Abstract

Deregulation was launched as a concept in the United States more than a decade ago; the European Union Commission has also formally announced that electric deregulation must be completed by the end of 2005. Deregulation or reform has already been a popular topic on the Electricity Power Sector. This paper will discuss the restructuring and regulatory reforms in the PR China’s power sector. It begins with a discussion of the characteristics of electricity reform or deregulation in other countries, including the US, the United Kingdom, and so on. It will be followed by the industry structure and regulatory framework that characterized China’s power industry during the latter part of the 20th century and the history of China’s reform to restructure the power industry to competitive suppliers of generating services in recent years. It discusses the role of the State Power Corporation in the reform and gives a detailed description of the latest electricity reform in the year 2002. The paper concludes with some thoughts regarding future challenges and trends on the reform for China’s power sector.

Keywords: China; Power sector; Reform

1. Background

China dismantled the State Power Corporation on December 29, 2002 and set up 11 new companies in a move to end the corporation’s monopoly of the power industry. The former State Power Corporation owned 46% of the country’s electricity generation assets and 90% of the electricity supply assets.

The new companies include two power grid operators, namely the State Power Grid and China South Power Grid. Each of the five electricity generation companies own less than 20% of China’s market. They will compete with each other for signing contracts with the power grid operators. The country also set up the State Power Regulatory Commission on December 30, 2002, to supervise market competition and issue licenses to operators in the power industry.

China is the world’s second largest electricity generation and consumption market, and the State Power Corporation was a giant with nearly 2 million employees. The price of its electricity affected the daily lives of most Chinese people. The completion of restructuring the power industry is a milestone.

Over the past few years, China has made marked progress in its campaign against industrial monopoly. The break-up of China Telecom and the establishment of six civil aviation companies have leveled the ground for market competition in these industries.

Since the early 1980s, electricity output in China has increased greatly, and installed capacity also witnessed great increase. See Figs. 1 and 2.

China will invest 360 billion RMB in construction of power grids in the 10th Five-Year Plan period (2001–2005), accounting for over 40% of the total investment it will make in power projects in the period. The next 5 years will be a key construction period for China’s power industry. Key projects, such as the Three Gorges power transmission, national integration of power grids and west–east power transmission, will...
construct 25,000 km of AC transmission lines and over 3000 km of DC lines.

In terms of distribution of resources, most coal reserves are buried in the north and northwestern areas and the two areas account for 80% of the country’s total reserve, while the west and southwestern areas abound in hydroresources and make up 82.09% of the total exploitable amount in the country. So, we can say, the distribution of resources is extremely unbalanced in China. The west areas of China are rich in coal and hydro. However, the electricity consumption in western areas is much less than that in east and central China. Fig. 3 shows the regional electricity consumption in China.

Thermal power and hydropower will continue to be the principal energy sources in China. The implementation of the west–east power transmission project, the national unified power grid and optimization of energy structure will alleviate the pressure from unbalanced energy distribution and make great contribution to the economic development in the whole country.

However, the regulatory system could not meet the requirements for the development of China’s power industry and became an obstacle to market-oriented reform. China has always been seeking a modern regulatory system for the power industry. Since 1949, especially in the latest 20 years, China was trying to improve the regulatory system and made great progress.

2. Experiences of foreign power industry regulatory systems

2.1. Power industry regulatory systems: past and new trends

At the beginning of the 20th century, the American power industry was dominated by privately owned public power utilities with increasing vertically integrated management. These corporations controlled the power generation, transmission, and distribution markets. In brief, they developed a kind of monopoly in a “monopolized franchise sector.” In 1916, America established governmental regulatory agencies in its 33 states that supervised the public power utilities, issued franchise rights, regulated pricing, and provided financing to power enterprises. The regulatory agencies were also responsible for monitoring the monopoly of public power enterprises, so as to guarantee a safe, affordable, and reliable power supply and to ensure that power utilities received proper investment return rates. Although the Federal government did not prioritize public and power utility interests, the government was concerned with two things: the price of electricity, and investors would provide necessary investments to guarantee a safe and reliable power supply.

