DOE/FE/63313--T3 - Pt. 4

China's Current Anti-Inflation Measures is Nurturing an Electricity Supply Crisis

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June 1995

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1. Introduction

Prior to 1994, China's highest inflation rate was 18.8 percent in 1988, the high inflation rate in 1988 was believed to have contributed to the Tiananmen Square Incident in 1989. Since January 1994, China's inflation rate has been above 20 percent. In October 1994, inflation had climbed to a record 27.7 percent (*China Daily* December 23, 1994). Although inflation rate has dropped since then, it is still haunting at about 20 percent even now (*China Daily* March 18, 1995). Naturally the high inflation rate has caused serious concern of the Chinese government. A series of anti-inflation measures were adopted including strictly control the scale of investment in fixed assets and direct price controls on selected commodities. Since the beginning of 1995, the State Council has not approved any new large and medium sized projects. In a speech on national economic situation on May 28, 1995, Chinese Vice-Premier Zhu Rongji urged governments at all levels to give priority to the control of inflation and take strict measures to control the investment scale in fixed assets (Zhu, 1995). Anti-inflation measures have affected the power sector development seriously. Total fixed asset investment in China's power industry in 1995 is about one-fourth less than that of the 1994 level in constant value (Ministry of Electric Power, 1995), and many power projects are suspended. Price controls on electricity and the Chinese government's attempts to cap the rate of return of foreign investors in China's power sector at 12-15 percent start to scare away foreign investors. The combined effects are expected to deteriorate China's electricity shortage situation and negatively affect the country's economic growth. Threatened by the damages of electricity shortages, many local governments started to build small size power plants to avoid central government interferences; however, the efficiency of small power plants are typically lower than large ones.

2. The Impacts of Anti-Inflation Measures on China's Power Sector

Since the beginning of China's economic reforms, the country has experienced rapid growth in its power sector. During the 1980-1994 period, China's electricity generation grew at an average of 8.2 percent per year. In 1994, total electricity generation reached 905 billion Kwh (TWh), of which hydropower plants generated 168.5 TWh, thermal power plants (predominately coal-fired) generated 723 TWh, and nuclear power plants generated 13.5 TWh. Figure 1 shows that by the end of 1994, China's total generating capacity reached 198 gigawatts (GW), of which hydropower capacity accounted for about 25 percent, thermal power about 74 percent, and nuclear power about 1 percent. In 1994, 12.4 GW of large and medium-size generators were put into operation (*China Daily* December 28, 1994). The past achievement in China's power sector is contributed by a number of factors including central government priorities in the power sector, reforms in the investment mechanism, and the open-door policy toward foreign investors. China now has a total of 60 foreign-financed power projects (24.7 GW in hydropower, 45.7 GW in thermal power and 2 GW in nuclear power) either under construction or negotiation (Peregrine, 1995, p20). However, the recent anti-inflation measures are expected to have serious negative impacts on the development of China's power industry.

In order to reduce the investment scale in fixed assets, a total of 67.6 billion yuan investment in power construction projects are scheduled in 1995, reflecting an one-fourth reduction from the 1994 level (in constant value). The reduction in power project investments will postpone about 20 GW power projects which are currently under construction, some projects will have to be suspended, and new large and medium sized power projects will not be started in 1995. By the end of 1995, total generating capacity is expected to reach 210 GW with

total generation of 990 TWh. Although the installed capacity and generation targets set by the Eighth Five Year Plan (1991-1995) can be achieved. The actual capacity of power projects under construction can only meet about half of the planned target and the investment in the transmission and distribution system is also much lower than planned target (Ministry of Electric Power, 1995). The effects of reduced power sector investment will become more obvious in the near future, as newly completed capacity in 1996-1998 will be reduced to about 10 GW per year (Shi, 1995), which is substantially below the projected demand for new capacity of 17-20 GW per year (Li and Johnson, 1994a).

Figure 1 also shows that China plans to increase total generating capacity to 300 GW by 2000, of which hydropower will account for 22 percent (65.9 GW), thermal power 77 percent (233.1 GW), nuclear power and new energy 1 percent (nuclear power 2.1 GW, others 1 GW). By 2000, annual generation is planned to reach 1,400 TWh. During the Ninth Five Year Plan period (1996-2000), China is estimated to require 770 billion yuan (\$93 billion)¹ investment in its power industry to achieve the planned target (Ministry of Electric Power, 1995). However, even this aggressive development plan can be achieved, electricity demand is likely more than 11 percent higher than supply by 2000 (Peregrine, 1995, p14).

