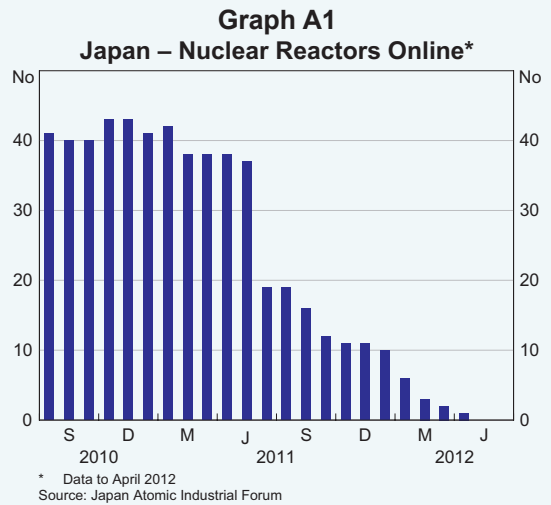


## Box A

# Electricity Supply in Japan

Japan is Australia's second largest trading partner, and the primary destination for exports of coal and liquefied natural gas (LNG), both used in thermal power generation. Over recent years, Japan relied on thermal energy sources for around 60 per cent of its electricity generation and nuclear power for around 30 per cent. However, since the nuclear crisis at Fukushima, almost all Japanese nuclear power plants have been shut down, so the share of thermal energy sources in electricity generation is now around 90 per cent. Assuming it is sustained, this shift away from nuclear power generation is likely to continue to boost demand for coal and LNG. In the near term, uncertainty about electricity supply poses a significant risk for economic growth in Japan. There is a considerable chance that the electricity generation capacity currently in use will not be sufficient to meet the increase in demand ordinarily experienced in the Japanese summer months.

Since the nuclear crisis at Fukushima that followed the March 2011 earthquake and tsunami, concerns about the safety of nuclear power plants throughout Japan have led to a steady decline in the number of plants operating (Graph A1). Plants have not restarted after routine maintenance, even after passing new stress tests in some cases, and at this stage none of Japan's 54 nuclear plants have been approved to operate over the summer months; the only plant still operating is scheduled to be shut down in early May. It is uncertain when, and how many, nuclear plants will be restarted. There has been an expansion of other forms of electricity generation, but this is unlikely to fully compensate for reduced nuclear power. The capacity to meet demand for electricity over the summer, when demand is strongest, is also uncertain as electricity



demand will depend on how hot summer will be this year. How businesses and households respond to the reduction in capacity and uncertainty about the extent of any shortfall relative to demand could have implications for economic growth.

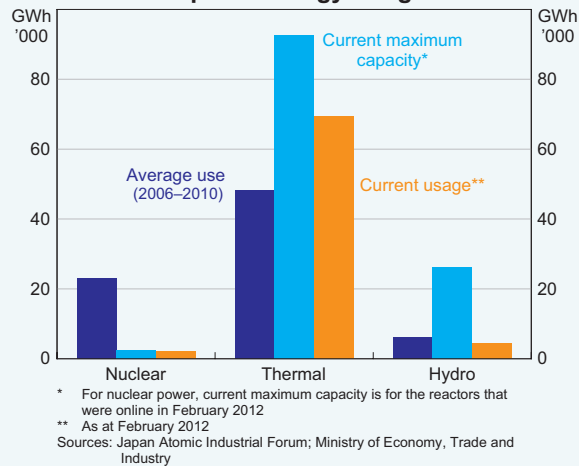
To date, local governments have not authorised the reopening of any nuclear plants in the face of public distrust of nuclear power. More stringent standards for nuclear power plants have been introduced since the earthquake and further tests are being conducted. Nevertheless, given public concern over safety, it is unclear whether, following the completion of the second round of testing, local governments will approve the reopening of any plants before the coming Japanese summer.

