Energy Supply and Demand Following the Great East Japan Earthquake

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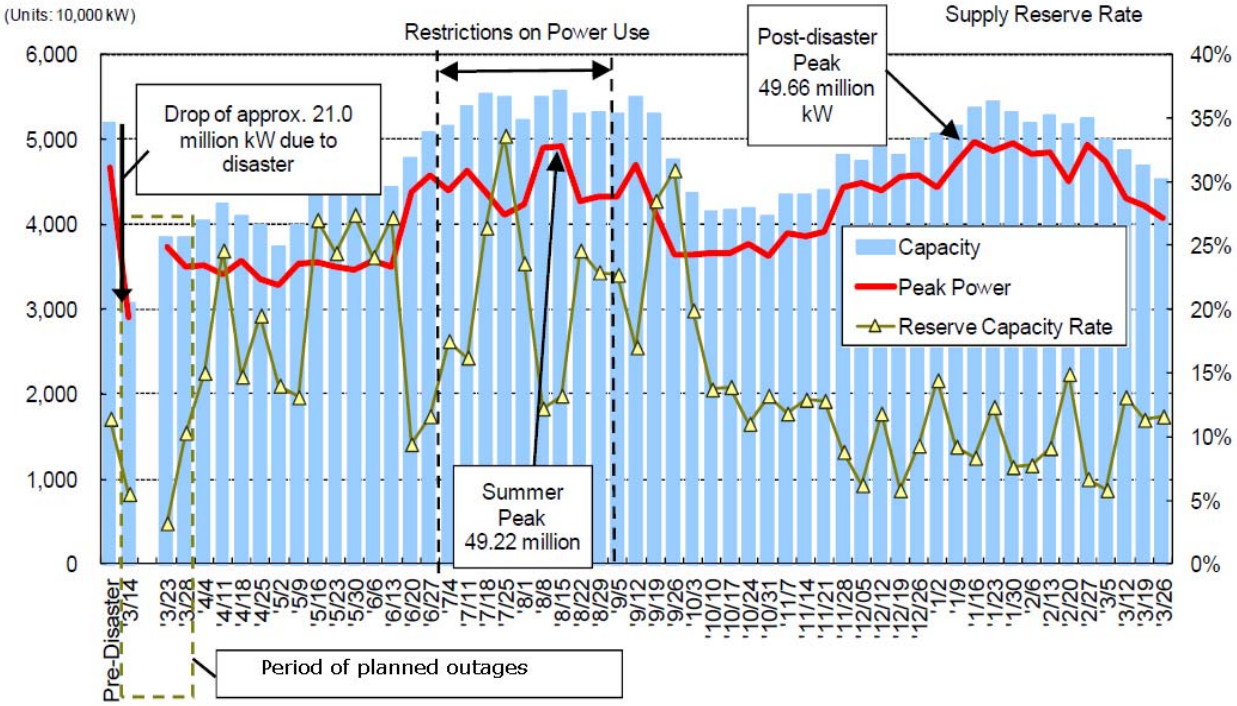
Introduction

It has been more than a year since the Great East Japan Earthquake. With fuller statistics for FY2011 now available, this paper pulls together information regarding the state of energy supply and demand in the past fiscal year.

