

Separation of Power Plants from the Grids - A Theme of the Reform in China Power Industry

Li Guanghua
China Power Investment Group Corporation
25th March, 2003

The optimized utilization of energy resources is the purpose of reform in power industry by deregulation and marketing which is already a trending in the world. The rich experience as well as lessons during the process of deregulation gained by many developed countries, such as UK, America, France, Germany and Japan modified the old saying that the processes of electric power generation, transmission, distribution and supply have an inherent monopoly for they need to be accomplished simultaneously. Every country is reconsidering the merits and faults of the power industry deregulation. The differences between countries lie only in the extent of their deregulation and the depth of reform according to their economy structure.

In the past more than twenty years, the reform and rectification of power industry in China did not stop, so as to meet the requirements of higher speed development of the economy. Separation of power plants from the electric grids, which is a theme of reform in this year in China, aims at introducing a competition system and making a break against market bulwark. With this further reform, the efficiency of the power enterprises will be improved, costs reduced, services upgraded and resources optimized. This is considered a profound reform that will make a good foundation for full marketing of China power industry in the new century.

For better understanding of the reform and the investment strategy in China, it is necessary to have a general view of China power industry.

1. General situation of China power industry

1.1 Energy Resources

China has a coal reserve of 1,000 billion tons, accounting for 90 % of its total primary energy. These coal reserves, nearly 80 % of the total, are mostly distributed in the north and northwest parts of China. The exploitable water resources in China are 380 GW, accounting for 16.7 % of the world total and ranking the first in the world. However, the water resources those have been exploited so far account only for 17% of the total in China. Those water resources, about 82% of the total exploitable in China, are mainly located in the west and southwest areas. Since 2000, China has become a country that has oil net importation, 40 million tons per year. The governmental policy strictly restrains oil-fired units. China has a rich natural gas deposit of 55,160 billion m³. However, the amount of exploitable gas remained only 1,230 billion m³ by the end of 2001. China has relatively rich nuclear energy resources. With only an installed capacity of 8,500MW, including that in operation or under-construction, there is good potential for further development. With area coverage of 96% in China, the Chinese power grids have had a very

successful development in recent years. The national power grids are consist from that in North China, Northeast China, East China, Central China, Northwest China, South China, Sichuan and Chongqing areas and four independent power grids that cover Shangdong, Fujian, Guangdong and Hainan provinces. At the moment, the inter-connection of the network between areas has been speeded up.

According to current energy situation, Chinese government has worked out a strategy for the development of China power industry. That is, “to build up three channels in north China, central China and south China for power transmission from west to east, to further restructure the power generation to improve efficiency, to develop hydropower, to construct of mine-mouth coal-fired units, to shut down small-capacity units, to properly develop nuclear power, to encourage heat-electricity co-generation and power generation by wastes material and renewable resources.

1.2. Development of China power industry in the past 20 years

In 1980, Chinese government worked out a plan for its development of national economy by a quadrupled increase in 2000. It was actually a prelude of the rapid development of Chinese economy.

The total installed capacity of power generation was 63 GW in 1980. In the last twenty years, an average increase of 12,000 MW installed capacity per year has been obtained. By the end of 2002, the total installed capacity in China was 353 GW and the total power generation was 1,640 TW.h, ranking the second in the world. China electrical power construction market has been the most prosperous in the world.

In view of proportion of electrical power consumption to primary energy and to final energy consumption in China, it can be noted that the proportion of electrical power consumption to primary energy has been increased from 20.60 % in 1980 to 41.27% in 2000 and the proportion of electrical power consumption to final energy consumption was increase from 4.81% in 1980 to 11.2% in 2000. Now, the power industry in China has become a stanchion industry in the domain of energy. As a basic industry, the important role it plays in the national economy will gradually show itself and be further strengthened.

In addition, the technical level of equipment in China power industry has been greatly improved. In the past twenty years, the number of large-capacity units having higher steam conditions and a better efficiency has been increased by several times. The coal-fired units with a capacity of 300MW have now become the brunt units in the present power sector. And most of the power grids in China have rebuilt their main frames with 500kV and 330KV lines and the technical level has been continuously improved.

1.3. Development of China power industry for the next 20 years

As being planned by the China Sixteenth Party’s Congress held in November 2002, China’s national economy will be quadrupled again by the year of 2020. It foretells that China will have a continuous and rapid development in the near future. This increase will be even greater in gross than the last 20 years and be realized on the

bases of optimized structures and efficiency improvement.

