Chinese Electric Power Market Stepping into E-commerce

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【Abstract】Electric power industry in China has its monopolistic position for a long time. People are paying much attention now to how to construct a competitive Electric Power Market. At present, we are living in a Power Gridwork time when e-commerce economy and traditional economy are interoperated with each other. However, the special period offers special chance. E-commerce also gives the platform and support for the development of Electric Power Market. As we know, the problem of distribution occurred in normal e-commerce trade is out of question in electricity supply. So, through InterPower Grid it’s relatively easy for electrical companies in China not only to bid price in real-time procedures of electricity production, power supply, thermo energy supply and power sales but also to do marketing and trade for other relative raw materials and products. We believe that all resources can, with the power of “Invisible hand”, be allocated optimistically in Electric Power Market.

With plenty of information, the authors depicts the procedures and present status of e-commerce development in Chinese Electric Power Market and puts forward to the way of solving the problems blocking the way of constructing it perfectly.

【Key Words】Electric Power Market;        E-commerce;       Informative Simulation Market;        Electronic Electric Power Market

1.0 Introduction

Many countries are taking measures to reform Electric Power Market by breaking monopoly, releasing constraints and stimulating competition in order that resources can be allocated rationally and efficiently. In that way, electrical industry can be developed in harmony with that of society, economy and environment. At the same time of rapidly developing electrical industry, Chinese government has been making many rules such as company-like reconstruction, commercialized operation and legalized management to strengthen its reform to electric power line. For instance, Chinese government is now building up e-commerce based Electric Power Market to enhance competition and open the gate of constructing power plants.

2.0 The Status of Electric Power Market in China

2.1 The Development of Electric Power Simulation Market

In 1980s, the former Chinese Electric Power Ministry began to reform the cost calculation method of Power Plants and Electricity Board affiliated to the Power Grid and Provincial Electric Power Bureaus. Besides that, on the basement of Inside Responsibility, Chinese government started to reform the management system in Electric Power Ministry at that time and built up the preliminary shape of Electric Power Market. At first, the Ministry was changed to be Chinese State Power Co. and then the
secondary Electric Power Co. Groups and their subordinate Provincial Companies were set up too. So all the operational styles were changed accordingly. Around 1994, Zhejiang, Anhui and Hunan Provincial Electric Power Companies in China started to take steps to improve final accounting method that was called “Electric Power Simulation Market”, set up Accounting Centers in the Power Grid and trade electrical products used to be supplied by themselves. Moreover, East China Electric Power Group Co. made a objection in 1996 to spend three years to abolish its planed economy frame and turned it into commercial operation.

The core of Electric Power Simulation Market can be described as follows: Instead of planned economy, all the Group and Provincial Electric Companies sign the agreements with power plants to be connected to Power Grid stipulating load, electricity sales, operational responsibilities and also applied Operational Responsibility to their affiliated companies by inside price, inside profit, inside accounting, inside allocation and rate tests. As for the power plants, whoever win the price bidding in the Simulation Market will have the right to connect with Power Grid and produce electricity. As for electricity boards, the outcome could be decided by inside price accounting and inside profits. Up to now, there have been more than one third of Group and Provincial Electric Power Companies in the Simulation Market. And their function was classified to three parts: production, distribution and dispatching. The dispatching operators usually act as brokers. For example, a Power Grid dispatching operator buys the electricity from the power plants at the bidding price and then sales it to electricity boards with an additional rate.

It can be shown from the several years’ practice that some great progresses have been made such as the increasing of economical profit, the improvement power dispatching ability and managerial level. We can see that all enterprises in the Emulation Market have got lots of benefits. Their operational rates and performances are better than ever while operational cost and expenses were controlled. And the dispatching automation has been improved. But for that, the most important might be the ideas toward competition and market have been established and enhanced. It will ultimately smooth the way of completing real-time e-commerce based Electric Power Market.

2.2 Commercial Operation Between Joint Power Grids

Because of the unbalanced economical condition and resource allocation in Guangdong, Guangxi, Guizhou and Yunnan provinces, central government and these four provinces jointly established South Electric Power Joint-operational Co. which is under the leadership of State Power Co.. The major task is to develop the abundant electrical resources in southwest China jointly and distribute electricity from west to east according to the central and west area development strategy, energy policy and regional coordinated evolution rules. Actually, the optimistic relocation of resources has supplemented and coordinated the economic conditions in four provinces.

With the accumulation of operational experience in Model Market and the completion in relative policies, the whole set of commercial operation style is gradually matured and gives lots of useful information to the operation of real Electric Power Market. As a matter of fact, the South Power Grid has applied commercial operation such as planning trade proposals and signing trade contracts, acquisition and metering, trade accounting and so on.