1. Supply and Demand for Tokyo Electric Power Company and Tohoku Electric Power Company Following the Disaster

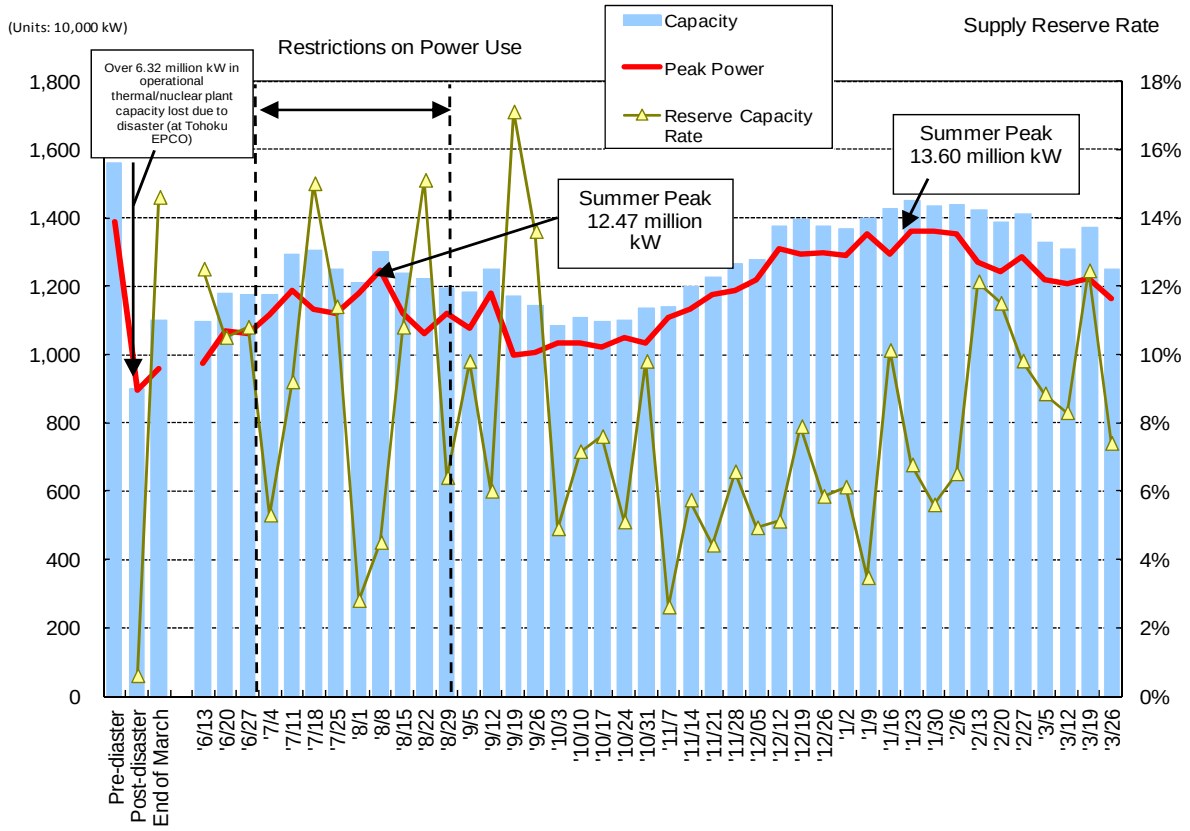
As a result of the Great East Japan Earthquake and the subsequent accident at the Fukushima Daiichi nuclear power plant, Tokyo Electric Power Company (TEPCO) lost 21GW in power generating and supply capacity, with Tohoku Electric Power Company (Tohoku EPCO) losing 6.32GW (numbers do not included purchases from other companies). Between March 14 and 18, between March 22 and 24, and on March 28, scheduled outages were implemented within the TEPCO service area as power shortages worsened following the disaster. Subsequently, there was a rush to restore capacity as operations at thermal power plants and other facilities taken off line due to the disaster were restored, but given concerns about shortages with increased demand during the summer months, the government issued an order restricting electricity usage by major customers (those with contracts in excess of 500kW) between July 1 and early September, 2011. At the same time, other customers also worked to save power, preventing further planned outages such as those implemented following the disaster (see Fig. 1 and 2). While electric power demand typically increases from the latter half of July, when the summer vacation starts, through the end of the mid-August holidays, lower temperatures in the Kanto region during this period in 2011 are seen as also having contributed to curbing demand.

Fig. 1 TEPCO Weekly Supply and Demand Following the Disaster



(Source) Created using data from TEPCO's "Electricity Forecast", etc.

Fig. 2 Tohoku EPCO Weekly Supply and Demand Following the Disaster



(Source) Created using data from Tohoku EPCO's "Electricity Forecast", etc.

Note that due to the impact of torrential rains in Niigata and Fukushima on August 8, 2011, Tohoku EPCO temporarily suspended hydropower generation, causing reserve capacity to fall by approximately 1GW. While possible shortages were a concern, a crisis was avoided by increasing purchases of power from TEPCO.