In 1935, Congress passed the Public Utility Holding Corporation Act (PUHCA), which not only authorized regional power companies to provide power services, but also empowered state governments to regulate the retail trade of electric power. PUHCA prohibited other power companies from expanding their power generation into the public power utility franchise sector. However, this stifled competition among public utilities. For this reason, the Congress passed the Federal Power Act (FPA) and authorized the Federal government to regulate the inter-state power trade. The Federal Power Commission was in charge of setting wholesale power prices for the inter-state power trade, while a state-level regulatory agency regulated intra-state retail business.
At the end of 1935, most of the power trade was regulated within the so-called “rate of return” or “pricing based on cost of service” framework. This idea of regulation dominated in America until the 1970s and was gradually brought to other countries with market economies.

Two oil crises in the 1970s severely affected the American economy, including its power industry. In 1978, Congress passed the Public Utility Regulatory Policy Act (PURPA) as Section Two of the National Energy Law, to encourage the development of renewable resources and new technologies. While not the original intention of the law, it paved the way for competition in the US power market through the introduction of rules requiring monopolistic utilities to buy power from independent power producers (IPPs) at “avoided costs” and rules for “wheeling power” (i.e., selling to a customer outside your immediate area by placing power into the grid where generated). Later, when Ronald Reagan became President, he emphasized the “supply side” school of economic theory, which encouraged deregulation and free competition, setting in motion the reform of the power industry and its regulatory system. In April 1996, the Federal Energy Regulatory Commission (FERC) issued Act 888 that allowed power transmission services to enhance competition in the power wholesale market. Since that time, further deregulation has proceeded on a state-by-state basis.

The US concept of economic control was adopted and further developed by the British Prime Minister Margaret Thatcher. The reform of the British power industry involved the privatization, the breaking of the vertically integrated monopoly, the restructuring of the market, and the reform and restructuring of the regulatory system. The British Power Law, passed in 1989, provided that the ownership of power should shift from state to private investors, a competitive power market should be introduced, and an independent regulatory system should be established.

Many countries followed the British model of power industry reform, especially during the 1980s, when market-oriented reform in the power industry became a trend around the world. Aside from a few countries in Asia and Africa, most countries in the world have achieved or are in the process of completing market-oriented reform of their power industries. With the opening of the power market and the introduction of competition, many countries (including Britain, Canada, Argentina, Brazil, India, and Poland) established specialized regulatory agencies.

In Europe, the European Union (EU) Council requested in its Directive of Power Industry Reform (1996) that all member countries establish an effective regulatory system, making sure that it is transparent in order to evade abuse of monopoly markets, especially predatory behavior that will harm consumer interests. By April 2001, all member countries of the EU, except Germany, had carried out regulatory reform and established regulatory agencies for the power and energy industries.

2.2. The main features of modern power industry regulatory systems

Power regulatory systems are different in each country. The structure of regulatory power authorities depends on power market patterns (including scope and scale of competition), the type of political regime, the legal system, and the history of the power industry in that country.

2.2.1. Regulatory authorities

For the regulation of the power industry, there are two main patterns.

First, the dependent regulatory pattern in which policy making and regulatory functions are unified. This pattern has been adopted in Japan and in many European countries with continental legal systems (such as France and Germany).

Second, the independent regulatory pattern has been adopted in the US, the UK, and other countries that favor the Anglo-America legal system (such as Australia and South America). The main characteristic of this system is a separate regulatory authority that is independent from the legislative government bodies and is authorized for implementing policy and enforcing regulations, and neutrality. A new development of this regulatory pattern is a shift towards regulating other energy industries. Such comprehensive regulation of the energy industry reduces the cost of regulation and enhances efficiency.

According to the relationship between central and local regulating bodies, the independent regulatory pattern can also be subdivided into two types: The first is the vertical regulating pattern, in which a national unified regulatory agency with a few regulatory branches is established. For example, Britain, Argentina, and New Zealand have national power industry regulatory authorities with a few branches in different regional areas according to practical needs. The second pattern is a multi-level regulatory system that countries with federal authorities (such as the US and Australia) tend to adopt. For example, the United States has established power industry regulatory agencies at both federal and state levels. At the federal level, the Federal Energy Regulatory Commission (FERC) is a government body with independent authority bestowed by the legislature, regulating inter-state power transactions and wholesale markets. In addition, each state has its own public utility regulatory authority in charge of regulating the local power industry. State regulatory authorities
have considerable autonomy for their activities, based on their state mandates.

