Research on Distribution and Sale of Electricity Service in Parks Facing the Electricity Retail Market

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Abstract. The park is the best experimental field for power system reform. In the context of power reform, the number of market players will increase sharply. Compared with the traditional power market, the competitive power sales market covers ubiquitously connected diversified new players, and the retail market has formed a diversified market structure. How to serve the park enterprises, provide service and product of differentiated and customized electric distribution and sale, is an important part of the future electric retail business. Starting from the concept of distribution and sale of electricity in the park for the retail market, this paper develops a broad service design for the distribution service, electricity sales and value-added service in the park, in order to provide support for the scientific development of the park-level electricity market.

Keywords: Electricity Market; Park Electricity Distribution; Service Design.

1. The Concept of Distribution and Sale of Electricity Service in the Retail Market Park

Compared with the traditional power market, the competitive power sales market covers ubiquitously connected diversified new entities. The retail market has become a diversified market structure. There are both independent power sales companies that have evolved from power grid companies and new entrants after license opening, which makes the electricity retail market face many challenges in the process of operation and management. Service and products are the foundation of the survival and development of an enterprise, including the services provided by the enterprise to realize the value positioning and the prescribed business scope, and they are the core of the enterprise to realize its value. For a long time, China's electricity distribution and sales business has been monopolized by state-owned enterprises, forming a vertically integrated structure including power transmission, distribution, and power supply. The long-term monopoly and the particularity of power products have caused widespread system problems in the power industry, such as lack of cost awareness, low efficiency, and lack of service awareness. The market-oriented reform of electricity requires the introduction of competition on the power sales side and the gradual liberalization of power distribution business. The vertically
integrated business model of traditional power distribution companies no longer applies to new types of power distribution companies, and the business scope of power distribution companies has evolved from the original distribution and sales of electricity to the provision of multiple auxiliary energy services. According to the resources obtained by the power distribution company in the park and the needs of target customers, the service products that the power distribution company in the park can provide to users include power distribution services, power sales services and value-added services.

2. Power Distribution Service Design for Retail Market Park
The power distribution business in the park may include power generation and maintenance services, user engineering services, investment-distributed power and energy storage, energy efficiency management and entrusted management. The following is a detailed introduction of various services.

2.1. Power Generation Operation and Maintenance Service
The operation and maintenance of electric power is to carry out operation and maintenance of users' own power distribution assets or other energy equipment assets, and use the original operation and maintenance resource advantages of power grid enterprises to provide users with professional and efficient power guarantee services. While ensuring the stable and safe operation of the power grid, it is vital to improve the efficiency of operation and maintenance services, rationally allocate service resources, improve service quality, and increase customer satisfaction.

2.2. User Engineering Services
Customer power engineering service integrates engineering consultation, survey and design, general contracting, engineering supervision, planning and evaluation, information software and other industries into one, specifically including customer power engineering consultation, power engineering design and power engineering construction and other services.

2.3. Investment-Distributed Power and Energy Storage
The distribution company considers the initial investment, operation and maintenance, equipment replacement and other cost factors and comprehensive income in the full life cycle of the distributed power supply, invests in the distributed power supply and energy storage equipment, and creates a vertically integrated business model for distribution. In the future, it can generate revenue through distributed photovoltaic networking and participate in carbon emission index trading and non-water renewable energy quota trading to obtain income. At the same time, it will build energy storage facilities and recover investment costs through frequency modulation market.

2.4. Energy Efficiency Management
Due to the lack and low level of enterprise power efficiency management system and power efficiency management methods, enterprises generally have problems of high energy consumption and low energy efficiency. Power distribution companies can manage their power efficiency to help companies save energy, reduce consumption, and reduce operating costs, so as to obtain economic benefits and achieve a win-win situation.

2.5. Entrusted Management
After the power distribution company obtains the right to invest and operate the incremental distribution network, it can entrust other entities such as power grid companies to invest, construct, operate and manage, and the distribution power company charges a certain fee, which will help the distribution power company to streamline its structure, reduce operating costs, and use its advantages to obtain certain benefits.
3. Design of Park Electricity Sales Service Facing the Retail Market

Electricity purchase and sale services are the core services provided by power distribution companies under the current market situation, which mainly include electricity purchase and sale services, as well as electricity purchase and sale data analysis services.

3.1. Electricity Purchase and Sale Services

Power distribution companies are in the middle part of power sales. The upstream buys power through transactions with power generation companies, and the downstream sells power by attracting more users. The role of the power distribution company in the power market, on the one hand, as the buyer, it needs to continuously reduce the power purchase cost; on the other hand, as the seller, it needs to continuously expand the market capacity and improve the income. The electricity market can be divided into four types: wholesale market, retail market, auxiliary service market and spot market. According to the relevant documents on the liberalization of the power market and the characteristics of each market type, the trading mode of the power market in the park mainly includes bilateral trading, centralized trading and listed trading, as well as the options and futures trading mode existing in the future power financial market.

