

## **Lessons learned from the Great East Japan Earthquake - Restoration and Reconstruction of Power Facilities -**

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### **Abstract**

The 9.0-magnitude Great East Japan Earthquake hit the wide area of northeast coast of the main island of Japan on March 11, 2011. The subsequent gigantic tsunami caused devastating damages across the coast in the Tohoku region, where Tohoku Electric Power Co., Inc. supplies electricity.

The tsunami also destructively affected the electrical facilities of Tohoku EPCO, including thermal power stations, substations, and transmission and distribution lines. The massive quake of the earthquake resulted in a huge blackout almost throughout the Tohoku region. The number of customers affected was 4.66 million just after the earthquake. But thanks to day and night strenuous restoration work by this utility with the help of other electrical utilities and many subcontractors willing to provide help, nearly 80% of the customers whose electricity had been cut off were restored only three days after the disaster. The early resumption of power supply not only provided local residents with a sense of security, but also contributed to promoting the restoration of other infrastructures.

Tohoku EPCO has two nuclear power stations, one of which, Onagawa Nuclear Power Station, is the closest station in the country to the epicenter of the earthquake. Although the massive quake with long duration and the 13m-height tsunami hit the station, the company was able to cold-shut down all the units in operation safely.

The damages of thermal power stations facing the sea coast were quite serious. In particular, Haramachi Thermal Power Station, a capacity of 2,000MW, was devastatingly damaged by the 18m-height tsunami. Strenuous reconstruction effort on 24-hour basis took as long as two years to resume operation of the station.

The gigantic tsunami and accompanying massive debris also hit substations at near shore, destroying many apparatuses on the ground. Some substations were submerged and some were swept away. Transmission towers were collapsed by huge debris attacking the towers. Distribution lines were more widely and severely affected. A great number of poles were collapsed and conductors were broken, and many were washed away. The removal and reconstruction of these destroyed facilities were extremely difficult jobs, but the company put all resources into the reconstruction for delivering the electricity to affected areas and customers as early as possible.

This presentation will describe the damages of the facilities, the processes of restoration and reconstruction works, and various countermeasures taken in order to provide the audience with lessons learned from the catastrophic natural disaster.