Research on Value Perception Models and Strategies of Electric Power Users

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Abstract. Energy management business is to provide a "management nature" business for the user's energy use process, focusing on the management of the user's energy system, improving the efficiency of energy use, and reducing the user's energy cost. The key factor that affects the transformation of consumer psychology into consumer behavior is the value of electricity value-added services. This article constructs a quantitative model for the perceived value of energy management business, which is based on the definition of user value perception and value-added service value perception function, so as to serve electricity sales companies to develop integrated energy business.

Keywords: Energy management; Value perception; Value-added services.

1. Definition of user value perception

This article will further extend the preliminary definition of the perceived value of electricity value-added services, which is mainly based on the in-depth analysis of the utility value theory.

Utility theory of value refers to the ability of goods to satisfy people's desires or people's subjective psychological evaluation of the utility of goods to explain value and its formation process. Utility refers to the usefulness of the object to meet the subject's needs, and the value relationship is essentially the utility relationship of the object to meet the subject's needs. A commodity can become a useful thing and possess value when it satisfies the material and spiritual desires of consumers. Therefore, the value of goods depends on utility, and utility determines value.

Based on this, combined with the characteristics of electricity value-added services, the perceived value of electricity value-added services can be defined as: the degree to which electricity value-added services meet user energy expectations.

There are two points in this definition that need to be explained: first, the value of electricity electricity value-added service is a perceptual prediction of the degree of satisfaction that users may obtain before the consumer behavior occurs, rather than the evaluation of the business experience after the consumption is completed; second, the value of electricity value-added service is not a standardized
evaluation, and it is different because of the different expectations of users and the different judgments of satisfaction.

2. Value Perception Function of Value-added Service for Electric Power Users

The value of electricity value-added services is a key factor that affects the transformation of consumer psychology into consumer behavior. From the perspective of users, the value of electricity value-added services conforms to the law of convex functions (such as quadratic functions), as shown in the figure below.

![Figure 1. Function of the value of electricity value-added services.](image)

Q is the number of value-added services purchased by users, and V is the value of value-added services. As the number of services purchased by users increases, users’ evaluation of the value of value-added services will show an increasing trend, but when the number of purchased services exceeds the user’s own demand Q0, the value of users’ evaluation of value-added services will decrease gradually.

There are two functions to define the value of electricity value-added services: first, in order to effectively improve personal benefits, users can use the concept of the value of electricity value-added services to measure the ability of electricity value-added services to meet their actual needs, evaluate the effects of various businesses, and select electricity value-added services that can create the greatest value for themselves. Second, for distribution companies, the value of electricity value-added services has important guiding functions, such as grasping consumer psychology, understanding users' energy usage trends, capturing potential market demand and so on. At the same time, it can also be applied to the price setting of electricity value-added services. Therefore, it helps to ensure that the distribution and sale company obtains reasonable income in the process of providing business, by defining the perceived value of the electricity value-added service.

3. Quantitative model of perceived value of energy management business

Energy management business is to provide a “management nature” business for the user's energy use process, focusing on the management of the user's energy system, improving the efficiency of energy use, and reducing the user's energy cost. In order to achieve the expected energy-saving effect, this type of business gets rid of the mindset of only achieving energy saving and consumption reduction through technology, and starts from the perspective of improving the efficiency of the entire energy utilization system and implements effective management measures, which are based on the characteristics of user power consumption, power consumption characteristics, and energy saving potential.

At present, the general mode of energy management electricity value-added services is that users and power distribution companies reach an agreement, and the power distribution companies are responsible for the management and transformation of the user's entire energy use system. At present, the general mode of energy management electricity value-added services is that users and power distribution companies reach an agreement, and the electricity distribution companies are responsible for the
management and transformation of the user's entire energy use system. Within a certain time limit, users will pay the corresponding business fees when their energy-saving standards are met; if the user does not reach an agreement with the distribution company, the user will not purchase the service. Energy management electricity value-added services mainly include: demand response business, energy management business, power quality improvement business, etc.

Because of the characteristics of energy management electricity value-added services, when users evaluate the value of the business, they will mainly focus on whether the ultimately reduced energy cost of the business meets their own energy-saving standards, and users only have a basic understanding of the implementation process and operation process of the business.

Therefore, the value of energy management electricity value-added services can be evaluated through the following steps.

1) According to the user's industry characteristics, user energy consumption characteristics and other information, the electricity distribution company designs and develops technically feasible and economically reasonable energy-saving plans for users, and determines the energy-saving level \( \sum C \) that users can achieve after implementing energy management-type electricity value-added services within the specified period of time.

