

# Impact of Supply Reliability and Blackout on Residential and Business Customers of Electric Power Companies in Japan

## Background

Massive blackouts in recent years in Japan and overseas, such as the Tokyo metropolitan area in August 2006 and Europe in November 2006, have brought renewed attention to the importance of power supply reliability. The theme of “ideal power supply reliability” has been so far been addressed with the emphasis on measures to be taken by power suppliers. The subject, however, needs to be addressed with an added perspective that fully takes into account the damage caused to customers and their reactions.

## Objectives

Our survey study examines the extent to which customers consider the significance or importance of power supply reliability in relation to customer satisfaction, electricity price and customer services in Japan. It also evaluates and estimates quantitatively the economic damage incurred by customers due to power failure from the points of the duration, customer business size and industry type, etc. Our survey study then analyzes and draws lessons from the actual impact on the residential customers of the power failure in the Tokyo metropolitan area.

## Principal Results

Our study analyzed two domestic surveys. One survey was performed in November 2005 in respect of electricity services with residential and business customers, of which 4,647 responded. The other was performed in September 2006 in respect of the power failure in the Tokyo metropolitan area with residential customers, of which 1,035 responded. The findings of the analysis on the two surveys are as follows:

### 1. Analysis on the survey with residential and business customers in Japan

- (1) Of the four major factors, namely “supply reliability,” “electricity price,” “customer services” and “corporate image,” Japanese customers (both residential and business) expressed the view that a high degree of supply reliability is the most important concern for them. More business customers place importance on supply reliability than residential customers. Among the business customers, there is a tendency that supply reliability is valued more greatly by high-voltage or ultra high-voltage customers than by low-voltage customers, and that it is valued more greatly by industries such as “finance and insurance,” “communication and information processing” than by other industries such as “restaurant and hotel.”
- (2) With regard to the level of customer satisfaction for supply reliability in the U.S., the U.K. and Japan, the scores are at present more or less the same at approximately 80% in the three countries. Considering the cost for further reduction of power failure duration in Japan would be much higher than in the U.S. and the U.K., the survey study concluded among others that further improvement of customer satisfaction in respect of supply reliability would require upgrading further the related customer services such as “information on the cause of power failures and voltage instability, etc.” as well as “responsiveness of staff in charge” (Fig.1).
- (3) Hypothetically calculated economic damage incurred by each customer for a power failure of one hour (i.e., cost of power failure) is estimated on average to be approximately ¥1,700 (approximately ¥2,900/kWh) with respect to residential customers, approximately ¥220,000 (approximately ¥5,200/kWh) for low-voltage business customers, approximately ¥1,100,000 (approximately ¥2,800/kWh) for high-voltage business customers, and approximately ¥7,600,000 (approximately ¥1,600/kWh) for ultra high-voltage business customers. The above estimated damage varies substantially according to the industry type, the duration of power failure, etc. (Fig.2).

### 2. Analysis on the survey with respect to the power failure in the Tokyo metropolitan area

- (1) The survey study on the power failure in the Tokyo metropolitan area revealed that more than 80% of total residential customers incurred damage of some kind including “heat due to stoppage of air conditioning” by the power failure. The existence or non-existence of psychological pain and economic damage caused by the power failure showed significant correlation with the nature of the damage and the attributes of the customer (Fig.3). In addition, the survey confirmed that the economic damage amount incurred by residential customers corresponding to these inflictions averaged approximately ¥2,500, which was to some extent consistent with the hypothetical damage amount estimated in 1. (3).
- (2) The survey indicated that residential customers, having experienced the power failure in the Tokyo metropolitan area, became somewhat more aware of the merits of “emergency generator,” “power failure insurance,” etc. (Fig.4). The survey suggested, as measures after such outage incidents with a view to effectively easing residential customers’ discontent, each power company should increase the awareness of its contact points for customers and build up a cooperation structure with relevant local authorities.

## Future Development

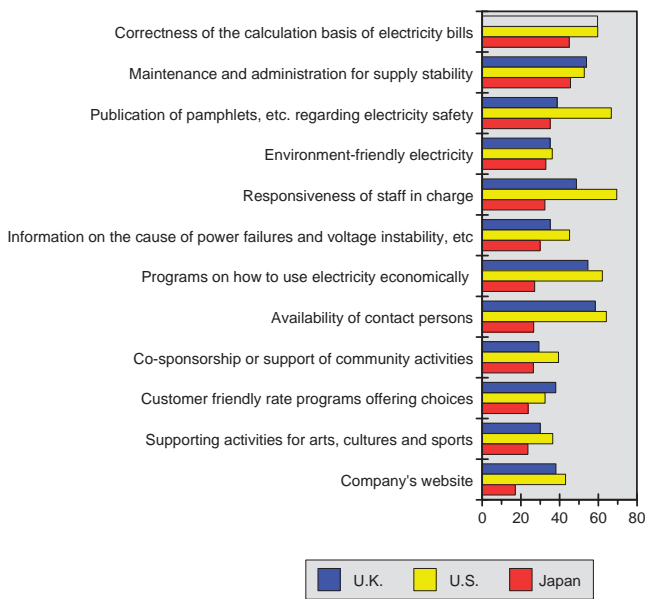
The study shall expand its scope to also cover Europe, which is more advanced in terms of electricity liberalization, and perform in-depth analysis on domestic customers’ valuation of supply reliability through international comparison, and examine the correlation between electricity liberalization and supply reliability.

