

# Research on the Construction Path of Power Financial Market in China under the New Situation of Power Reform

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**Abstract.** In China, with the deepening of power reform and construction of the electricity spot market, urgent and realistic demands have been put forward for the construction of power financial trading market. In this paper, based on the background of power market construction and current power financial transaction practice, the significance of introducing power financial transaction is analysed and the path for construction of power financial transaction market in China is proposed.

## 1 Background of power market construction in China

In 1998, China began to build a competitive power market on the power generation side. Pilot projects were carried out in the six provinces (municipalities) electricity market and the northeast, eastern and southern regional electricity market, and combined with the practice of various forms of power trading such as cross-provincial trading, the generation right trading, direct trading between power user and power generating enterprise. It has made a beneficial exploration in the construction of the power market. After the issuance of “Some Opinions on Further Deepening the Power Reform ([2015] No.9)” by the Central Committee of the Communist Party of China and the State Council in 2015 [1], the pace of China's power market construction has been accelerating, the policy system and market rules have been continuously improved, and the market system combining mid-to-long-term and spot has been gradually established. The market size power has reached a certain scale, and the reform dividends have been accelerated release. In 2017, the national electricity market transaction power totalled 1632.4 billion kWh, accounting for 33.5% of the national power sales (i.e. the marketization rate of sales power), accounting for 25.9% of the total social electricity consumption. With the continuous growth of market size trading power and the gradual improvement of various physical trading mechanisms, urgent and realistic demands have been put forward for the construction of electricity and finance trading market of China.

## 2 The practical significance of introducing power financial transaction

On the one hand, introducing power financial transactions is an inevitable trend to improve China's power market system. In “Some Opinions on Further Deepening the Power Reform ([2015] No.9)”, the government demands speeding up the construction of the power market, and proposes to “explore the trading of electricity futures and electricity over-the-counter derivatives when the conditions are ripe, and provide forward price benchmarks and risk management tools for power generation companies, power sellers and users”. At present, China is still in the initial stage of power market construction, mainly to carry out the medium and long-term electricity trading and spot power market pilot projects. In the future, transaction varieties should be gradually enriched, and a diversified market system including electricity market, auxiliary service market, financial market, capacity market and green certificate transaction, etc. should be established and perfected as soon as possible. The development experience of the mature power market in the world shows that the power finance market is an important part of the complete power market system, which helps to discover the real price of electricity and enhance the liquidity of the market. Meanwhile, it can provide risk management tools for market participants and guarantee the smooth and orderly operation of the market.

On the other hand, introducing power financial transactions is a realistic requirement for China to deepen the reform of the power market. At present, China's power trading is still dominated by physical contracts. With the proportion of market trading power continues to increase, the physical execution of power trading contracts is subject to greater deviation adjustment pressures in the day before and during the day. At the same time, with the advancement of the power spot market pilot, the market participants face greater operational risks. Therefore, some regions in China have

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begun to explore the "medium and long-term Contract for Difference (CFD) + Whole electricity quantity spot competition" centralized market trading model. CFD is a kind of power finance derivative that is widely used in the UK power pool market model, Australia and other power markets. It can be seen that with the launch of the spot market pilot, gradually introducing of power financial trading tools (for example, CFDs) is of great practical significance for exploring the power spot market model suitable for the national conditions, alleviating the pressure on balance of electric power and energy, gradually increasing the market size trading power, and deepening the construction of the power market.

In addition, the development of power finance transactions has a positive effect on enriching and implementing the functions of the trading center and promoting the large-scale optimal allocation of resources. In February 2016, the National Development and Reform Commission and the National Energy Administration issued the "Reply on the Establishment Scheme of Beijing and Guangzhou Power Trading Centers" [2], and approved the "Beijing Power Trading Center Formation Scheme" to clarify the future power finance transactions of the Beijing Power Trading Center. It can be seen that with the deepening of market construction, further enriching the market trading varieties and gradually exploring the power financial transactions is the actual need to enrich and implement the functions of the power trading center. At the same time, due to better market liquidity and flexibility of the power finance market, it can achieve a wider range and more market participants to participate in the market, and to guide medium and long-term power system planning through price signals, which is of great significance for promoting the optimized allocation of nationwide resources.

### **3 The current status of power financial transaction practice in China**

The current domestic power transaction is still dominated by physical contracts, and have not yet formed a mature power finance market. Mainly combined with actual conditions of China and the demand for flexible adjustment of medium and long-term trading contracts, practical exploration of financial transactions has been carried out, such as the generation right trading, contract repurchase, transfer, replacement transactions, etc.