2. Changes in Power Supply Structure

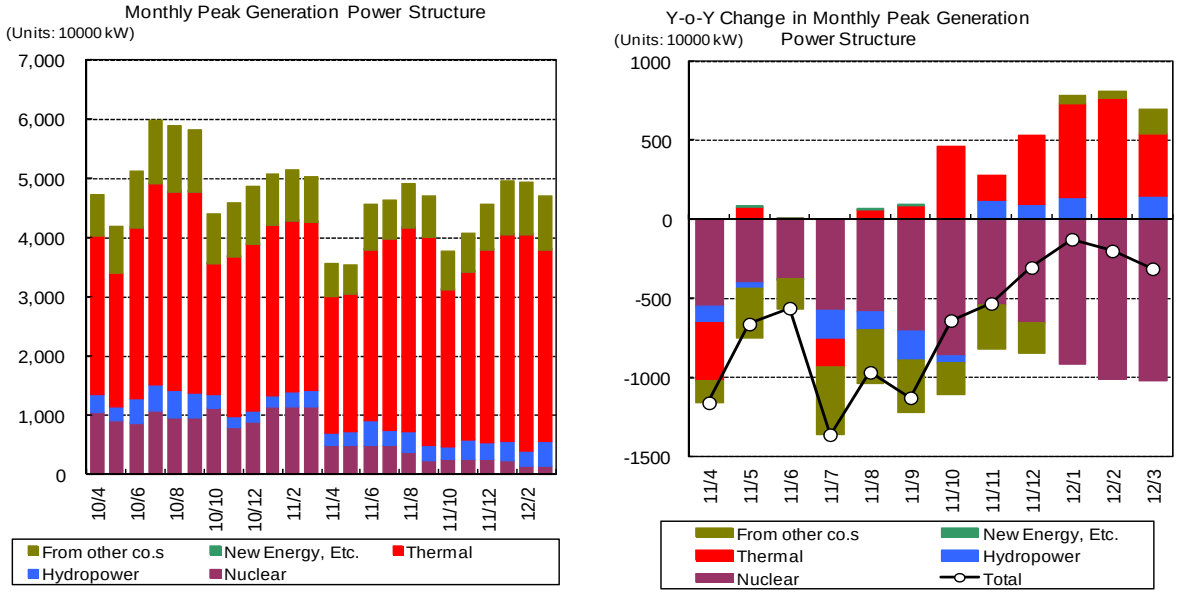
Meanwhile, with the accident at the Fukushima Daiichi nuclear power plant, concerns regarding the safety of nuclear power generation increased, and on May 6 Prime Minister Naoto Kan, through the Minister of Economy, Trade, and Industry, issued a request that Chubu Electric Power Company suspend operation of its Hamaoka nuclear power plant. On July 6, the Prime Minister expressed new views regarding the need for stress tests, and with the controversy over faked e-mails involving the restart of Kyushu Electric Power Company's Genkai nuclear power plant, the restart of nuclear reactors taken off line for scheduled inspections became increasingly difficult. As a result, the issue of a power supply crunch gradually expanded from East Japan to encompass the entire nation. At the same time, with a drop in nuclear power generating capacity nationwide, the industry increasingly turned to thermal power plants as an alternative power source, raising concerns that increased fuel costs would worsen financial conditions at the nation's electric power companies (see Figs. 3 through 5). Concerns focused particularly on possible summer and winter shortages at the Kansai and Kyushu electric power companies, both of which were highly dependent on nuclear power generation, and customers in both regions were urged to save power.

Power supplied to the transmission end totaled 953,500GW in FY2010, and this ultimately fell to 906,600GW in FY2011, a drop of 4.9% year-on-year. Viewed by power source, the fluctuation was even more dramatic, with nuclear power generation in FY2011 falling 62.9% year-on-year, to 100,700GW, hydropower generation at 62,800GW, a drop of 0.1%, and thermal power generation at 610,300GW, an increase of 25.8% over the previous year. In other words, the significant loss in nuclear power generating capacity was largely offset by an increase in thermal power generation combined with a drop in power consumption.

Note that on February 3, 2012, Kyushu Electric Power Company shut down its 2.295GW Shin-Oita Power Station, causing a drop in reserve capacity and raising concerns about shortages. However, the utility was able to secure the necessary power and avoid a crisis by making use of a nationwide facility that provides a framework for contingency support from other power companies, and by requesting that 46 of its customers (totaling 375,000kW) with contracts calling for contingency adjustments restrain demand for electrical power. As with the supply and demand crunch at Tohoku Electric Power Company mentioned earlier, the drop in supply capacity resulting