3.0 The Construction of Electric Power Information System
The operation of Electric Power Emulation Market has brought the enormous social influence and economical profit. However, why the real-time trade of the Electric Power Market is not applied yet? As the foregoing, it’s quite different in between Electric Power Market and the conventional markets. Because the manufacturers are special and the customers are all around the country and the electricity can’t be stored, there should be enormous information in the Market. That’s the reason why the development of Electric Power Market must be informative and e-commerce based, so are the trade and accounting systems. Without Internet/Intranet, the object of real-time trade couldn’t be reached.

As a matter of fact, in the beginning of 1960s the electric power industry began to apply information technology and became one of the earliest lines to use it. The stage could be classified to three steps. First of all, IT was applied to automatic production, supervisory & control in power plants and substation in 1960s and 1970s. Secondly, in the period of 1980s and 1990s, IT turned to be used as specialized tools such as Power Grid Dispatching Automation, Power Load Control, Computer-Aided Design, Computer Simulation System, etc. At that time Management Information System was a newborn baby after having aborted for many times. Thirdly, the application of IT was developed to all-round stage and to be extended from operational to managerial level after 1990s.

Up to now, the Information Technology has been applied around all parts in electric industry including the stages of design, construction, supply, transmission and distribution. For instance, the Power Plant Computerized Control, Substation Automation, Power Grid Dispatching Automation, Power Load Management, Computer Aided Design, Computer Emulation and scientific study have been operated successfully among which some applications are very advanced.

3.1 Hardware

According to statistics up to Feb. 1999, there are nearly 150,000 computers used by electrical line including 1000 servers and workstations. The average increasing rate was more than 20% annually since 1993. There are also over 2500 local networks including 10Mbps Ethernet, 100Mbps FDDI, 155Mbps ATM, so on and so forth. Most newly-but buildings have been installed PDS system, Building Automation System, Fire Automatic Control System, Closed-circuit Television System, Computerized Lighting Control System, Safety-guard System and Computerized Network System and made the working environment intelligent.

3.2 Wide Network

On the basement of electric power transmission system and aided by public telecommunication resource, Chinese State Power Information Network has been connected with the Computer Information Networks all around electric power industry. It is an Intranet inside Chinese State Power Co. and uses TCP/IP as its protocol.

At present, Chinese State Power Information Network has been successfully connected with 16 first-level Network and Internet and been put into operation since Aug. 28, 1998. In North China and East China, second-level Network has been finished while Jiangsu and Hubei provinces have done third-level one. Northeast, Central China, Huaneng, Yunnan and Neimeng in China have proposed the network and are constructing them. Northwest, Shandong, Fujian, Sichuan, Helongjiang, Zhejiang and Ganshu have also fulfilled the proposals and started to construct.
3.3 Electric Power Transmission Network and Dispatching System Data Net

Due to the construction of decades, Electric Power Transmission Network, located all over the country with multiform and multifunction transmission means, is now composed of large-scale specialized networks including microwave, transmission wave, satellites, optical-fibre, wireless mobile transportation and so on. And it is turning to be one of the most important equipment in information exchange for Power Grid Dispatching Automation System and other computerized networks. Up to now, more than 33,000 kilometer microwave line, 3000 optical-fibre, 1100 microwave stations, 32 satellite earth-stations, 650000 kilometer 110-kilowatt transmission wave and lots of 800MHZ mobile stations have been installed and operated in electric power industry.

4.0 The Problems to Be Solved in Developing E-commerce of Electric Power Market and the Function of Government in Handling Troubles

The development of E-commerce is a complicated and systematic society engineering not only involved in the construction of information fundamental structure but also depending on commercial credit, paying system in Internet, identification, standards, forwarding system, tax system, enact and amendment of relative laws and the framework of regime. In other way, it relies on two essential factors, one is the broad application of technology and another is the construction of market environment and policies. Studying from the evolution of e-commerce in Chinese Electric Power Market of late years, we can easily conclude that the main bottleneck of developing e-commerce is none of the technical difficulties other than the rules of market environment and polices.

Because electric power industry is very important to China, the development of e-commerce of Electric Power Market in China should be intimated to the commercial environment and government policies. The Electric Power Market will, in developing its e-commerce, be accustomed to harder environment than that of normal trade and abide by more strict rules. So the key point for the government to enhance the development of e-commerce of Chinese Electric Power Market is to strengthen the construction of market environment and policies.

