Xi'an and Xinyang will be completed. Upon completion, natural gas from Shan-Gan-Ning and Sichuan oil fields will flow to Shanghai. The Qaidam and Tarim gas fields will be linked to these main pipelines by 2005 and 2007, respectively. Stretching 4,200 kilometers in length, yearly delivery capacity is expected to total 25 billion cubic meters, an equivalent of some 25 million tons of oil. A 900-km gas pipeline running from northwest China to Beijing has already been completed, and in the future a pipeline network complete with underground storage tanks and branch pipelines stemming from these main pipeline routes will be built.

According to a statement made by an organization representing China's oil and natural gas reserve interests, by 2010 there should be four major gas fields within China capable

of producing 50 billion cubic meters of natural gas (the equivalent of 50 million tons of oil). In addition, two gas fields of a similar operational scale are scheduled to be developed overseas, yielding a combined total natural gas output of 300 billion cubic meters (the equivalent of 300 million tons of oil). This volume would be more than fifteen times the current amount of natural gas produced, or twice that for oil. If petroleum production remains stagnant, the weight of natural gas is sure to quickly rise.

Progress is being made toward the integrated use of coal and thermoelectric power generation. China's energy structure is heavily weighted towards coal, and any attempt to rapidly replace this resource would be unrealistic. Current policy calls for maintaining yearly production capacity at about 1 billion tons as the government grapples with one key issue, how to increase economic efficiency and prevent environmental pollution through integrated applications. Toward this end, research is being conducted on coal liquefaction and gassification. Types of integrated usage include using coal ash as building material, making use of the heat generated during power generation, and the widespread use of coal in the chemical engineering sector.

In an attempt to lower the costs and amount of coal transported, mine-mouth thermoelectric power plants will be constructed in Shaanxi and other coal-producing regions to supply power to China's eastern coastal economic development areas by means of a power transmission network. In 1997, energy generated in China was 75.7% thermoelectric, 23.5% hydroelectric and 0.8% nuclear (China Economic Yearbook, 1998 Edition, p. 290). Coal provided the raw material for most thermoelectric power generation during the year; however, the volume of coal transported could drop significantly if mine-mouth power generation plans are realized. Moreover, the movement of this resource via coal/water slurries is also being looked into.

Finally, plans are being draw up to balance the supply and demand of energy through international transactions. During earlier planned economic terms, coal and oil were exported, but no imports were made. China's movement towards a market economy, however, has brought about calls for economic efficiency, and today China both imports and exports these resources. Now, geographical factors affecting transportation and production costs, quality and grade are compared with those outside China. For instance, because of China's vastness, it is often cheaper to import natural gas by tanker than to haul it to southern China from western China. For example, it is reported in June of this year that, a liquefied natural gas (LNG) installation will be constructed in Shenzhen with a yearly throughput capacity of 3 million tons. In addition, a 400-km long gas pipeline will be constructed in the Pearl River Delta region, as the result, an urban gas operation must be established. LNG from this installation is expected to be imported from Australia, Malaysia, Oman and other countries.

There are also plans to funnel natural gas from the Russian Far East and the Caspian Sea to Northeast Asian regions. For example, some advocates are hoping embark on a project to build a pipeline that would bring gas from Irkutsk gas fields through China and South

Korea to Japan and other regions. Moreover, efforts are being made in China to export coal. Its export target for 1999 is 40 million tons, or a 25.5% increase over the previous fiscal year.

For the past twenty years, and during the opening and reform period, China has basically been self-sufficient in energy area. For example, in 1997, energy output for standard coal was 1.32 billion tons. With consumption at 1.42 billion tons, the self-sufficiency ratio was 92.95%. The reason that China's self-sufficiency ratio was so high was that, until recently, demand for oil was limited and China managed to make do with the coal it had. However, with the demand for petroleum increasing rapidly, indigenous oil resources evaporating, and a need to convert to cleaner energy sources is present, and China will find it more difficult in the future to be self-sufficient in this regard. In terms of the international division of labor, the country's policymakers had to consider how to balance energy supplies with demand. There is also a need to shift away from the national defense-oriented mindset that views energy resources as commodities of strategically important requisite to the preservation of self-sufficiency. While looking at energy in such way has been mostly put aside over the last twenty years, it has not been completely put to rest. Japan faced a similar controversy during the 1960s as to whether it should preserve self-sufficiency with high-cost domestic coal or convert to low-cost imported oil. Today's China is being pushed into the same situation that requires making a similar choice.

It is often said that Japan and other countries are concerned that increased demand for energy in China might force it to expand outside of its borders to acquire energy sources. I think this is an unreasonable judgement. More than anything, China's economy will inevitably be edged towards greater international cooperation if its external dependence on such important commodities is higher. Japan's situation in the post-war period is a strong evidence for this case. The frequently heard avocation for a life-line sealane (a route for importing oil from the Middle East) aiming at securing energy resources comes straight out of pre-War and cold-war thinking pattern. This type of contentiousness towards China stands in the way of China's energy reform, and at the same time acts as a damper on international cooperation.

China needs an enormous amount of capital to succeed in its energy revolution, and international cooperation both in scientific and technical areas is also indispensable. It is no exaggeration to say that China's success or failure may hinge on the coming international political environment. Both China and the rest of the international community must clearly understand this, and it is expected a cooperative structure will be built to ensure the success of this endeavor.

**Prof. Xing-guang Ling teaches in the Department of Economics at Fukui Prefectural University in Japan. He is also a research fellow of the World Economic Politics Institute in the Chinese Academy of Social Sciences. Prof. Ling is doing research on China's economic reform, economic zones of North East Asia, and Sino-Japanese Economic Relations. He is the author of *China's Economic Reform and Its Future* (1996), written in Japanese. Prof. Ling can be reached at ling@fpu.ac.jp.