The development trend of the power industry for regulatory authorities is to be independent and specialized, with little interference from government policy makers. For example, by the end of 2000, 12 of the 15 EU member countries had established specialized, independent regulatory authorities, which displayed some differences in rights, power, size and degree of independence, depending on the country. Degree of independence has two meanings:

- Independence from the government policy makers, which helps to both reduce the risk of legislators affecting market operation for some short-term political objectives and strengthen sector stability by freeing regulatory authorities from being impacted by radical government changes.
- Independence from stockholders interests, which means that the regulators must not have any financial interests in the companies they regulate.

### 2.2.2. Regulatory functions

Regulatory functions are usually determined by the degree of competition in the power market. The weaker the competition, the more regulation required. Regulation alone cannot ensure the power market will benefit the public most effectively. Instead, competition through market inducements must also be introduced. This suggests that a regulatory authority should focus its activities on opposing monopolies and encouraging competition through strategic market-oriented reform rather than on directive regulations.

A modern regulatory system is characterized with the following functions:

- The separation of the competitive segments of the power industry (generation and sales) from the naturally monopolistic segments (transmission and distribution).
- The relaxing of economic regulations in the competitive segment with the strengthening of natural monopoly pricing, security, environmental protection, and social regulations.
- The shift from protective to incentive regulation, particularly in respect to regulating power transmission and distribution prices.

However, the objectives and focus of power system reforms do vary according to local differences and stages of development. Developed countries, for example, usually have a well-developed power market where supply and demand are generally in balance. They therefore tend to focus their efforts on creating incentive regulatory mechanisms to improve the operation of the power industry, promoting industrial efficiency, lowering power prices, diversification of energy sources, environmental protection, etc. In contrast, developing countries are faced with the task of developing their power industry, enhancing economic development, and realizing the goals of social progress. The objectives of reform include guaranteeing safe operation of the power system and attracting new investments to support the development of their power industries.

### 2.2.3. Monitoring and balancing mechanisms

The monitoring and balancing mechanisms of regulatory systems are usually made up of the following aspects:

- The separation of the role of setting policy guidance from that of administering and enforcing regulations. Government law-makers and agencies should be responsible for strategic and long-range planning and for setting the guiding policies. A separate regulatory body should implement the government’s guiding policies through regulations, and should have authority to generate and enforce implementing polices within well-defined bounds.
- Legal authorization is provided to the regulatory authority. All the activities conducted by the regulatory agency should be within the framework of laws and regulatory rules. Regulating by law helps to prevent abuse of rights by the regulators.
- A dispute-resolution process that allows for arbitration and justice: Australia, for example, has the Power Court of Justice.

So, China’s power industry reform should include the construction of a new regulatory system that measures up to those of developed countries. The reforms should seek to overcome existing regulatory problems by learning from the experiences of advanced countries, ensuring that power industry reforms go hand in hand with ongoing market-oriented reform, and taking Chinese unique characteristics into account.

### 3. Electricity reform in China

#### 3.1. China’s power regulatory system— the history of China’s reform for the power industry

Most countries in the world have chosen to improve the efficiency of their power industries over the past 20 years, generally through deregulating and restructuring and thereby lowering power prices. Such market-oriented reform has tended to promote the integral economic competency of the power industry. In China, the power industry has gone through a series of changes since 1985, including: the termination of the monopoly of “exclusive investment in power generation,” which
existed for over 30 years during China’s planned economy period; the gradual opening of the power generation market; and the introduction of new investment and operation entities to relieve the power shortage that had been hindering the development of the Chinese economy. Such changes led to the remarkably rapid development of China’s power industry. For example, the demands for electricity have been largely met.

In 1997, the Chinese government took more radical steps to reform the power industry, particularly with respect to separating business operations and management from government oversight and guidance. The governmental functions of the former Ministry of Electric Power were divided between the State Power Corporation of China (which was newly established) and the State Economic and Trade Commission.

