

Research on the generation side of electricity market bidding proposal

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Abstract. Quotation strategy of power generation company is a new problem with the emergence of electric power market. The amount of a single transaction at least 1 million, more than 100 million in electricity market. The advantages and disadvantages of electricity generation quotation will decide enterprise's benefit good or bad directly. This paper established a set of scheme generation of quotation proposal in electric power marketing system. And on the generation side, power marketing system realized by a modular way, which provides a key supporting role for power market quotation system. Further more, it also provides auxiliary reference for power generation side and helps enterprise to obtain due profits.

Introduction

Along with the deepening of the new round of electricity reform, power generation enterprises obtain generating capacity by means of marketing means will become the development trend in the future. Subsequently, the electric power marketing on the power generation side will occupy more important position. The existing information system can not meet the requirements of marketing management, and increasing the function of auxiliary quotation proposal on generation side is needed.

The research on bidding theory is still on exploration stage in China currently, many aspects of research results are still not very mature, and most of studies are based on certain assumptions or specific types of electric power market and transaction mode. Additionally, factors which influence bidding strategy are numerous and complex, so implemented verification can not be widely carried on. In this paper, electricity power market quotation system module starts from the cost analysis. We combined most of China's electricity market trading rules to find out generation method of quotation strategy in electric power market.

The pace of electricity market reform is accelerating, competitive power capacity ratio is increasing in power generation enterprise. Generation side market competition is becoming increasingly fierce, which urgently needs a set of electricity market transaction support system based on information technology and market oriented. In this paper, electric power marketing system bidding generation scheme is a key module of power generation side marketing system, which provides auxiliary support for trading decision.

Current situation of China's electric power market

After the publication of the article 5 in 2002, the orientation of electric power market in our country is "net plant separately, bidding online", which means power plant owned by power grid operation

enterprise have to separate with power grid. A standardized, independent legal status of the generating entity will be built. Market is only open to the power generation side. The market main body of the generation side electricity market is independent power generation enterprises and power grid operation enterprises. The power grid operation enterprises are responsible for organizing the competition among the power generation companies. The government is responsible for the supervision and management of the electricity market. According to the policy of "province as an entity", the electricity market in our country is mainly based on the provincial electricity market, and the provincial power companies are the organizers of the competition in the electricity market.

With the publication of article 9 in 2015, a new round of electric power system reform kicked off. At present, electricity market in our country is still occupied by large consumers direct purchase of electricity trading mainly. In large consumers direct supply power bidding, power grid according to direct power supply, which signed with power generation enterprises, to deduct a certain percentage of base power, which means power generation companies will generate more than a part of the electricity correspondingly. Through the benefits generated by multiple electricity quantity to offset the loss of depreciate of large consumers direct purchase of electricity.

Electricity market bidding analysis method

Now existing analysis method of quotation in electricity generation side is mainly analyzed by game theory and other methods. Through analyzing potential bidding strategy of main body, establishing market game model, and then analyzes race condition of electricity market.

Total quantity method in this paper mainly use cost volume profit analysis model to establish scene of quotation. In the analysis scene, the factors that need to be considered in the quotation analysis are displayed in a straight line and a curve through boundary conditions. This method can be used to complement each other, and it can complete bidding strategy generation in electricity market generation side.

Construction of model

Calculation formula of profit and loss balance curve :

$$X = \frac{F}{Y_0 + Y_1(1-H)} + C - (1-H) \times (G - C) \quad (1)$$

In this formula, direct supply price (X), on-grid energy(Y), marginal cost of power generation(C), fixed cost of power generation(F), base price(G), deduction of base electric proportion(H). Y_0 means base capacity, Y_1 means large user capacity.

Calculation formula of fixed cost curve:

$$X = \frac{F}{Y} \quad (2)$$

In this formula, direct supply price (X), on-grid energy(Y), fixed cost of power generation(F).

Calculation formula of target profit curve:

$$X = \frac{F + E}{Y_0 + Y_1(1-H)} + C - (1-H) \times (G - C) \quad (3)$$

Calculation parameters in this formula, direct supply price (X), on-grid energy(Y), marginal cost of power generation(C), fixed cost of power generation(F), target profit(E).