The central government is no longer the major source of investment. In 1980, the share of central government investment in total power sector investment was 91 percent. At present, central government's share in any new power project normally is not more than 30 percent of project investment, and in many cases less than 20 percent (Li and Dorian, 1995). Most

¹ The exchange rate used in this paper is the current exchange rate (\$1=8.31 RMB) unless otherwise mentioned.

investment today comes from local sources, including specialized tariff charges to consumers, and stocks and bonds issued to the public. The importance of foreign investment has also increased. The Ministry of Electric Power (MEP) hopes to raise \$25 billion abroad in the 1995-2000 period (Peregrine, 1995, p20). This is not a easy job, because the demand for foreign investment in other Asian countries are also very strong, and the terms offered by many other countries are more attractive to international investors.

As an anti-inflation measure, price administration authorities throughout China have implemented price control measures. For example, the Shandong Huaneng Power Development Corporation (SH), one of the two Chinese corporations listed in New York, indicated that its application to raise tariffs according to the agreed tariff formula had been turned down by the local authorities. The on-grid tariffs of the company for 1995 were maintained at the 1994 level, while the operating costs increased substantially due to inflation. As a result the market value of the stock decreased to about half of its initial price, although its on-grid output increased 48 percent in 1994 relative to 1993 (SH Annual Report 1994). The impacts of this event are not limited to one company, it has seriously undermined the credibility of China's regulatory framework. In a recent survey conducted by the East-West Center of the United States among international power, coal, and engineering companies, China's investment climate was ranked second lowest (next to Vietnam) among 13 major coal-using Asian economies (Johnson and Li, 1995).

3. China's Inflation Rate Cannot be Reduced by Sacrificing the Power Industry

Due to political reasons, the Chinese government is desperate for reducing the current

high inflation rate. However, China's high inflation rate is unable to be reduced by sacrificing the development of the power industry and/or squeezing the profitability of foreign investors. As indicated by a Chinese economist: "Inflation in China is described as essentially institutional because the macroeconomy lacks a microeconomic base that is compatible with a market economy (Li, 1994)." Although China's inflation is also contributed by excessive investment, the main reason behind the irrational investment is that many local governments and state enterprises do not assume the risk of investment and do not worry about the returns of their investments. Reportedly, by the end of 1993, the enterprises owned by the MEP had lent 7 billion yuan (\$842 million) to other sectors, while the annual return of these loans was less than 1 percent (Shi, 1995).

Tight fiscal and monetary policies may have a short term effect on inflation caused by overheated investment. However, a belt-tightening policy on all investment projects, good and bad alike, will probable do more harm than good. As pointed out by Li (1994), inflation in China is essentially institutional, but it is also demand-led, cost-driven, and structural. The key to reduce China's inflation rate is a healthy economic growth. China's electricity shortages have certainly contributed to the structural inflation.²

The power sector's crucial role in China's economic development is fully recognized by the MEP. However, since the MEP also owns most of China's power plants and electric systems, the function of MEP is not a real regulatory authority, rather it is a combination of state enterprises and government authority, while the State Planning Commission (SPC) is more

² Structural inflation occurs when some key sectors fail to meet demand, resulting in bottlenecks and in turn driving up the prices of other products.

of a regulatory authority in China. The SPC has no vested interest in the development of the power sector, but also it has much less knowledge with respect to the electricity demand and supply situations. Recently, China's electricity shortages appear to have been alleviated, which is an important reason behind the reluctance of the SPC in approving power projects, although the MEP has warned the SPC that any attempt to curb inflation by suspending new power projects will set back China's economic growth (*Power in Asia* April 17, 1995).

4. Power Sector Foreign Investment Policies Need to be Reformed

With respect to foreign investment in China's power sector, both the MEP and the SPC have two schools of thinking. The school which against foreign investment emphasizes the higher prices of foreign invested power projects, while the school which in favor of foreign investment emphasizes the economic losses of electricity shortages due to the limited ability for domestic sources to meet demand, and the higher quality of foreign invested power projects in terms of reliability of supply. Reportedly about one-third of the necessary funds to achieve the planned capacity target by 2000 has not been available so far (*China Daily* March 24, 1995).