In the evolution of the People’s Republic of China, we can identify the following three main phases of the power regulatory system:


This phase was mainly characterized by the multifunctional unification of policy making, business regulations, national property management and the production and operation of business enterprises. In other words, the power industry departments of the central government, which were administrative agencies of the State Council, were not only responsible for the policy making and the planning of the state power industry, but also for the management and operation of the industry. Thus the government power departments functioned as both sector managers and as administrative law enforcers, acting as producers, operators, and managers of state property. These departments also invested in and obtained earnings from power projects.

The regional power industry structure was similar to that of the central government, with parallel administrative, production and operating counterparts at the regional level. The regional power sectors in turn assumed responsibility for managing subordinate agencies and their production and operations, while being supervised by higher bureaus under the central government. During this phase, China’s power industry did not step beyond the systematic framework of the “unification of government and business functions” and “as a state monopoly operation,” despite the fact that competent departments of the power industry did make some adjustments and changes. Although some structural adjustments were made, the interference with the operation of the business was not significantly changed.

While this system successfully mobilized limited resources and created a strong backbone for the power industry, the management system under a planned economy proved too constricting for the industry. The lack of clear definition of the responsibilities of both government and commercial enterprises gave rise to many problems, the most serious of which was that of discouraging regional economic entities from investing in the power industry. The resultant lack of diverse investment led to a 20-year nation-wide power shortage, which might have stunted China’s economic and social progress.


During this phase, some governmental regulatory policies were introduced to encourage new investors in the power generation market, terminating the operating monopoly. However, there were no changes in the old management system. The vertically integrated management remained, as did the unified responsibilities of government and businesses.

In 1985, China’s State Council promulgated the Provisional Regulations on Promoting Fund-Raising for Investment in the Power Sector and Implementing Different Power Prices in order to encourage investment in the power industry by regional, corporate, and foreign economic entities and to relieve the worsening power shortage. The regulations provided guidelines for: separating the responsibilities of government and business enterprises; making the provincial power bureaus into operating entities; interconnecting power grids; unifying the dispatching of power; raising investment funds for the power industry; and taking advantage of the local grids to facilitate the development of the power industry. In addition, a new pricing policy was implemented for power generated from newly built power plants.

The reforms during this phase were largely focused on adjusting the regulatory policies, with the aim of providing incentives for investment in power generation. The government, therefore, facilitated access to the power generation market and reformed the power grid access pricing system. Such policy changes and their implementation led to two positive results. First, they greatly promoted the initiative of regional governments and foreign investors, which in turn sped up the development of the Chinese power industry. By 1997, the nation-wide serious shortage of power had been almost entirely relieved. Second, the long-standing State monopoly had been forced to dissipate, being gradually replaced by a new market structure composed of diversified investors.

However, many structural problems remained intact during this phase. That is to say that, while the power generation market was opened, there were no corresponding adjustments in the government’s administration of the power industry. Meanwhile, three new problems occurred, further highlighting intrinsic institutional conflicts. There were two distinct interests in the
power generation market: One was governmental, made up of the former Ministry of Electric Power and its subordinate enterprises where vertical monopoly operations were practiced (integrating power generation, transmission, distribution, and sales). The other was that of independent power plants and power generating companies. Those interests often conflicted, which created problems, especially because of their unequal statuses with regard to market competition. The problems of unfair competition between the two interests tended to worsen after the supply and demand of power had been coordinated and after competition had been enhanced in the power generation market. The regulatory authority of the central government was decentralized while local protectionism was thriving. This created a barrier to both inter-provincial trading of power and the optimal allocation of resources. Improper pricing mechanisms and ineffective pricing controls led to the serious rise in transmission prices; prices for end users escalated.

**Phase III: Separating the functions and responsibilities of the government from those of commercial enterprises, and establishing market mechanisms for the power industry in some pilot provinces and cities (1998–2002).**

The reforms of this phase hoped to deal with the structural problems of the power industry, focusing on the separation of government and business functions and responsibilities. Meanwhile, in order to enable the power companies of five pilot provinces and one pilot city to manage market competition, an attempt was made to administratively separate power plants from power grids (with access granted for the latter through competition).