According to this target, China power industry will keep a rapid development just as it has done in the past twenty years. It is estimated that the annual increase of power consumption all over China will be 6.6 ~7% from 2003 to 2010. With total power consumption as 2,700 TW.h by 2010, the total installed capacity in China will be 600GW. With annual increase of power consumption 4.5~5.5% from 2010 to 2020 and total power consumption as 4,200~4,600 TW.h all over China by 2020, the total installed capacity in China will be 900GW then. With the projects being completed, such as the “Power transmission from the west to the east”, the “Mutual transmission power between the north and the south” and the “Inter-connection of power grids over whole China”, there will be a nation-wide integrity power grid in China. The optimization of resources can be realized in this scenario in large extent.

China will still remain as the most prosperous power developing market.

2. Deregulation of China’s power industry

2.1. Reform of power industry in the past 20 years

The electric power market in China used to be a single-crop farming market with mixed functions of administration and enterprise practices before 1985. Due to rapid development of economy and increasing demand of electric power, China followed a policy that was to have a unified running of power grids and an investment to power generation by all sides, raising money for electric power construction. With grid resources and a great number of power plants in the state control, China deregulated its power generation market. With civil and foreign capitals flowing in succession into the power generation sector, a large number of IPPs began to be built in China. There was a very stimulating mechanism for investment to power generation at that time. For those IPP, the amount of electricity generated every year and the tariff were ensured by a long-term agreement signed by the governments. In general, the repayment to IPP was over 15% every year. With such a high and stable repayment, more and more capitals were raised for the power generation sector, thus the demand increase by rapid development of national economy being ensured.

In 1997, in order to separate administrative functions from enterprises, the State Power Corporation of China (SP) was established. It inherited from the former Ministry of Electric Power all the assets of national power grids and about 50% of the installed power generation capacity. SP was the largest enterprise in China at the establishment that owned in it the power generation, transmission, distribution and sales, as well as the right for power dispatching. By the end of 2001, SP had a total capital of 1,002.7 billion RMB, accounting for 72% of the total capital of China power industry and ranking the sixtieth among the world 500 strongest enterprises.

2.2. Introduction of market mechanism – a theme of reform at present

Just like 20 years before, the present reform is once again initiated at the moment China working out a plan for its development of national economy by a quadrupled increase in the next 20 years. This quadrupled increase will demand ever-greater

development of the power industry in gross. However, unlike those before, this reform will have even far-reaching influence.

As China has already entered into WTO, all business activities of its enterprises have to be on the track of international rules. It is required now to build enterprises that should have perspicuous definition of property right, clearness of rights and responsibilities, separation from administrative functions and with scientific management. The enterprises in China are required to have their development under a market system with fair competition. More and more evidences show that the system of monopoly business management followed previously in China has clear faults. And the market bulwark actually embarrassed resources optimization and structure adjustment. Therefore, those monopoly enterprises involved in the field of electricity generation, air transportation, railway transportation, telecommunication, etc. in China are the objectives to be restructured in the present reform. The Chinese government will also be restructured according to the principles of simplicity, unification and effectiveness and will follow a system that has the three rights – “decision making, execution and supervision”, separating from one to another. It can be found that the restructure of power industry is a also part of the big reform in China which make the market ever opening to the outside world. China will realize its great goals with its economy merging into the world in large extent and on an ever-profound level.

2.3. Scheme of power industry reform

The purpose of present reform is to make a break to the vertical integration monopoly of the power industry, to introduce a market mechanism by organization restructuring, and to establish a power supervision system for competitive marketing. For doing so, it required in one hand to restructure the assets of the SP by separating power grids from power generation. On the other hand, the power generators being separated according to the above have to follow a competition system by selling their products to the power pool. For restructuring the assets, five national power generation groups and two power grid corporations have been established, with the main principles as the following:

- For each power generation group, the scale of assets and quality of installed capacity are quite similar. With a rational geological distribution, they all have in principal a share of > 20% in the regional power markets. Each of these groups also has a controllable capacity of 32,000MW and a capacity of 20,000MW for rights and interest.
- All IPP, the enterprises of hydropower and the power utilities having shares in stock markets have to be evenly and integrally divided into each of the power generation groups.
- Under the precondition that the original position of each share holder of power plant remains no change, all the assets belonging to the SP in one power plant have to be restructured into one power generation group, so as to avoid “one power plant running with several management”.
- Under the precondition that each of the power generation groups has a similar

market share in one region and no monopoly marketing emerges in power trading pools, it is principally agreed to have all the power assets in one province centralized.

