Impact of the 2003 North America Blackout on Commercial/Industrial Customers of Electric Power Companies

Background

A massive power outage produced a blackout in parts of the northeastern United States and eastern Canada on August 14 (Thursday), 2003. It was the largest blackout in North American history, affecting an estimated 61,800 MW electricity demand in Ontario, Canada and northeastern United States. In Japan, this blackout was strongly noticed because it gave great impact to not only electric utilities but also public society due to significance of the social effect in power quality/reliability service. Many reports, however, on the blackout were shifted to the viewpoint from the power supply side with discriminant analysis for preventive recurrence from the system shutdown to blackout occurrence, and did not present quantitative information and evaluation on influence and response effective to minimize the resultant damages from the viewpoint of customer side.

Objectives

This report aims to survey the details and various impacts of the blackout, and utilization of power failure protection and services in the view of commercial/industrial customers of electric power companies in North America.

Principal Results

We obtained the following findings through analysis based on the telephone interview to 604 commercial/industrial customers with 50 or more employees of electric power companies in November and December 2003.

1. We confirmed that the averaged total blackout duration was 18.2 hours, individually 5.3 hours in Pennsylvania, 8.8 hours in New Jersey, 16.4 hours in New York, 23.7 hours in Ontario, and 25.6 hours in Michigan (Figure-1). According to the industry classification, the duration was 13.0 hours at hospitals and 19,9 hours at manufacturing industries. The restoration duration after the blackout differed greatly for every state, industry and company scale.
2. Immediately after the blackout occurrence, most customers obtained information from radio and TV, and only 20 percent commercial/industrial customers received information from the electric power companies. In this case many customers required exact and quick information on questions such as what occurred?, when will it be restored?, and what measures are being taken? Customer satisfaction indicated that information delivery was not sufficient and wanted their electric power companies to improve communication services of account managers during an emergency condition.
3. This blackout caused reduced sales of 20% in customers, but 47% of commercial/industrial customers suffered financial damages including loss of products and additional labor costs (Figure-2). Discriminant analysis of the damages revealed that significance of the blackout influence depended on industrial classification or insurance cover in addition to the blackout duration of customers (Figure-3).
4. In the United States, the average annual blackout duration per customer is about 120 minutes depending on areas, so about half of the commercial/industrial customers have already installed emergency generators and uninterruptible power system (UPS). After the blackout, about 20% of commercial/industrial customers considered introducing or upgrading these measures, showing further interest to needs for power failure protection (Figure-4).
5. More than half of commercial/industrial customers estimated it possible for the blackout to recur in three years. This report also showed that only about 20% of commercial/industrial customers agreed to raise electricity rate to enhance the transmission network for power quality/reliability service.

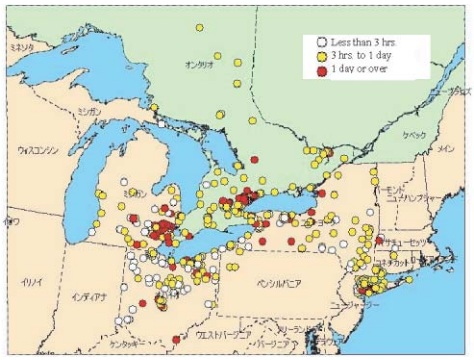
Future Developments

Including results of customers survey in Japan, we will consider difference in consciousness, measures, and power quality/reliability service in Japan and United States to analyze the blackout influence and will present effective and concrete blackout protection and electric utilities services.

Main Researcher: Toshio Ariu,
Research Consultant, Energy Management and Business Strategy Sector, Socio-economic Research Center