The loss of nuclear capacity has been offset somewhat by having fewer thermal power stations offline for maintenance and by recommissioning older plants. The most important factor helping to support supply, however, is the more intensive use of thermal power stations, particularly LNG and

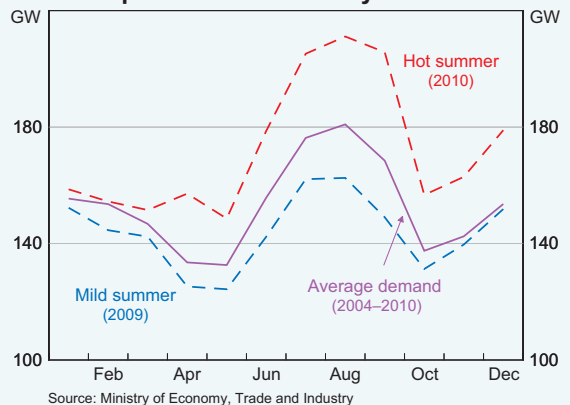
oil-fuelled stations. Because these stations have high generating costs but are relatively easy to start up, they usually operate only when demand is high; the average utilisation rate in normal times for these stations is around 40 per cent (Graph A2). In recent months, these power stations have been used much more in order to satisfy demand. This has resulted in a large pick-up in imports of thermal fuels, particularly LNG. At the margin, increased use of private generators has also boosted electricity capacity (though this is not reflected in the official statistics). Overall, if nuclear plants are not reopened, aggregate generation capacity could be around 18 per cent below what is usually available (although nuclear plants account for 24 per cent of authorised generation capacity in Japan, typically one-quarter are offline at any time for maintenance).

Japan experienced energy supply shortages in the summer of 2011, but these were mainly limited to the Kanto (including Tokyo) and Tohoku regions, which were directly affected by the earthquake and tsunami. Many nuclear power plants in the rest of Japan were still operating. But now, with nuclear plants shut down across the country, electricity shortages are expected to be more widespread during the coming summer if nuclear plants are not reopened. From July to September, peak demand for electricity from the 10 regional electricity companies is around 20 per cent higher, on average, than at other times of the year, and up to 50 per cent higher if the weather is particularly warm (Graph A3). With little scope to further increase output at thermal plants, there is likely to be a shortage of electricity in the summer months if there is a strong increase in demand. The maximum supply of electricity could be as low as 160 gigawatts in the summer months, around what was required in the mild summer of 2009, although it could be somewhat higher if private electricity generation increases in response to the expected shortfall.

**Graph A2**  
**Japan – Energy Usage**



**Graph A3**  
**Japan – Peak Electricity Demand**



Any electricity shortages during the summer months are unlikely to affect all regions of Japan equally as there is only limited scope to transfer electricity between regions. Those regions that have traditionally been more reliant on nuclear power for electricity generation, such as Kansai, Kyushu and Shikoku, are likely to be most affected. These three regions account for around 30 per cent of all manufacturing production in Japan.

Demand management targets, some of which were voluntary, were effective in limiting the impact of electricity supply shortages on economic activity

in the Kanto and Tohoku regions last summer, and are likely to be applied again this summer if a large number of nuclear stations are not restarted. These targets focused on reducing electricity used by households and businesses. They were flagged well in advance of summer, enabling businesses to mitigate the effect on output by shifting production to weekends, holidays and nights to avoid peak demand times and by carrying out more electricity-intensive production in June, before the peak summer period. Although there is widespread acknowledgement of the risks to energy supply over the coming summer, very few businesses have openly stated that they are increasing production ahead of the peak demand period this year. Further, a business survey has found that around 15 per cent of firms may be less willing to save as much energy this summer as they did last summer. If demand management measures fail to compensate for any shortfall, it is likely that areas will be subject to rolling blackouts, as occurred in the Kanto region directly after the 2011 earthquake. Rolling blackouts (and even an increased risk of unscheduled blackouts) could reduce output substantially, particularly in industries such as electronics and chemicals that need a reliable supply of electricity.

The rapid increase in generation from thermal power plants has increased the cost of electricity. For example, the cost to the Tokyo Electric Power Company (TEPCO) – one of the 10 regional electricity companies – of generating electricity has reportedly increased by around 20 per cent. Electricity rates paid by households, which are set by the government, are due to rise a little in June across Japan. TEPCO has already raised its rates to large users by 17 per cent. If firms perceived this to be long-lived, it would be likely to lead to higher prices and reduced economic activity. Persistently higher energy costs would also be likely to accelerate the relocation of Japanese production to elsewhere in the Asian region, particularly for industries where energy makes up a large share of production costs. ↘