3.2. Electricity Purchase and Sale Data Analysis Services

3.2.1. Analysis of market supply and demand.

Market supply and demand analysis refers to providing support for formulating auxiliary quotation scheme through analysing supply and demand situation of market, forecasting future price trend according to historical transaction information and analysing future electric energy trading market according to input information. Electricity distribution companies can provide other electricity sales companies with big data services such as analysis of the supply and demand situation of the electricity sales market, and charge consulting service fees from other electricity sales companies.

3.2.2. Auxiliary quotation decision.

Assistant quotation decision making research is required for electric power trading auxiliary quotation decision making through market analysis forecasting, user electricity consumption, electricity selling plan and generating cost analysis. Firstly, electricity selling company formulates a quotation scheme to simulate, then formulates corresponding quotation scheme according to different requirements. Through analysing market environment such as network constraint, historical price analysis, electricity generation side/consumption side demand analysis, calculates the basic information needed for quotation decision making, such as demand quantity analysis, cost calculation, electricity sale, electricity price, marginal income etc, combines company development strategy completes quotation plan formulation. Similarly, electricity distribution companies may provide ancillary quotation decision services such as market selling business quotation strategies to other electricity distribution companies, charging certain consulting services fees.

4. Value-Added Service Design for the Retail Market

Value-added power distribution services in the park mainly include user energy analysis and control, energy efficiency management services, demand-side management and integrated energy services in incremental distribution networks.

4.1. User-Based Energy Analysis Control

The analysis of users' energy consumption behavior mainly uses the power big data analysis platform to classify and store the electricity big data collected by the platform in time, and select a specific type of user electricity data for research. When studying a type of user's electricity consumption behavior, we firstly scan the overall data, analyze the overall characteristics of the data, and then eliminate the data under different influencing factors, and then conduct detailed analysis and research on the data, find the connections and laws between the data, establish user models of different load types, and conduct a
comprehensive analysis and prediction of users' electricity consumption behavior. Based on the results of user energy consumption analysis, we can reasonably control the user's heating, air conditioning, lighting, power distribution and other system equipment, monitor the status of various electrical equipment for users, realize modern equipment management, and improve power efficiency and reliability.

4.2. Energy Efficiency Management Service
Aiming at the energy consumption of enterprise users, energy efficiency management services perform refined management of the equipment assets invested, carry out energy-saving monitoring, evaluation and calculation at the same time, adopt effective energy-saving solutions to reduce energy consumption, optimize energy costs, increase energy supply, discover energy waste phenomenon in time, and improve energy efficiency management level. It has realized the energy efficiency data monitoring and analysis of the regional power grid, and carried out the life cycle management of assets, which has transformed the enterprise from the traditional extensive energy utilization method to the refined, intensive and sustainable energy utilization method.

4.3. Demand-Side Management Service
Power demand-side management refers to power companies and power users, under the guidance of national policies and regulations, to adopt scientific and effective methods to jointly improve power efficiency, realize the transformation of power usage, effectively reduce power waste, and achieve energy conservation, consisting with the requirements of sustainable development. Power distribution and sales companies can also benefit from the reduction of power supply costs for their own power companies through the development of power demand-side management services.

4.4. Integrated Energy Service
At present, a unified definition of comprehensive energy services has not yet been formed at home and abroad. Based on the relevant literature, it is believed that integrated energy services include three aspects: one is integrated energy, covering multiple energy sources such as electricity, natural gas, heat (cold), and gas; the second one is the entire industry chain, covering energy production, transmission, consumption, and storage; the third one is full life cycle services, covering energy planning, design, investment, construction, operation and other services. The comprehensive energy service of the park is a service mode that uses the energy Internet of the park as the carrier, through the coordination and optimization of the various energy resources inside and outside the park, to meet the current or potential energy needs of the end users in the park.

5. Conclusion
The park is the best experimental field for power system reform. The electricity sales market gives small and micro market entities the right to choose independently, which can support the ubiquitous access of distributed energy, virtual power plants, electric vehicles, interactive energy and other diverse new entities, creating open and sharing market environment. In the context of power reform, the number of market players will increase sharply. Compared with the traditional power market, the competitive power sales market covers ubiquitously connected diversified new players, and the retail market has formed a diversified market structure. The park is the best experimental field for the reform of the electric power system. How to serve the enterprises in the park, provide differentiated and customized electric products and services, are important parts of the electric retail business in the future. According to the resources obtained by the power distribution company in the park and the needs of target customers, the service products that the power distribution company in the park can provide to users include three categories: power distribution services, power sales services and value-added services, involving 11 types of self-product design, such as power generation operation and maintenance services, investment-distributed power supply and energy storage, data analysis services for purchase and sale of electricity.
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