

# Innovative Mechanism Design of Credit Management in Electricity Market

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**Abstract:** With the deepening of the reform of the power system and the basic establishment of the power market system, the credit management of the power market urgently needs to be carried out. This article directly confronts the pain points and difficulties of credit management, combines with the characteristics of the electricity market, analyzes and designs from the aspects of evaluation indicators, linkage mechanisms, and application of results, and also proposes executable innovative management plans.

## 1. Introduction

"People do not stand without faith". Since ancient times, sincerity has been the foundation of every citizen, organization, country and even nation, and it is the moral quality we should have. Since the Eighteenth National Congress of the Communist Party of China, the Party Central Committee and the State Council have attached great importance to the construction of the social credit system. In June 2014, the State Council issued the "Outline of the Social Credit System Construction Plan (2014-2020)" to clarify the overall thinking of China's social credit system. In recent years, in accordance with the requirements of the socialist market economy, important progress has been made in the construction of the social credit system, the unified social credit code has basically achieved full coverage, and the joint incentives for trustworthiness and the joint disciplinary mechanism for breach of trust have initially shown their prestige. For the power industry, power market credit management is an important part of building a social credit management system and actual needs, and needs to keep pace.

On the basis of studying the current status of credit management at home and abroad, this paper combined with the specificity of the power market, made a targeted and innovative design for the credit management of the power industry, to provide reference and reference for the credit management of power trading institutions.

## 2. The current status of domestic and international credit management

Like other management work, credit management work is also a systematic project, and the basis and core of this management work is credit evaluation. Looking at the domestic and international credit evaluation situation, it is divided according to the evaluation target and evaluation object, mainly including the main body (Country, enterprise, organization, individual, etc.) Evaluation and debt evaluation are divided according to the evaluation subject, mainly including internal evaluation and external evaluation.

### (1) Bond rating

In order to raise funds, governments and enterprises will issue bonds of a certain size and form. For investors, buying bonds is an investment behavior. While investment may bring benefits to buyers, there will also be risks. The bond rating is positive It is to a certain extent reveal the risks of bonds to investors.

In Japan, the local governments have successively adopted some credit ratings on public

market debt issued by them in 2008, and some bonds even have triple ratings. From a domestic perspective, the rating targets are concentrated on high-yield bonds. Credit rating is not only a measure of high-yield bonds but also an important risk disclosure tool. Compared with ordinary bonds, high-yield bonds have high credit risk characteristics. Mandatory requirements for their credit rating are in line with China's current actual development needs and can provide references for investors' risk identification and risk monitoring by regulatory authorities.

## **(2) Subject ratings**

Subject ratings are widely applied. On the one hand, national sovereign ratings are organized by international rating agencies such as Standard & Poor's and Moody's. National sovereign defaults are the main factor for rating; on the other hand, corporate ratings are Corporate credit ratings, basically agreed at home and abroad, are considered to be a comprehensive evaluation of the debtor's solvency, willingness to pay, and operating ability. The credit rating is forward-looking and includes judgments on the future, not just Rely on historical records and judgment of current conditions. There are many subjects participating in the evaluation of enterprises. From the domestic rating situation, the evaluation objects include commercial banks, insurance companies, securities companies, automobile companies, shipbuilding enterprises, urban rail transit enterprises, etc., evaluation concerns, evaluation models and evaluation results There is a certain similarity in the application; the last is the personal evaluation, which records and evaluates the credit status of the individual. Currently, it is mainly carried out by the People 's Bank of China. The system collects personal repayment records, default records, and arrears records to form personal credit. report. In recent years, the railway passenger transportation industry has also conducted exploratory personal credit evaluations, recording passenger hegemony, ticket evasion and other behaviors and restricting passenger travel to a certain extent.

## **(3) Credit evaluation of the power industry**

China's social credit system construction department is entering a stage of construction, implementation and vigorous development. Its system structure, operation mode, policy standards, service content and the establishment of credit commitment carriers are gradually improving. However, the development of the electricity market is becoming more and more perfect, the construction of the credit system in the power industry has just started, and the problems in the construction of the social credit system, such as: low transparency of information, conflict between administrative dominance and market construction, and lack of relevant laws and regulations support The construction still exists, but the power market transaction rules are still not perfect. For the construction of the power industry credit system, the urgent problem to be solved is the lack of a comprehensive credit evaluation system to restrict the main body of the power market, prevent power market risks, and protect power. The orderly operation and development of the market.