2) According to the current energy consumption situation and the average energy consumption level of the industry, users calculate their total energy consumption cost \( D^a \) within the same prescribed time limit.

3) From step one and step two, the degree of satisfaction of the energy demand of users for energy management electricity value-added services can be further obtained.

\[
h = \frac{\sum C'}{\gamma D^a}
\]  

4) According to the definition of electricity value-added service value, the construction of a quantitative model of energy management electricity value-added service value is:

\[
V_{ij} = \sum_n C'_{ij} \cdot h_{ij}
\]  

In the formula: \( V_{ij} \) is the value of the energy management electricity value-added service \( j \) selected by the user \( i \); \( n \) is the time limit for the user to choose the energy management electricity value-added service; \( \sum C'_{ij} \) is the energy cost value of energy management electricity value-added services \( j \) that can save user \( i \); \( h_{ij} \) is the degree coefficient of energy management electricity value-added service \( j \) that meets user \( i \)'s energy demand.

5) Based on the business value obtained in step 4, the user consults with the energy-saving standards required by the user to decide whether to sign an agreement to purchase the business.

According to the above value quantitative model, the value of energy management electricity value-added service is calculated: when \( V_{ij} \leq 0 \), it means that the value of energy management electricity value-added service \( j \) to user \( i \) is negative, that is, it has no value, and the default users are all rational users, then the user will not choose to purchase the service at this time; when \( V_{ij} > 0 \), it means that the energy management electricity value-added service \( j \) has value for the user \( i \). The greater the value of \( V_{ij} \), the greater the value of the business and the greater the user's demand for the electricity value-added service.
4. Electricity value-added service pricing strategy

In the context of diversified electricity sales entities, the electricity sales market presents a "multi-buyer-multi-seller" pattern, where users have more options, and service prices will become a key factor affecting users' choices. An important issue in the marketing of electric electricity value-added services is how to effectively transform users' consumer psychology into consumer behavior. For distribution and distribution companies, the first priority is to seize the price advantage, and to implement "price sales" guided by "user demand" has become a key step to win the competition. Power distribution companies can implement diversified and differentiated service pricing strategies for users to meet the needs of various users and attract more users.

In electricity value-added services, users will choose the most economical service according to their own needs, and price has become a key factor that affects the conversion of users' consumer psychology to consumer behavior. So, this article is based on the user demand orientation, through the analysis of user acceptance, according to the intensity and difference of user demand for the differential pricing of electricity value-added services, so that the price meets the user demand to the maximum extent, and at the same time, it is conducive to the distribution and sales company to obtain the best economic benefits.

The distribution company sells two or more value-added services at a bundled price and provides service packages to users. Usually, the price of purchasing a service package will be lower than the sum of the prices of each service purchased separately. Therefore, users can enjoy services at a more favorable price, and distribution companies can also achieve greater service sales and expand revenue in the service package strategy.

Generally, there is no difficulty in selling products for enterprises in a market situation of rapid growth and best-selling products, so the significance of bundling sales is limited. Only in those industrial fields with changeable market information, structural changes and fierce competition, the formation of service packages can help enhance competitiveness and achieve a "win-win" for both parties. Therefore, the service package strategy is suitable for the mature stage of the marketization of electricity value-added services.

In addition, not all services can be "bundled" together at will. The effect of "1+1>2" in the service package depends on the coordination and mutual promotion of the two services, and can effectively attract users to purchase. Therefore, how to select the appropriate combination of multiple services is a key issue in the service package strategy.

5. Suggestions

Under the background of the continuous opening of the electricity sales side market, the market's profit redistribution of hundreds of billions has attracted major power generation groups and many social capitals to enter the market, forming a significant competition pattern for multiple electricity sellers. How the electricity value-added service can fully meet the actual energy consumption of users, so as to attract users to purchase and use them reasonably is a key issue faced by power distribution companies. If a value-perceived model of value-added services for power users is built for energy management business, it can provide important support for power sales companies to explore user value, design value-added services for power prices, and develop integrated energy business. The value quantitative model constructed in this paper can calculate the value of energy management electricity value-added services: when the value of energy management electricity value-added services to the user is negative, that is, no value, and the default users are all rational users, the user will not choose to purchase the business at this time; when energy management electricity value-added services have value to users, the greater the value of the business, the greater the user's demand for the electricity value-added services.

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