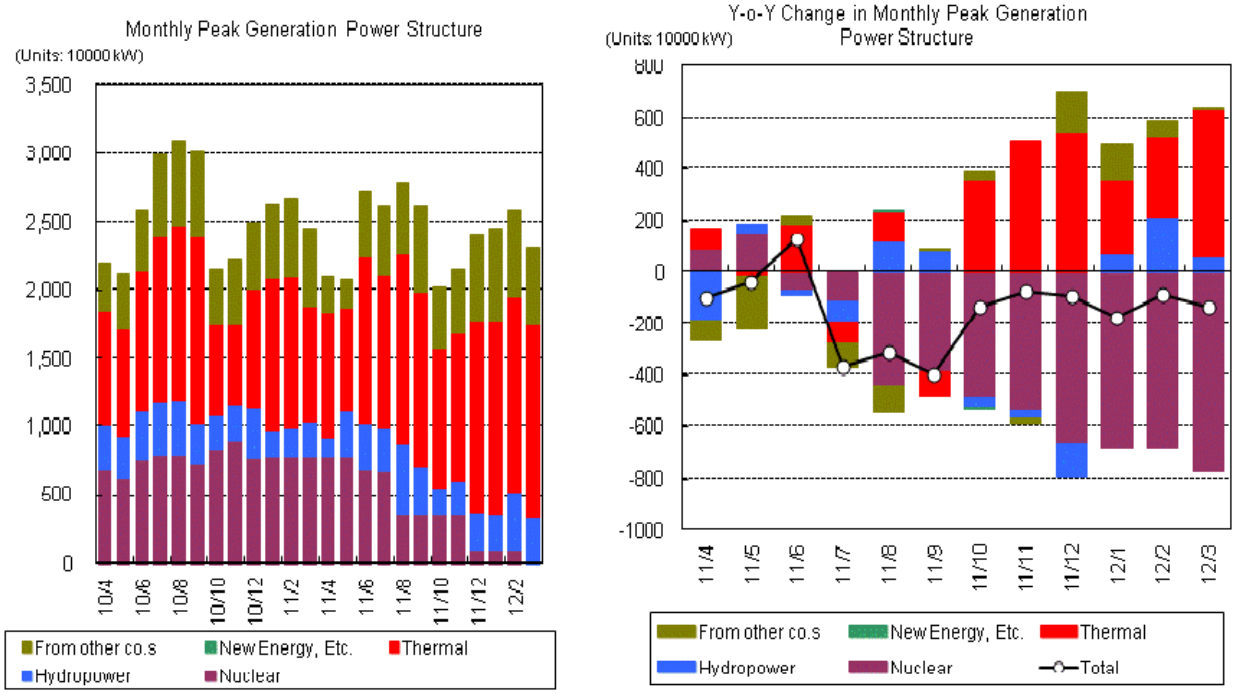
from the nationwide suspension of nuclear power plant operations has a significant impact on the ability of power companies to maintain a balance between supply and demand in the event of accidents and other unplanned suspensions of power plant operations. It can be said, then, that FY2011 saw a heightening of the risk to a stable supply of power.

Fig. 3 TEPCO: Changes in Power Supply Structure During Peak Generation, by Month



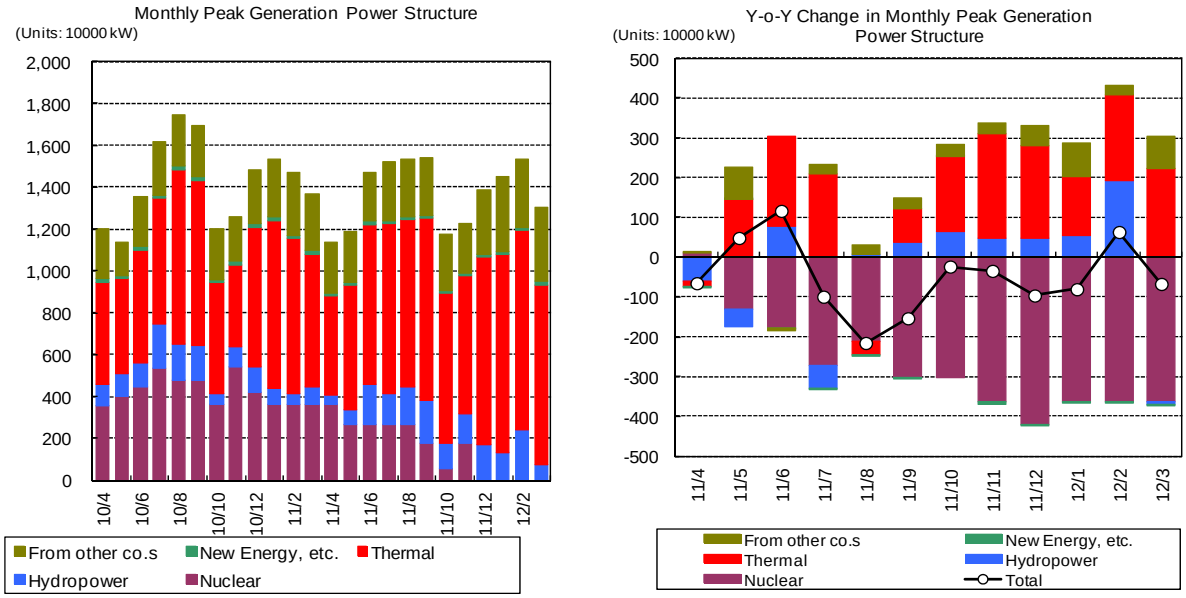
(Source) Created using data from the "Electric Power Research Statistics" of the Agency for Natural Resources and Energy