- A Power Supervision and Regulation Committee is established. On behalf of the government, this Committee works out operating rules for the market, supervise market operation and maintains a fair competition between power generators.

On December 29, 2002, eleven new power groups were established in China, including two power grid corporations – the State Power Grid Corporation of China and the South China Power Grid Corporation; five power generation groups corporations – China Huaneng Power Corporation, China Power Investment Corporation, China Huadian Power Corporation, China Guodian Power Corporation, China Datang Power Corporation; four assistant corporations – China Power Engineering Consultation Corporation, China Hydropower Engineering Consultation Corporation, China Water Resources and Hydropower Construction Corporation, China Gezhouba Corporation. The South China Power Grid Corporation is composed of five provincial power grids – Guanxi, Guizhou, Yunan, Hainan and Guangdong. The State Power Grid Corporation of China is composed of the rest of regional power grids – North China (including Shandong province), Northeast China (including east part of Inner Mongolia, East China (including Fujian province), Central China (including Sichuan province and Chongqing City) and Northwest.

The present reform is only a start of deregulation and marketing of the power industry in China. The reform target in the next stage is to make separation of power transmission, distribution and sales. China power industry will be deregulated completely with a marketing mechanism.

3. Investment strategy for the new power market in China

In the next 20 years, an abundant amount of investment is required obviously for the rapid development of China's power industry. In the present reform of power industry, the Chinese government will balance electricity tariffs in processes of generation, transmission, distribution and sales, according to rule of efficiency, stimulation mechanism, attraction of investment and payment capability of citizens, so as to ensure a reasonable profit for power enterprises in their normal business practices, an attraction of investment and a promotion of further development. However, the good time when foreign enterprises obtaining much higher profits like 20 years ago may not come back again. Instead, there will be an open, fair and impartial market environment for all participants. For power enterprises, a good repayment only comes from efficiency improvement and reduction of costs.

3.1 Choice of project investment

It can be noted that there still remains a monopoly business for power grid construction and operation as they are in the hands of the State Grid Corporation of China and the South China Grid Corporation. As the power generation market has now been totally deregulated, the hydropower will enjoy priority in development while the coal-fired units will maintain its stanchion role in power generation. For natural gas turbine combined cycle, nuclear power and wind power, they will be

developed in a proper scale according to local conditions.

According to development plan of the Chinese government, it is estimated that the installation capacity of hydropower will be 200GW, natural gas combined cycle 80GW, nuclear power 38GW, wind power 12GW and coal-fired generation 570GW in 2020. So, there will be a bright future for investment in China's power generation projects.

In the meantime, there will be a big market too for design, manufacture, installation, construction and services for power generation and power grids. There are a good number of enterprises involved in these fields, and they do need technologies and management to make them bigger and stronger. So, to invest and restructure these enterprises, to strengthen and improve their technical level and to make their products famous in China can also be a good business.

3.2. Investment strategy in China

Apart from the aforementioned five newly established power generation groups, there are many other power generation companies in China, such as the biggest company for hydropower - Changjiang Hydropower Power Corporation, power companies of national level. such as Gouhua Power Corporation, China Investment Corporation, Xinli Power Corporation, and a large number of provincial power investment companies. The competition is becoming more and more intensive.

For a rapid development, power enterprises have to expand their installed capacity and make more profits by using resources supremacy. Therefore, they need an occupation of good resources for power plants construction, a sufficient power generation capacity and a reasonable power tariff to ensure their benefits. It can be expected that there will be a severe competition in the east China where the economic development is better and in the areas where coal reserves are.

For the Chinese power enterprises, especially those power generation groups newly established, they need in their power plant construction and operation foreign strategic investment and advanced technologies and management to improve their efficiency in capital operation and in reduction of power generation costs. To do so, the Chinese power enterprises will seek for cooperation with foreign power utilities and other strategic investors. This cooperation will not only limit to the Chinese power market, but also in the international market if each side could have a good use of its own superiority.

4. Summary

It is clearly shown that a next round of large-scale building and construction has been already started now in the Chinese power generation market. This market is full of vigor and with an environment of fair competition. Rich repayment can be foreseen for any strong investors.

China Power Investment Corporation has attached a great importance to acting as partner to all the colleagues and strategic investors in the world. It is willing to have a joint involvement in the power generation construction projects in China, to work

hand in hand in the management and operation of Chinese power enterprises and to have a cooperative development of the international market too.