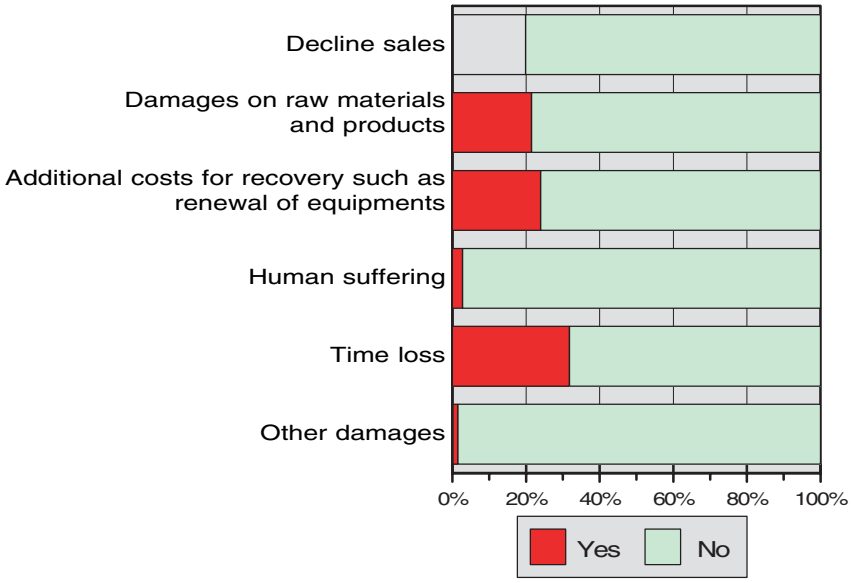
Reference

Toshio Ariu, 2003, “Impact of the 2003 North America Blackout on Commercial/Industrial Customers of Electric Power Companies”, CRIEPI report Y03008 or SERC Research Report SERC-RR0401



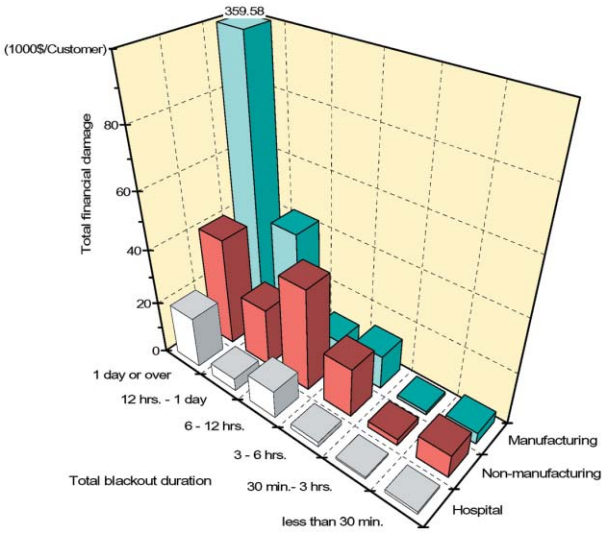
Note: n=604.

Fig.1 Total Blackout Duration in North America



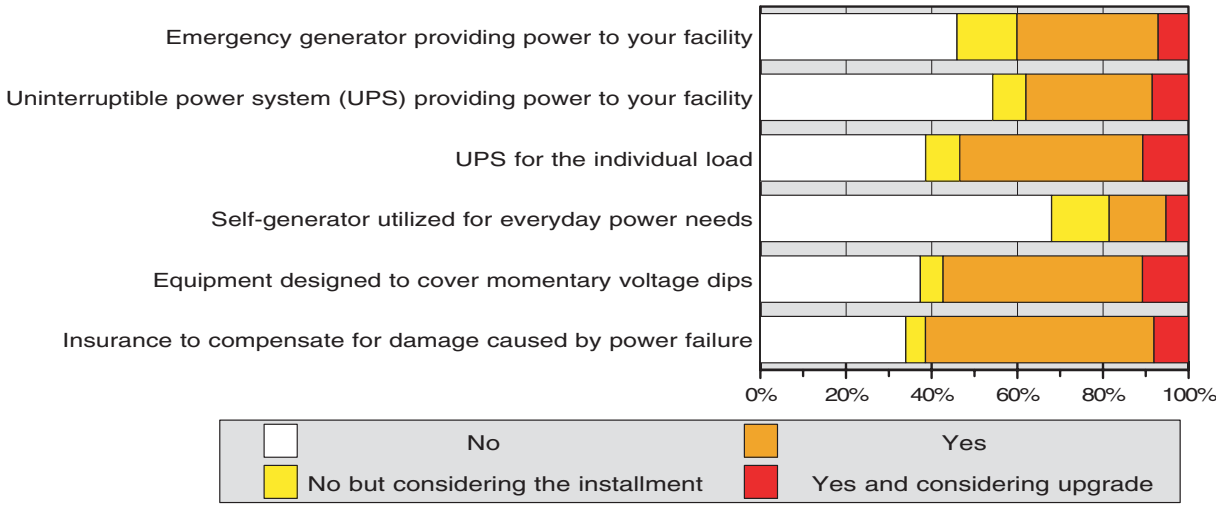
Note: Multiple answers. n=604.

Fig.2 Various Influences of the Blackout



Note: 1) The sum of "Decline sales", "Damages on raw materials and products" and "Additional costs for recovery such as renewal of equipments" is "Total financial damage."
2) A rate of exchange was CAN$1 = US$0.72458 on August 14th, 2003.

Fig.3 Damage of Power Failure by the Blackout Duration and Industry



Note: n=604.

Fig.4 Power Failure Protection and Services after the Blackout