Fig. 4 KEPCO: Changes in Power Supply Structure During Peak Generation, by Month



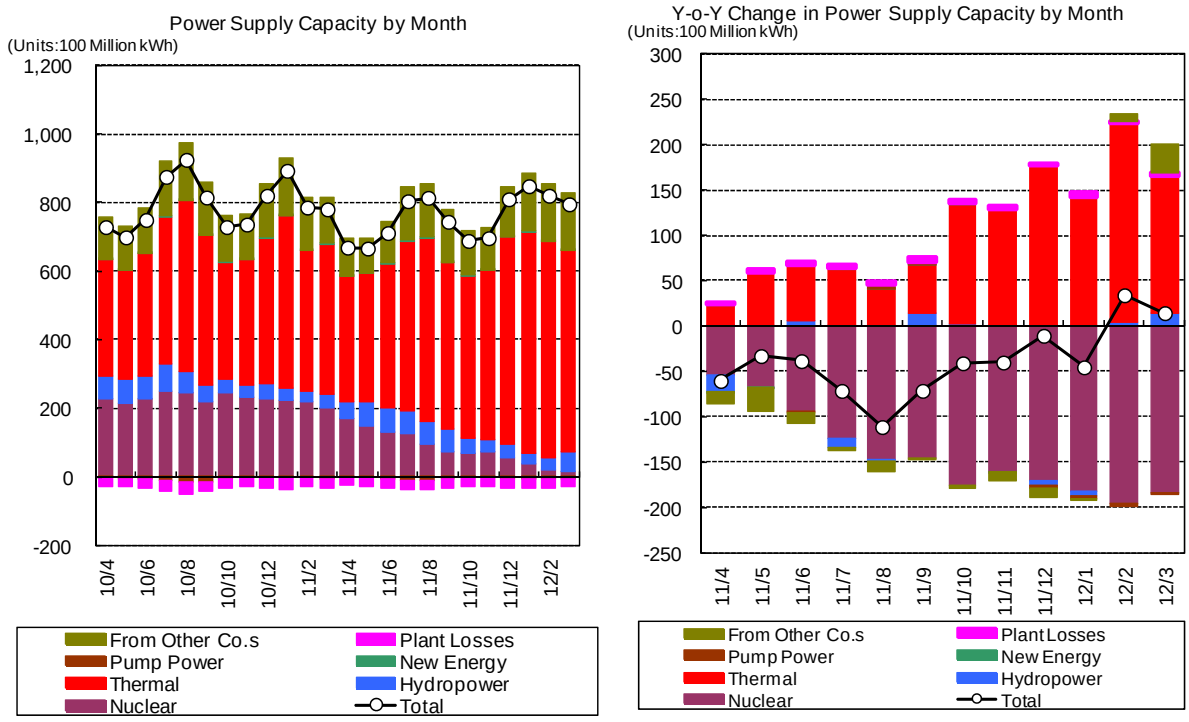
(Source) Created using data from the "Electric Power Research Statistics" of the Agency for Natural Resources and Energy

Fig. 5 Kyushu EPCO: Changes in Power Supply Structure During Peak Generation, by Month



(Source) Created using data from the "Electric Power Research Statistics" of the Agency for Natural Resources and Energy

Fig. 6 Year-on-Year Change in Monthly Power Supply Capacity of 10 Power Companies



(Source) Created using data from the "Electric Power Research Statistics" of the Agency for Natural Resources and Energy

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