In 1997, the State Power Corporation was founded to resolve the power industry’s structural problems, while the Ministry of Electric Power (whose administrative functions were transferred to the State Economic and Trade Commission) was officially dissolved in 1998. Thereupon, an institutional framework was formed within which the State Economic and Trade Commission (SETC) and the State Development and Planning Commission (SDPC) functioned as regulators of the power industry; power generating corporations, including the State Power Corporation, operated autonomously; and a new federation of power producers provided self-disciplining services. At the same time, the policy of “separating plants from power grids and accessing the power grid through competition” was carried out in five pilot provinces (Zhejiang, Shandong, Jilin, Liaoning, and Heilongjiang) and one pilot city (Shanghai). The purpose of these pilots was to seek practical solutions to end the vertically integrated monopoly of the power sector. SETC and SDPC provided some guiding principles for establishing the rules of market operation. According to these principles, power price regulatory departments reformed the pricing system for accessing power grids by replacing power prices based on repayment of capital with rate of return prices based on interest payments for a fixed period of operation. This move was considered an important step towards a more standardized power pricing system.

The reforms of this phase reduced the systematic difficulties involved in the unification of government and business responsibilities that previously existed in the Chinese power industry. The separation of power generating companies from the grid operators alleviated the fundamental problems characteristic of a vertically integrated monopoly in China’s industrial power sector.

The market structure of the power industry during this period and its governmental regulatory departments is illustrated in Fig. 4.

Through these phases of reform, the regulatory system and operational mechanisms of the power industry had both been improved. The policy of “raising funds for diversified investment in power generation” and other coherent reforms, such as power price reform, had played essential roles in promoting investment in the power industry, thereby rapidly relieving the country’s severe power shortages. A new systematic framework had been established in which the functions and responsibilities of government and commercial enterprises had been segregated. The experiences obtained from the pilots regarding power generation market reform had justified further reform in the power industry sector, including the introduction of competition.

However, during this phase, the reform in the electricity industry was mainly on the governmental level, the old regulatory system did not change at all in the lower levels, which remained incompatible with both the power industry’s market-oriented reform and diversified operating entities. Although two new regulators replaced the former one, the influence from the central government was still very large and the governments, both central and regional, played an important role in the industry. A modern regulatory system was far from coming into being.

**Fig. 4. Regulatory Institutions in Phase III.**
Market performance is generally believed to be the only criterion for assessing the effectiveness of a regulatory system. Considering its market performance, China’s power industry, after 1997, still had some major problems, as described below.

First, in the absence of effective market mechanisms, the government administered the power industry directly. This tended to distort market quotations, leading to high cost and low efficiency. Although the establishment of the State Power Corporation helped to define the interface between the government and commercial enterprises, in most of the country the continued integration of power generation, transmission, distribution, and sales prevented a competitive mechanism from evolving. The lack of competition, clearly a defect in the system, did little to help promote efficiency in the power sector.

Second, the power market was arbitrarily segmented across administrative divisions (provinces), compounding the inter-provincial market barriers. Areas rich in primary energy deposits were far from power-load centers. However, market segmentation by administrative divisions exerted a tremendous impact upon resource allocation; power from cheap, clean energy sources were rarely distributed across provincial divides due to inter-political barriers.

Third, since the government did not establish an effective regulatory and enforcement system, the traditional administrative approaches to management could not meet the demands of new situations. One of the most serious problems laid in price management. Without an appropriate pricing mechanism, power prices could not reflect the true relationship between supply and demand.

Fourth, investment incentives (such as power purchase agreements promising long-term investment return rates) granted under the condition of a shortage of power became a central problem after supply met the demand. Specifically, independent and intra-system power producers were placed at a disadvantage compared to State power plants when the allocation of power resources again became influenced by non-market factors.

These problems illustrate that during this period the regulatory system and its methods of regulating failed to meet the need for power sector development and market-oriented reform, and failed to block the expansion of monopolies and local protectionism that noticeably reduced the efficiency of resource allocation. These problems caused harm to both the interests of the country and the public. As a result, the power sector required additional drastic changes and adjustments.

3.2. China’s Electricity Reform in 2002

In April, 2002, the State Council of PRC authorized the Scheme of the Reform for Power Industry. The guidelines of the reform for power industry is that “in accordance with the spirit of 15th CPC congress and the fifth session of 15th plenary conference of CPC, taking the reference of experience and lessons regarding power sector reform of both home and abroad, follow the development rules of power industry, give full play to its basic function to allocate resource based upon market-oriented system, speed up the establishment of modern enterprise system, promote the transforming of internal operational regime for power industry and set up the power sector structure which is in line with socialist market economy. The reform shall be conducive to the development of power industry, to the improvement of reliability of power supply, to the enhancement of environment protection and shall meet the increasing electricity demand required by the whole society. The reform process shall be accomplished in different stages stably and actively under the overall design and elaborating arrangement by strengthened leadership.”