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## Reference

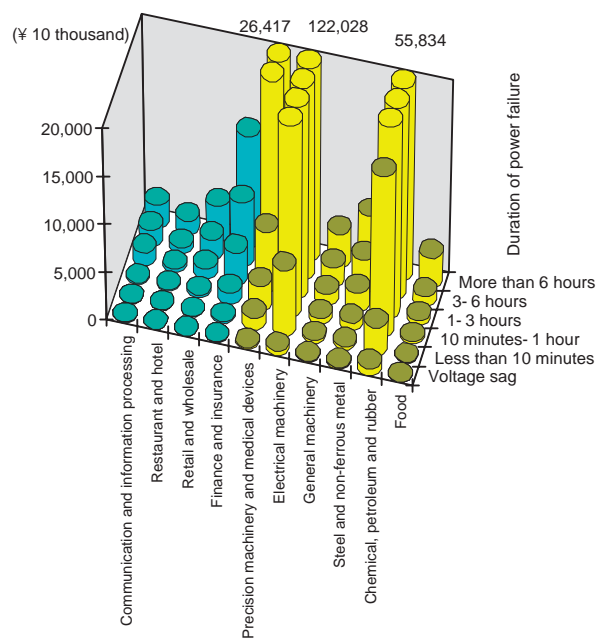
T. Ariu and H. Goto, 2007, “Impact of Supply Reliability and Blackout on Residential and Business Customers of Electric Power Companies in Japan”, CRIEPI report Y06005 (in Japanese)

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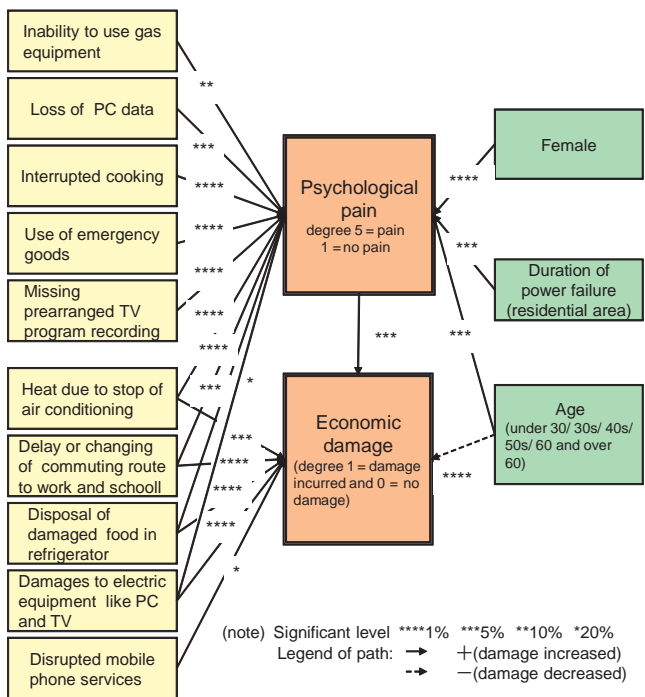


(Note) "very satisfied" + "somewhat satisfied"

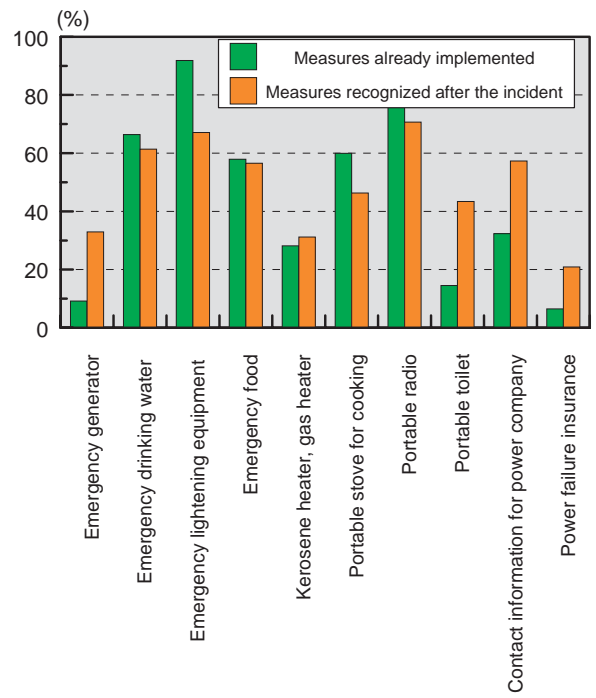
**Fig.1** Satisfaction with customer services in the US, UK and Japan



**Fig.2** Estimated economic damages by blackout duration and industry in Japan



**Fig.3** Factors of monetary loss and psychological pain of household



(Note) n=1,035

**Fig.4** The status and needs of measures for blackout