The high prices of foreign invested projects are caused by two factors. One is that most foreign invested power projects tend to use imported equipment which is more expensive than domestic equipment.³ The second reason is that foreign investors require higher returns on their

³ In the listing prospectus of Huaneng Power International (HPI), the estimated construction cost of the Shangan Phase II is budgeted at only 2.23 billion yuan, while the Dalian Phase II is estimated 4.57 billion yuan. The plants are roughly the same size, the only difference being that Shangan will use domestic equipment while Dalian will use imported equipment. Information from the listing prospectus of HPI revealed that the estimated investment for domestic and imported coal-fired power plants are about \$427 and \$750 per Kw, respectively (Peregrine, 1995, p5, p15).

investment than the state owned power plants.⁴ Although it is difficult to reduce the prices of foreign invested projects, there are ways to do it through the efforts of both parties. For foreign investors, trying to use more domestic equipment will have an obvious effect to reduce the costs. Since Chinese consumers are used to lower quality electricity supplies, improvement in supply reliability is valued much less in China than in developed countries. With respect to the required returns on investment, there is less room to make concessions for the foreign investors, given the huge demand for international capital and better terms offered by other Asian countries. However, policy reforms in China's power sector may reduce the risk premium required by foreign investors.

The aforementioned survey indicates that the target internal rate of return (IRR) required by international power, coal, and engineering companies is the highest in China among the 13 major Asia-Pacific economies (Table 1), reflecting the fact that foreign companies require the highest risk premium in China. The results of the survey also suggest the following directions of policy changes to reduce the required risk premium in China:

(1) Improving the creditability of the regulatory authority. Figure 2 shows that government policy is the most important criteria in selecting countries for investment. If the government retreat from its promises for political reasons, it will force foreign companies to demand a high political risk premium. The aforementioned case of Shandong Huaneng Power Development Corporation will make other Chinese power companies extremely difficult to find international takers for equity.

⁴ Reportedly, the profit rate of capital for China's domestic power sector as a whole is only 2.5 percent (*Energy Research Bulletin*, April 24, 1994).

(2) Regulating on electricity prices instead of on rate of returns. Figure 3 indicates that according to the Euromoney country risk ranking China has a lower risk than Pakistan, Vietnam, Philippines, and the India; however, international power companies are requiring the highest risk premium in China. One possible explanation is that while China is regulating on the rate of returns, Pakistan, Indonesia, and the Philippines are fixing the electricity prices (only fuel cost is allowed to fluctuate). Under fix price contract, power companies bear the major risks of operation and enjoy the marginal benefit of improved operational efficiency. The potential disputes between the power companies and the utilities over the actual costs under the fixed rate of return system can be avoided under the fixed price system. Therefore, reducing the required risk premium.

(3) Improving the transparency of government policy. Foreign power investors face similar regulations in China and India; however, they charge a lower risk premium in India than in China. One of the most important reasons is that India has a clear policy with well-defined financial terms, while foreign investors complain that China lacks a similarly clear policy. When the Chinese government attempts to cap the rate of return on power projects at 12-15 percent, it did not clarify the actual meaning of rate of return. As indicated in Table 1, the required IRRs on different bases are substantially different.

(4) Providing incentives to increase the share of debt financing. If China insists on regulating the rate of return, it is better to cap IRRs based on total funds rather than on equity. In addition to provide stable electricity supply, the government's main objective is to minimize the tariffs paid to foreign investors and the investors' objective is to maximize the return on equity. By regulating return on total funds the government can directly control tariffs while the

investors can achieve higher return on equity through increased share of debt financing and/or acquiring lower interest loans.

Although the measures discussed above may narrow the price difference between domestic and foreign invested power projects, the gap is unlikely to be closed in the foreseeable future. Therefore, the government's attitude toward foreign invested power projects is critically determined by the power shortage situations and the economic costs of electricity shortages.

5. China's Electricity Shortages and the Associated Economic Losses

China's nation wide electricity shortage is estimated by the MEP to average 20 percent (Cha, 1994). However, due to the concerns that the MEP may have vested interest to over estimate electricity shortages and much less affiliation with the power industry, the SPC may assume a lower level of shortages, especially when a great deal of electricity shortages are hidden shortages.

The hidden shortages are partially caused by underinvestment in transmission and distribution systems. The share of investment in power transmission dropped from 24 percent in 1980 to 17 percent in 1993. Generally speaking, the share should amount to at least one-third for a power network to have enough capacity to handle the power generated.⁵ In 1994, since most of the investments were used to build power plants, only 50 percent of the annual transmission and distribution targets were completed (Shi, 1995). Due to the bottle-neck of the transmission and distribution system, many potential electricity consumers cannot be hooked up

⁵ The share of investment in power transmission in China Light & Power in Hong Kong is about 50 percent, while KEPCO in South Korea spends about 40 percent on transmission and distribution systems (Peregrine, 1995).

to the power system. For example, many Chinese households that want to install room air-conditioners are refused by the utilities due to the limited distribution system capacity.