#### **3.1 The generation right trading**

The generation rights trading is mainly based on traditional planned electricity management of China, and is a transitional trading method proposed to implement energy conservation and emission reduction policies and balance the interests of all parties. In the foreign power market, the variety of generation rights trading has not been clearly proposed and defined. According to the "Interim Measures for the Supervision of Generation Rights Trading" (Electricity Supervision Market [2008] No.15) [3], which is issued by the former State Electricity Regulatory Commission (SERC), generation rights

trading refers to the trading behaviour of realizing the substitution of electricity between generator sets and power plants by means of the market, i.e. the compensated transfer and purchase of scheduled contract energy. According to the transaction mode, the generation rights trading mainly includes centralized bidding trading and bilateral negotiation trading. The transaction price under the bilateral negotiation trading mode is negotiated by both parties of the generation rights trading. The price formation mechanism under the centralized bidding mode mainly includes the high and low matching mechanism and the unified clearing mechanism. According to the trading range, the generation rights trading can be divided into generation rights trading in the province and the inter-provincial generation rights trading. According to the trading cycles, the generation rights trading mainly includes the annual, quarterly, monthly, weekly and over a week medium and short-term trading. In 2017, the scale of the generation rights transfer trading in the national grid operation area totalled 121.4 billion kWh, accounting for about 10% of the market size trading power in 2017, accounting for 3% of the total electricity.

#### **3.2 Contract repurchase, transfer and replacement transactions**

The contract adjustment transactions such as contract repurchase, transfer and replacement are in the medium and long-term power market environment in China, through the market size way to realize the compensated transfer and purchase of the contract power, which have been signed between the market participants. The contract repurchase transaction is negotiated by the parties to the original contract, and the seller repurchases the trading volume of some of the trading power. The repurchased electricity and price are determined by the parties to the contract. A contract transfer transaction is a transaction in which all or part of the contract's electricity is transferred to a third party other than the contract. The contract replacement transaction means that the two parties to the transaction will replace their respective power sales (or power purchase) contract execution period, keeping the total contractual power of the two parties unchanged throughout the year. Contract repurchase, transfer and replacement transactions can be divided into medium and long-term transactions such as many years (2 years and above), annual, quarterly, monthly transactions and multiple days of the month according to the power trading period. Generally, it is carried out according to the annual and monthly transaction schedules. If necessary, it can carry out medium and long-term transactions for many days in the month. According to the organization of power trading, it can be divided into bilateral negotiation, centralized bidding, and listing trading.

### **4 The path for construction of power financial transaction market in China**

From the actual situation in China, the establishment of

the power finance market needs to go through a longer period of cultivation, development and evolution process. It needs step by step construction, by stages of expanding trade market behaviour, gradually improving the market microstructure, and carrying out standardized physical trading contracts, and then gradually transition to financial contract transactions, and finally introducing standardized power futures and options contracts in time, and gradually form a power financial trading market with multiple trading varieties, active market participants, and sound trading systems [4].

#### **4.1 Construction objectives and key tasks in the near future**

##### *4.1.1 The construction objectives*

Recently, it is the initial exploration stage of electric power financial market in China. On the basis of continuously deepening the power market construction of our country medium and long-term and spot trading combination, we will carry out generation rights trading, contract repurchase and transfer transactions, CFD, green certificate transactions, etc. power financial transaction varieties, strengthen the construction of market rules and management systems, regulate the trading behaviour of all parties, cultivate market participants awareness, promote trade openness, standardization of contracts, legalization of management, and gradually improve the physical market foundation needed and microstructural conditions for the construction of power financial market to prepare for the establishment of a mature power finance market.

##### *4.1.2 The key tasks*

Firstly, we will further develop electricity utilization plans, improve the spot electricity market and price mechanism, and lay a good foundation for the construction of electricity financial market. To establish a perfect electricity financial markets, we must first have perfect electricity spot market. With the construction development of the spot market, the market main body will face price fluctuations, the problem such as market risk, to gradually introduce futures varieties as risk aversion means to provide a good opportunity.

Secondly, we further regulated the trading of physical forward contracts for electricity, and carried out financial transaction practices such as power generation rights trading, contract transfer and buyback, price difference contracts, and green certificates. We conduct a preliminary exploration on financial transactions mechanism, realize a smooth start in the early market. The physical forward contract is the basic transaction form in the power market, while the futures contract is the highly standardized and financialized forward contract. Therefore, in the early stage of the market, the existing forward contract terms should be further regulated, gradually moving towards standardization. It also allows contract transactions (buybacks, transfers, etc.) to gradually introduce financial attributes. At the same

time, combining the current situation of China's planned coexistence with the market and promoting the demand of clean energy consumption, the existing power generation rights trading mechanism is further optimized and improved, and the renewable energy green certificate trading is explored. We will gradually introduce power financial trading instruments (contracts for differences in price differences) to reduce the risks of market members caused by large fluctuations in the spot market price of power.