The general goal of the reform goes as follows:

- to break up monopoly and introduce competition;
- to improve efficiency and lower cost;
- to rationalize tariff system and optimize resource allocation;
- to promote the development of power industry and push ahead the nation-wide interconnection;
- to set up an open, orderly and well-developed power market system based upon the principles of separation of administration and enterprise and equal competition under the regulator of government.

The key words for this power sector reform are restructure; Regulatory and competition

As for the scheme in April, the restructure would involve the segregation of generation and transmission asset as well as related non-core business.

Before the implementation of the reform, the State Power Corporation owned 46% of nation-wide installed capacity and 90% of transmission asset. So, the core business assets divestiture would be mainly related to the separation of most of the generation asset from State Power to form three to four independent generation companies. A state grid company would be established to deal with transmission assets as defined by State Council. As the representative of owner for the state-owned transmission and distribution asset, the grid company would be responsible for the construction, operation and management of the power network within its business scope. In addition, an independent southern network company, based upon the consolidation of the network assets of southern provinces including Yunnan, Guizhou and Guangxi whose assets belonged to the
State Power Corporation and the network assets in Guangdong and Hainan, would be formed.

On December 29, 2002, the Scheme of the Reform for Power Industry was taken into force. On that day, the State Power Corporation was dismantled and five independent electricity generating and two transmission companies were established. That day was called a breakthrough in the progress of the reform for power industry.

Before the dismantlement, the State Power Corporation played an important role and bore significant influence in the process of economic development. It kept in line with the requirement of the State Council to consistently develop and timely optimize its corporate development strategy according to the need of the national economy and made outstanding contribution for cost and low efficiency, which was absolutely not adaptive with the needs of the sector and the whole national economy. Just as Premier Zhu Rongji said: “Pushing forward the reform of the monopoly industries is part of the in-depth economic reform in China.” So reforms to break-up the state-monopoly of the electricity supply system in order to cut costs and raise efficiency were imperative under the situation.

In the reform at the end of last year, five independent electricity generating and two transmission companies were established. The objective for segregation of generation and transmission asset was primarily achieved.

However, as a corporation, the State Power controlled half of the nation’s electricity generating assets and almost all transmission grids. It had assets of 1.8 trillion Yuan (US$213 billion) at the end of 2000, accounting for 72% of the country’s power assets. Undoubtedly, the State Power was a monopoly in China’s power sector, accompanying naturally with high cost and low efficiency, which was absolutely not adaptive with the needs of the sector and the whole national economy. Just as Premier Zhu Rongji said: “Pushing forward the reform of the monopoly industries is part of the in-depth economic reform in China.” So reforms to break-up the state-monopoly of the electricity supply system in order to cut costs and raise efficiency were imperative under the situation.

In the reform at the end of last year, five independent electricity generating and two transmission companies were launched. The objective for segregation of generation and transmission asset was primarily achieved.

On the generating front, the five newly established companies have an equal share of the generating assets of State Power. The government hopes the big five companies—China Huaneng, China Datang, China Huadian, Guodian Power, and China Power Investment—will compete to sell their electricity across the nation, in an attempt to improve efficiency and lower electricity bills. The structure of the generating assets of the power industry during this reform is illustrated in Fig. 5 and the assets distribution of the big five companies is listed in Table 1.

On the transmission front, the State Power Corporation of China, a pure grid company now, named State Grid Corporation of China, also split some of its power grids to form the China South Power Grid Co. The South Power Grid manages the grids in the southern provinces and regions of Guangdong, Hainan, Guangxi, Yunnan and Guizhou, while State Grid controls grids in the rest of the nation. And the structure is shown in Fig. 6. The geographic distribution of the regional power grids corporations is shown in Fig. 7.