According to China Daily (March 24, 1995), power shortages in China have turned from a regional problem to a heavy burden beleaguering many areas. Due to power shortages, generating units have to be overloaded. This has made it impossible to undertake timely maintenance or repair, thus reducing the plant's service life and causing accidents. The negative effects of power shortages on existing generating units are better felt by the MEP than the SPC.

Since electricity shortages are easier to feel than to measure. The recent policy change in electricity consumption priority may also contributed to the different views in terms of China's power shortage levels. Priority in electricity consumption was traditionally given to the production sectors, but is now given to the residential sector. Therefore, the seriousness of electricity shortages is less felt by the general public, as well as the SPC officials.

Reportedly about 240 billion yuan (US\$29 billion) worth of industrial value added was lost due to electricity shortages in China in 1993 (*China Times Weekly* September 19, 1993). This translates to average economic costs of about US\$0.17/Kwh to the consumer. Economic costs of power shortages in coastal areas are certainly higher than those in inland areas. According to the Asian Development Bank, the economic costs of each unserved Kwh is about US\$0.35 in Asia. The economic costs of power shortages in Guangdong Province are estimated to be at least US\$0.30/Kwh (Li and Johnson, 1994b). Although the economic costs of electricity shortages are substantial, this type of costs are difficult to measure and subject to great measurement errors. To obtain an unbiased estimate of economic costs associated with electricity shortages, a research program hosted by a neutral institution and participated by

representatives of both the MEP and the SPC will be very useful. The results of this research will be critical in power sector decision-making.

The threat of power shortages are better felt by local governments. Since obtaining SPC approval to build large and medium sized power plants is very difficult, many local government (and foreign investors) turned to small projects to avoid central government regulations. As a result, the actual additional large and medium sized capacity to be commissioned during the Eighth Five Year Plan period (1991-1995) is estimated 6 GW short of planned target, while the actual additional small sized capacity is estimated 7 GW above the planned target (MEP, 1995).

6. Suggested Strategies for Foreign Investors in China's Power Sector

We believe that trying to reduce China's high inflation rate by sacrificing the development of the power industry and squeezing the profitability of foreign investors is a policy mistake, and the costs of the mistake are likely to be paid in the near future. Unless China changes its policies, its power sector will remain an unpleasant environment for foreign investors. However, China's unfavorable investment climate is caused, to a large degree, by policy mistakes rather than the fundamentals, and policy mistakes are able to be corrected overnight. We believe that China will have to change its policies when the pressure of power shortages become more obvious in the near future, but it will be too late to come back to China after the policy changes. Therefore we suggest that international companies should keep their feet in China although the current investment climate is not encouraging.

Facing the current difficulties to obtain SPC approval for large and medium sized power projects, foreign companies should consider developing small projects to avoid central

government interferences while remain the potential of future expansion of the small projects and waiting for more favorable investment climate.

**Table 1. Target IRR on Investment of
International Power and Coal Companies**

	IRR on Investment (Percent)				Average Ranking (1=Lowest)
	Equity Current	Equity Constant	Total funds Current	Total funds Constant	
Japan	17.57	13.50	16.00	13.33	1
Australia	18.22	15.57	15.71	14.40	2
Taiwan	19.00	17.75	16.67	14.67	3
Malaysia	19.71	18.50	17.25	15.00	4
South Korea	19.71	17.00	16.67	15.67	5
Philippines	19.89	19.60	17.40	15.00	6
Hong Kong	21.00	17.00	18.33	15.00	7
Thailand	20.13	19.00	17.40	15.33	8
Indonesia	20.70	19.75	18.29	16.25	9
India	21.90	21.17	17.25	15.00	10
Pakistan	21.56	20.50	18.50	15.00	11
Vietnam	22.13	20.00	18.75	15.00	12
China	22.50	20.00	19.17	16.60	13
Sample Size	10	10	8	6	34

C. Johnson, B. Li, and A. Lamke, June 1995.

Total Generating Capacity 198 GW in 1994

Total Generating Capacity 300 GW in 2000

Figure 1. Energy mix of China's generating capacity.

Figure 2. Importance of various investment criteria in selecting countries for investment.

Figure 3. Ranking of economies based on IRRs (13=highest IRR) compared to rankings of economies based on Euromoney country risk rankings

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