## **(4) The necessity of power market credit management**

1. Power market credit management is a specific measure to implement the state's policy requirements on deepening power system reform and power market, the credit problem of the power industry has been around for a long time. Before the new round of power system reform, there were credit problems such as arrears of power charges by power users. With the deepening of the reform of the power system, the power market system is gradually established and perfected, the market members are more diverse, the power trading platform is operated, and the credit problems of the power industry will be more complicated. In order to prevent and mitigate the risks of the electricity trading market, the "Several Opinions of the Central Committee of the Communist Party of China and the State Council on Further Deepening the Reform of the Electric Power System" and its supporting documents clearly require that a credit system for power market entities should be established and improved, and credit evaluation of power market transactions should be conducted for different market entities ,Intensify supervision, disclose the illegal and untrustworthy behavior of market entities, make the credit status of various market entities transparent, traceable, and verifiable, strengthen the integrity of market entities, and regulate market order<sup>[1]</sup>. Power market

credit management is precisely the specific measures to implement the country's policy requirements for deepening power system reform.

2. Credit management of the electricity market is the fundamental need for the sustainable and healthy development of the electricity market

On the one hand, by constructing a credit risk management mechanism, you can understand the credit background of market trading entities in detail; objectively assess potential risks, and set guarantees and guarantees corresponding to risks for trading entities, which can greatly reduce the probability of credit defaults<sup>[2]</sup>. And there are corresponding control measures after the breach of contract, so as to reduce losses. On the other hand, after the establishment of the credit management mechanism, if it can be effectively implemented, it will make the behavior of market subjects more legal and standardized, and make the operation of the market more efficient. Accelerating the construction of a credit system for the electricity market and earnestly implementing credit management have an important role in reducing market operational risks, improving operational efficiency, and maintaining the healthy and stable operation of the electricity market.

### **3. Innovative design of power market credit management**

#### **(1) Innovation in the design of credit evaluation indicators**

With regard to the setting of credit evaluation indicators for power market entities, on the one hand, they will focus on evaluating the financial capabilities and comprehensive credit conditions of the market entities, and the evaluation indicators will be basically unified; The performance status of market entities is a "visual indicator", which can be calculated from transaction data, while the compliance of market entities' behavior is a "hidden image indicator", which is difficult to calculate through apparent data. Through systematic research on the evaluation index system of power market entities currently released, the evaluation of market players' violations is all involved, which is basically a blank area<sup>[3]</sup>. This article will make an innovative design for the evaluation indexes of violations of the main body of the power market, as follows:

Common violations of market players mainly include "fishing", "free-riding", "great profit pricing", "collusion", "stealing secrets", "technical interference", etc., mainly in the centralized bidding transaction organization of power transactions.

1. For "violent profit pricing" or "manipulation of electricity prices" and other violations, the main consideration is the impact of the declared quantity and the declared price of individual bidding members on the price of clearing electricity, and such violations can be monitored using the "price movement" indicator. The specific calculation formula is as follows:

$$\text{Price Momentum} = (\text{Momentum 1} + \text{Momentum 2}) / 2.$$

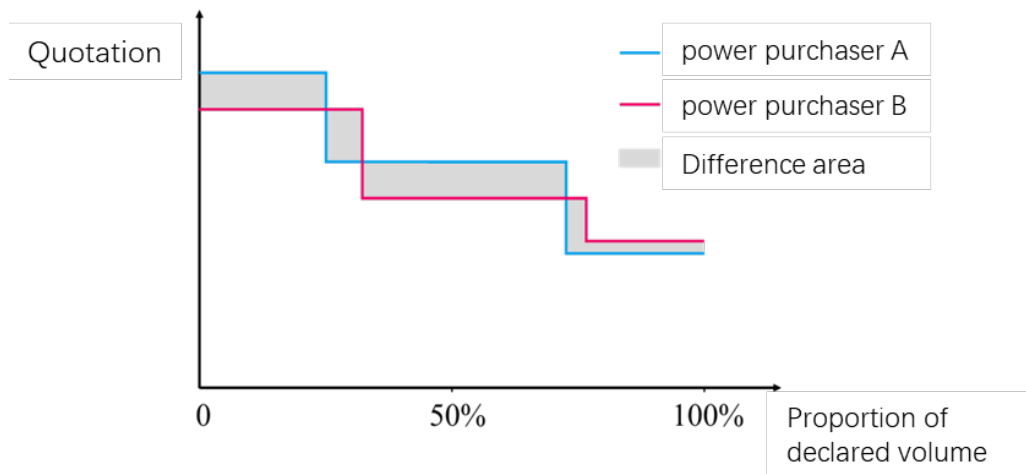
Among them, the momentum 1 = the actual clearing electricity price-the clearing electricity price when the bidding member's quotation is the average; the momentum 2 = the clearing electricity price calculated from the historical average bidding curve-based on the bidding member's revised bidding curve The cleared electricity price calculated.