Thirdly, we will further cultivate market players, gradually establish the concept of financial trading, and accumulate market experience. We will further open up user options, accelerate the development of electricity sellers, encourage more market members to participate in electricity market transactions, and jointly allocate market risks and benefits. In the initial stage, the participants of electric power financial market mainly include power generation enterprises, large power users, power selling enterprises and power grid enterprises. Considering the market main body experience relatively insufficient in our country, this phase will temporarily not ordinary users, power brokers and speculators into the market, to ensure the safety and order of the market. Through the development of electricity financial transactions, the participation awareness of market players and the concept of financial transactions are gradually cultivated, and the market experience is accumulated.

Fourthly, relying on the power trading center, we should organize and manage financial transactions, perfect the technical support system and rule system, and make preparations for the introduction of mature power financial trading varieties. Relying on the existing power trading center to organize and conduct power financial transactions has natural advantages and can fully consider the particularity of power commodities. It is helpful to reduce the operation cost and difficulty and ensure the stable operation of power market. In this stage, based on the existing transaction organization and management, the transaction mechanism and management system can be further improved, and the technical support system and rule system can be improved, ensuring fair, open and standardized operation of transactions.

##### *4.1.3 The boundary conditions*

Firstly, it has perfect and clear contract terms, specifying quantity and unit, quality and grade, quotation unit, minimum fluctuation price, maximum daily price fluctuation limit, trading time, trading place, default penalty, etc., realizing the standardization of terms of the contract. Secondly, it has a market price, and the contract for the bib contract has to be set up in the spot market. Thirdly, it has a certain number of market participants, with a certain degree of market awareness and credit awareness. Fourthly, it has some policy support, such as green certification deals that need to be implemented alongside renewable energy quotas.

## 4.2 Construction objectives and key tasks for the long term

### 4.2.1 The construction objectives

On the basis of the recent market, we will further enrich the trading varieties, activate the trading market, improve the trading system, and introduce trading varieties such as electric power futures, options, financial power transmission rights and virtual bidding. We will attract speculators, power brokers, market makers and other trading entities to participate in the market, improve the trading system, credit and regulatory system, and form a complete power market system that coordinates the operation of the electricity market and the financial trading market and complements each other.

### 4.2.2 The key tasks

Firstly, on the recent basis, we will continue to enrich trading varieties and timely carry out standardized financial contracts such as power futures and options. The transaction varieties of financial power transmission rights and virtual bidding are introduced to form a complete power market system in which the power market and financial transaction market operate harmoniously and complement each other. Market players can independently choose to sign forward contracts in the physical market for trading, and can also participate in the futures, options and other trading varieties of the electric power financial market. In this way, it can provide market players with means to optimize the cost of power and avoid market risks, improve market liquidity and promote the optimal allocation of power resources.

Secondly, we will further liven up the market, introduce more diverse participants and increase market liquidity. Forward electricity financial market participants in the recent market based on the gradual introduction of speculators, power brokers, becoming the subject of the transaction. Through more diversified market players, market liquidity can be improved, so that hedging can transfer price risk. At the same time, it can better promote the effectiveness of market price positioning, so that information can be timely reflected in the price.

Thirdly, we rely on the power exchange centers to set up power futures, options trading platforms, and strengthen the power financial market system. We will actively communicate with relevant authorities of the state, establish trading platforms for electric power futures and options, and gradually improve trading systems in financial markets. It mainly includes implementation rules of trading business, market access system, trading margin system, risk fund system, daily settlement system, ups and downs stop board system, physical delivery system, information notification and disclosure system, bidding and tendering system, etc.

### 4.2.3 The boundary conditions

Firstly, it is necessary to obtain the approval and policy support from the relevant government departments, and have a trading place approved by the relevant government departments. Secondly, we need to have a sound market technical support system, which can meet the needs of the registration, management, settlement, information release and other core businesses of electricity financial trading parties. Thirdly we must have enough market players, speculators, power brokers, etc. Fourthly, we should have a sound market credit system, supervision and risk control mechanism.

## 5 Conclusions

Generally speaking, China is now in the critical period of deepening power market construction. With the deepening of the electricity spot market, the gradual formation of the pattern of multi-purchase and multi-sale market and the gradual maturity of the market environment, a good opportunity is created for the timely introduction of electricity financial transactions. It needs to support and promote the top-level design and trading mechanism research of the electricity financial market synchronously. Through the combination of financial market and the spot market, it provides effective means for avoiding market risk, promoting price discovery and market competition, which promoting our country gradually perfect and stable operation of the electric power market system.

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