A Study on Preferences of Electric Rate Structures, Energy Equipments, and Energy Services

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(1) Overview

In Japan, since electricity and gas retail markets were liberalized partly, electric and gas rate structures have become diverse. And high energy-efficient equipments such as combined heat and power system and heat pump system have been developed and spread. And secondary battery and heat storage system have been also developed and spread to maintain domestic electric supply reliability.

On the other hand, customers try to choose these energy services, including rate structures and energy equipments, to suit their own various needs. From the viewpoints of customers, they choose their optimal energy services combining these services, because it could be difficult that one service could meet all of customers' needs.

So there are not only competitions within each energy service category, such as rate structure and energy equipment, but also competitions across energy service categories. Rate structures and energy equipments could be substitutive in this sense. Conversely, energy services, which would be chosen by one customer at the same time, could be complementary.

In marketing theory, customers would form their preferences towards products based on their own needs and products attributes, and choose products. Substitutability and complementarity among energy services could be produced by similarities and dissimilarities of these attributes. So it is important to understand attributes of energy services in investigating customers' preferences, developing and marketing them.

In this study, we propose the analysis method to investigate attributes of energy services, including electric rate structures and energy equipments. And this method is applied to understand Japanese customers' preferences of energy services. From the analysis results, we discuss substitutability and complementarity among them. Finally we summarize the usefulness of this method.

(2) Methods

The concept of analysis method is based on the concept of competitive market structure analysis studied in marketing science. Product/brand competition can be investigated based on their attributes by this competitive market structure analysis. And effective implications can be gained in product and brand strategy.

In this study, based on the above analysis method, we extract the attributes of electric rate structures, energy equipments and associated services using data of Japanese electric customers' interests levels in them collected by customer survey.

(3) Results

From the analysis, mainly two points are found.

First finding is that there are some common attributes across electric rate structures, energy equipments and

associated services. For example, insurance against power failure and uninterruptible power source (UPS) have similar characteristic in the same attribute. This attribute can be related to electric supply reliability. And dual fuel supply system, in which customers buy electricity and gas from same companies, and private power generation using gas have similar characteristic in the same attribute.

From this result, we can discuss the substitutability and complementarity among energy services. For example, the insurance could be substituted for UPS for some customers whose needs toward electric supply reliability could be met by one of the above two services. However, the insurance could be complemented with UPS for other customers who could have stronger needs toward the reliability.

Second finding is that some services have multiple attributes. Some of these attributes could correspond to customers' needs. However, others could not always correspond to the needs. This shows that it is difficult that attributes of only one service could meet all of customers' needs completely. So it is confirmed that to combine various services is important to make them complementary each other.

(4) Conclusions

In this study, we propose the analysis method to investigate attributes of electric rate structures, energy equipments and associated services. And it is confirmed that this method could be effective to analyze substitutability and complementarity among energy services in developing and marketing these energy services.