At the same time, four consultant and construction companies were also split from State Power to make them more efficient. And a ministerial-level industry watchdog, the China Electricity Regulatory Commission, was founded, which was called a major breakthrough for the sector.

### 4. Conclusion and future challenges in reform

Transition from a vertically integrated industry to a competitive and deregulated industry will be a long and complicated process. For this reason, power sector reforms in China should be implemented one-step at a time. The process should be divided into three phases:
Phase 1: Separate power plants from transmission grids, establish transmission companies, and construct a competitive generation market;

Phase 2: Separate distribution from transmission, provide transmission networks open access to the market, establish distribution companies with retail functions, construct competitive wholesale markets, and permit distribution companies and large consumers to either buy electricity from the competitive market or directly from power producers;

Phase 3: Separate retail sales from distribution, provide open access to the distribution network, establish independent retailers, construct competitive retail markets, and permit all end-users to choose any retailer or power supplier in the market.

Now, the electricity reform in China is going through the first phase. To build a competitive electricity generating market, 3–5 years will be required. Until then the next two phases can be put in practice. However, by now, the detailed schedule for further reform in China has not been drawn up.

China has been characterized by regional imbalances in the distribution of energy resources and economic development for a long time. While the government has encouraged the implementation of the strategy of transmitting power from western to eastern China, this strategy is impeded by serious market, technical, and administrative problems. Barriers to the inter-provincial trade of power are mainly brought about by the financial system, wherein central and regional financial operations are separated; individual provincial grids; and thriving local protectionism. Many projects that were initiated by provincial or municipal power companies have been abandoned, while the needs to self-balance supply and demand internally have also led to a serious waste of resources. The problems of optimizing resources among different regions could be facilitated by establishing an appropriate, unified, and centralized regulatory system, which would standardize the activities of the power market and break through the market blocks caused by local interests and market segmentation.

But now, along with the startup of the reform for the electricity power, the barriers mentioned above can be overcome step by step. From now on, a new modern regulatory system will be set up in a few years and the
new system that conforms to the socialist market economy will ensure that regulators guarantee new conditions for fair competition for both businesses and investors; regional governments or non-regulatory governmental departments do not interfere in regulatory procedures, and regulatory activities are conducted legally through the establishment of laws and regulations.

In the monopoly sectors in China, government functions and business operations were not generally separated. Although in the electrical power sector, government function and business operations were nominally separated, State-owned power enterprises, the State Power still suffered from considerable government intervention, which was one of the biggest obstacles to market-oriented reform. To ensure fair and orderly control, the government loosened its control over market access and allowed both commercial and State-owned enterprises the responsibility and authority for production and management. As a result, competition will be brought into the electrical power sector, in both generating and transmission, and the interference from the government will vanish, which will lead to a significant price cut and benefit the whole sector and the consumers in the long term.

In the future, China will accelerate west–east power transmission and nation-wide system interconnection to promote concerted economic development between western and eastern regions. Power Transmission from West to East is regarded as a landmark project within the national program for the West China Development, and also an inevitable result of non-equilibrium of layouts between primary energy and productivity. The main tasks of structural adjustment of the power industry in the 10th Five-Year Plan Period are to realize Nation-wide Interconnection, Power Transmission from West to East and Power Supply between North and South.

In a word, China has a beautiful perspective in the electrical power sector, but China still has some challenges.

First, price. Although the electricity prices will lower down significantly in the long term, in the near future, for fearing losses, power generation companies are unlikely to reduce electricity prices. The effect of competition will not surface in a short time. How to determine the price in an immature market is a difficult task.

Second, laws. Market economy should be performed under legitimate framework. Only when a series of clearly defined regulatory scheme is set up and perfected, could the market perform effectively. A whole set of fair, justified and transparent rules and strong regulatory agency should be organized to ensure the operation of competitive market. According to this requirement, it is an outstanding issue for the incoming reform that state electricity regulator should be created and a set of perfect regulatory rules shall be formulated, which will be another difficult task to do.

Third, environment. Power sector has great impact on the environment because of its polluting emissions. China, as well as other countries, face a dilemma: to protect the environment and to develop the electrical power sector at the same time.

And also, in the reform, China will have to consummate the tax and levy systems, investment and financial systems and other systems related to the electrical reform. The electrical reform in China has a long way to run.

Further reading