2. In view of the lack of persuasion and inconvenience in the existing "conspiracy" monitoring indicators, a better distinguishing and more convenient judgment indicator can be used, namely the difference area of the quotation curve. For any two centralized bidding members (both power generators and power purchasers), the method of using this indicator to monitor "conspiracy" is as follows:

(1) Draw the bidding curve of the two bidding members in the same coordinate system with the share of the declared amount of each segment accounting for its total declared amount as the abscissa;

(2) The area of the shaded part enclosed by the two curves is the difference area of the quoted curve;

(3) The smaller the difference area of the quotation curve, the greater the suspicion of "collusion" between the two bidding members, as shown in the figure below.



**Fig1.** Trend Comparison Graph of Declared Price and "Proportion of Declared Volume"

The design of the above-mentioned innovative indicators can effectively solve the problem of weak monitoring of market players' trading violations<sup>[4]</sup>.

## **(2) Innovation in the linkage mechanism of credit evaluation**

According to the basic path of power market construction, the current power market system in China is mainly divided into regional power markets and provincial power markets, of which regional power markets are mainly realized through Beijing Power Exchange Center and Guangzhou Power Exchange Center, while provincial power markets mainly develop Mid- and long-term transactions and spot transactions in the province are realized through the provincial power trading center. Because there are two levels of market, the regional power trading center is mainly responsible for the credit management of inter-provincial power market entities, and the provincial power trading center is mainly responsible for the credit management of intra-provincial power market entities<sup>[5]</sup>. The two will inevitably cross because the same market entity May participate in two or more electricity markets.

Taking the southern regional power market as an example, some power generation companies in the Yunnan region (such as Ahai Power Plant and Liyuan Power Plant) participate in both intra-Yunnan power trading and cross-province power trading in the southern region. The Kunming Power Trading Center to conduct credit evaluation on internal transactions, Guangzhou Electricity Trading Center carried out credit evaluation based on its cross-provincial transactions. Two evaluation results appeared.<sup>[6]</sup> At this time, it is necessary to establish a credit evaluation linkage mechanism to comprehensively evaluate market players from a regional scale. Credit status. For the linkage mode, the innovative design is as follows:

For market entities participating in multiple power markets, each level of market separately evaluates the credit status of market entities, and then weights and sums the evaluation results according to a certain proportion, and finally obtains the credit results of market entities within the region. The evaluation results give full play to the synergy and linkage of credit evaluation work.<sup>[10]</sup>

## **(3) Innovation in the application of credit evaluation results**

Credit evaluation focuses on application, and the application of credit evaluation results directly affects the effectiveness of credit management. At present, from the perspective of the application of power or other related industries to the credit evaluation results, the main application methods are: early warning of market entities with lower credit ratings, inclusion of market entities with the lowest credit ratings into the "blacklist", and high credit ratings The market players have opened some green channels and other common methods. [7]The depth and methods of application are worthy of further exploration. Combined with the actual situation of power trading and the application of credit evaluation results, the innovative design is as follows:

1. Give market subjects a certain "unsecured credit limit". After the spot market runs, in order to

avoid the transaction risk of price fluctuations and the settlement risk of arrears of bills, the power trading agency will manage the credit limit of the market entity. The main source of the credit limit of the market entity is the guarantee provided by the market entity (performance guarantee or guarantee), We can give market subjects unsecured credit lines, the size of which is linked to the credit evaluation results. The formula for calculating the credit limit of a market entity is as follows:

(1) Credit limit = unsecured credit limit + secured credit limit;

(2) Unsecured credit line = tangible net assets  $\times$  tangible net assets conversion rate (%);

(3) The assignment of the conversion rate of tangible net assets is related to the credit rating of market entities.

2. Restrict certain trading authority of market subjects. Trading authority is the authority of market entities registered in a trading institution to participate in specific trading varieties organized by the trading institution<sup>[8]</sup>. The opening and closing of trading rights and the setting of trading institutions according to the situation. For market subjects with low credit ratings, some or all of their trading rights can be controlled by the system to prohibit them from participating in specific trading varieties (such as bilateral negotiation or listing). When the credit rating is restored to the prescribed conditions, the trading authority of the market subject will be restored.<sup>[9]</sup>

## Conclusion

On the basis of reviewing the current status of credit management at home and abroad, this article clarifies the problems of credit management in the power market, and proposes an innovative management solutions to the existing problems, hoping to provide reference for the development of credit management in power or other industries to work together in order to advance the construction of China's social credit system.

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