4.1 Strengthen Electric Power Market Structure

4.1.1 Speed-up the Dissection of Plants and Power Grid

Whoever enters the Electric Power Market should be an electrical enterprise with independent operational system and bears its own profit and lose. So it’s very important to dissect power plants from Power Grid and definite all competitive bodies in the Market according to the relative policies like “Build-up Modern Enterprises”. The power plants will be independent legal bodies and bid with each other to get the right of connecting with Power Grid so that they can improve their management, lower the costs and raise their profit ultimately.

4.1.2 Regulate the Electricity Price
Due to the high capacity cost of electricity production, the complex estate and unclear possessions, the electricity price in China is very complicated and causes other problems in bidding system. It can be resolved by the Central Government as follows. As for the electricity with high capacity cost, we should not only consider minimizing the cost itself but also optimize the rate of capacity and amount. And we can evaluate the assets of the unclear possessions in the plants and calculate the factor into the electricity price.

4.1.3 Develop and Complete the Technology Support System

The Electric Power Market, which is governed by electricity trade, is composed of system operation, load management, the cooperation of suppliers and customers, telecommunication and e-commerce. So the operational system is very sophisticated and need a whole set of accurate and reliable metering system, information treating system, dispatching supervisory system and accounting system and a series of regulations and rules.

As we know, the whole range of procedures including electricity supply, transmission, distribution and utilization has to be coordinated and governed in Electric Power Market so that the Market can meet the need of controlling units and load. The difference compared with traditional dispatching and management is that the Market in China now is on the basement of trade partnership and the only control signal is only price instead of human beings. From operation of the Western Electric Power Market we can see that the more e-commerce the more profit it can get.

4.1.4 Metering Equipment

Metering equipment is not only related to the accounting accuracy which involved with the profit of enterprises but also playing a vital role of reference and instruction in the Market. From analysis and study of the accumulated data, the engineers can take measures to modulate the way of power supply and distribution and improve the efficiency accordingly.

4.2.2 Trade Management System

The Trade Management System is on the base of Internet and plays the most important role in Electronic Electric Power Market both in dispatching an accounting. It offers a platform for all traders like power plants and power supply units such as receiving quotation of them, checking and conforming their price and constructing database while replying power plants.

4.2.3 Accounting System

Although each Power Grid and provincial electric company has the function of accounting, it can’t be applied in Electric Power Market. The real-time Accounting System should deal with the cases not only under normal conditions but also in case of breach contract. All in all, the Accounting System has to reflect all economic behavior in the Market accurately and rationally.

4.2.4 Paying System in Internet

To develop Electronic Electric Power Market we must complete Paying System in Internet first, otherwise the trade efficiency will be lower. Due to its economic fundament, large-scale business, stable profit and good management, Chinese State Power Co. has got a reputation both in economic
area and in society. So it’s a good condition for electric power industry in China to use such an immaterial asset to cooperate with local commercial banks to start paying business and solve the aforementioned trouble.

4.2.5 Information Treating System

Electric Power Market contends a number of information including data acquisition and treatment, market management of electric energy trade, transmission service, bidding and other trades, publication for supply/demand, transmission service, real-time price, supervisory and management of contract execution, so on and so forth. So, the Information Treating System should be high speed and reliable. Because of the limitation of local net, wide net and the speed of Internet interface, the speed of transmitting information in Electric Power Market is also limited. If this problem can’t be solved, the request of real-time can’t be met sequently.

4.2.6 Electric Dispatching

According to investigation, Computerized Supervisory and Control System have been installed by 32 provincial Dispatching & Transmission Bureaus, 240 regional ones and more than 500 counties. The Automation Systems have been operated in all provinces, 85% regional areas and 25% counties in China. SCADA system in 29 provinces, 170 regions and 110 counties have been passed test.

However, the dispatching method will be quite different when the e-commerce based Electric Power Market is put into commercial operation in China. Any measures taken by dispatching divisions should be regarded as a business behavior and economical punishment will be enacted in the case of both normal power shortage and accident power termination. So economic dispatching turns to be a new study under the condition of Electric Power Market in China dealing with load model, custom response, termination lose, optimized power exchange, entrust venture evaluation, etc.

5.0 Conclusion

On the basis of Internet/Intranet, in this century the e-commerce will be the main mode of trade in electric enterprises in China and other countries. So it’s very useful to study the construction and operation of Electronic Electric Power Market. Actually, the Market is very complex and touches on a series of questions such as state estate policy, economic cosmos, laws and regulations, market structure and relative measurement technology, calculation method, transmission technology and automation technology. However, with the effort of government and engineers we can predict that it will bring us a brilliant future.

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