Output result

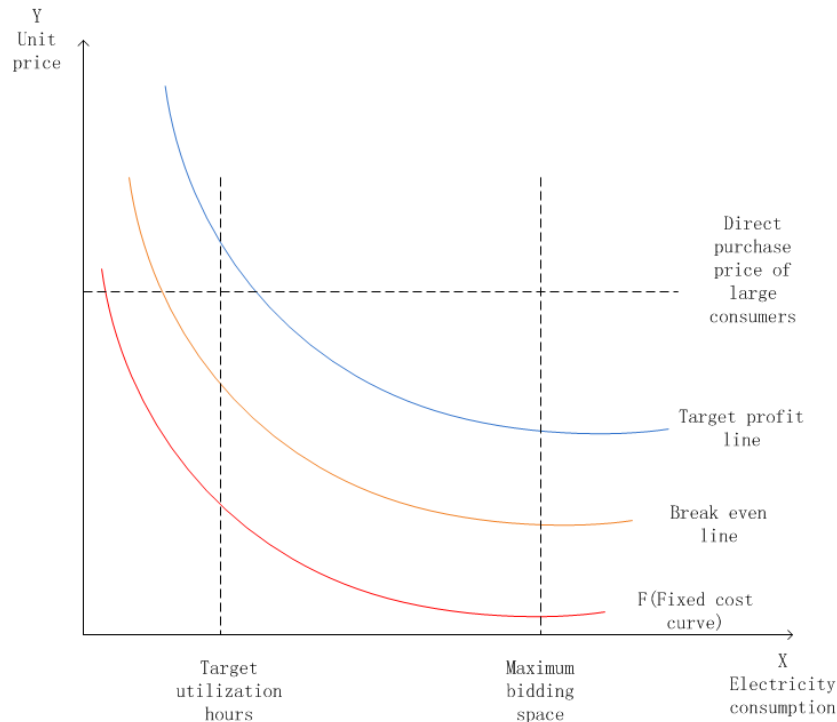


Fig. 1 output result

As shown above, the output of total quantity method of quotation analysis is a quotation scene. In the scene, through putting boundary conditions to calculate: breakeven curve, fixed cost curve, the curve of target profit and target utilization hour line, the largest bidding space line, save the user direct supply price.

Marketing system implementation

The functions which can carry out in quotation analysis scenario and carry out by quotation clerk in every power plant and marketing staff in provincial company are:

(1) Boundary condition entering

Quotation clerk in every power plant and marketing staff in provincial company can determine a quotation scene through the boundary conditions entering. Some boundary conditions can be automatically obtained, and users can modify; some boundary conditions require the manually input by users.

(2) Selection combination of quantity and price

When selecting a point (direct supply price, on-grid capacity) in the quotation scene, the system automatically shows the direct supply price, on-grid capacity, and profit or loss of this point.

(3) Input combination of quantity and price

System provides manual input box of direct electricity price and on-grid capacity. After users input information, it can locate scheme point in quotation scene.

(4) Generate quotation proposal

When selecting a point (direct supply price, power consumption) in the quoted price. Users can

choose to generate the quoted price proposal to view the detailed data. System allows 5 quotation proposal most.

Quotation proposal generation

Through Total quantity method and incremental method to determine a price point (direct supply electricity, on-grid capacity), system will automatically calculate and generate a quotation proposal. Quotation scheme is stored in the system by the way of object. Quotation clerk in power plant and marketing staff in provincial company can inquire the historical quotation according to the authority. Quotation clerk in power plant can see all the historical recommendations. Marketing staff in provincial company can see all quotation proposals.

Marketing system will have the following functions

(1) Quotation scheme comparison

As shown in the output results, system allows users to generate 5 quotation proposal, and compare 5 quotation scheme .Finally, they can choose one or more quotation scheme to save in the system.

(2) Quotation scheme inquiry

System provides the query function of historical quotation proposal scheme. Quotation clerk in power plant can see all the historical recommendations. Marketing staff in provincial company can see all quotation proposals. System provides program query on multi angle: according to the creation of time, founder and unit and so on.

(3)Quotation scheme summary

If necessary, the province's marketing staff can summary quotation proposal of multiple subordinate power plant, and quotation proposal of provincial company can be formed. In the proposed program can be summarized in the project are: equivalent average electrical gain, incremental transaction benefit, average direct supply price (including tax), on-grid capacity.

Conclusions

This paper started from cost analysis. The electricity market quotation system module is studied. Quotation scheme of electric power marketing system is a key module of power generation side marketing system, which provides auxiliary support for trading decision. The method studied in this paper can provide decision support for power generation enterprises in power market bidding by combining other electricity generation side bidding methods.

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