

Nuclear restarts and renewables expansion displacing natural gas in Japan’s power sector

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Over the last decade, natural gas has been the dominant fuel in Japan’s power sector, with an average share of around 36%. Following the Fukushima incident in Japan in 2011, the share of natural gas in the power sector jumped from 28% in 2010 to a high of 41% in 2014, driven by the shutdown of all the country’s nuclear reactors pending safety inspections. However, as of today, nine nuclear reactors with a combined capacity of more than 9 GW has gradually restarted operations since 2015 (see Table 1).

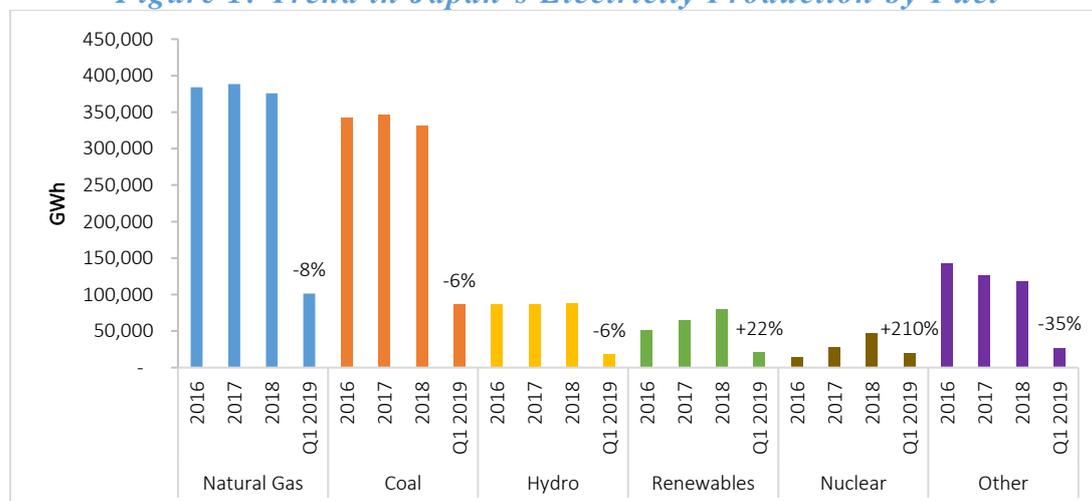
Table 1: Japan’s Nuclear Reactors Restarts

Reactor	Capacity (MW)	Restart
Sendai 1	890	August 2015
Sendai 2	890	October 2015
Takahama 3	870	February 2016
Takahama 4	870	February 2016
Ikata 3	890	August 2016
Ohi 3	1180	March 2018
Genkai 3	1180	April 2018
Ohi 4	1180	May 2018
Genkai 4	1180	June 2018

Source: GECF, World Nuclear Association

In 2018, Japan’s electricity production grew by 0.1% y-o-y to 1,042 TWh, significantly less than the 1.7% annual growth recorded in 2017. As shown in Figure 1, nuclear and renewables output in Japan’s power sector has been growing steadily over the past few years driven by the restart of nuclear reactors and expansion of renewables, mainly solar power. Although natural gas and coal burn increased slightly in 2017, they both fell in 2018 and continued to decline further in Q1 2019. During Q1 2019, Japan’s electricity production dropped by 4% y-o-y to 274 GWh due to a relatively mild 2018/2019 winter season which curbed heating demand in the country. The lower electricity production coupled with the increase in nuclear and renewables output cut natural gas burn by around 8% (-8.5 TWh) y-o-y in the first quarter of 2019, which was also higher than the decline in coal burn of 4% (-5.8 TWh) during the same period. Since Japan imports its entire natural gas requirement in LNG form, the 35% annual decline in the NEA spot LNG prices to \$6.68/MMBtu in Q1 2019, offered little support for natural gas burn.

Figure 1: Trend in Japan’s Electricity Production by Fuel



Source: GECF, IEA Monthly LNG Statistics

Note: the percentage shown in the chart reflects the annual change in production from Q1 2019 vs. Q1 2018

Impact on LNG Imports

The 8.5 TWh decline in electricity production from natural gas has cut natural gas consumption in Japan's power sector by around 1.5 Bcm in Q1 2019. As mentioned before, Japan is solely dependent on LNG for its natural gas requirements and the lower gas burn negatively affects LNG imports.

From January to March 2019, Japan's LNG imports fell by 10% y-o-y to 22.2 Mt, which translates in a drop of around 3.1 Bcm of natural gas imported. As such, the lower natural gas demand in Japan's power sector, coupled with high LNG storage levels at the beginning of the winter season and lower residential and commercial natural gas demand for heating, due to mild weather, affected the country's LNG imports during Q1 2019.

Short-term outlook for the nuclear output

Although Japan's nuclear output reached a peak in Q1 2019, maintenance of several reactors

between Q2 2019 and Q2 2020 is expected to curb the decline in natural gas burn for the remainder of the year, particularly in Q3 2019. In 2020, two additional nuclear reactors with a combined capacity of 1.7 GW has been targeted to restart. However, several nuclear reactors run the risk of being shut down between 2020 and 2022 if the operators do not complete the implementation of satisfactory counterterrorism measures by the given deadlines. As such, this creates uncertainty on the short-term contribution of nuclear output in Japan's power sector, which could negatively/positively affect natural gas burn, and hence LNG demand in the country.

In 2018, GECF supplied almost 40% of Japan's LNG imports and any further decline in natural gas burn could reduce natural gas supplies to the country. However, should any nuclear reactor be shutdown or delayed from restarting, GECF countries are able to continue their resilient supply in meeting any incremental demand for LNG to ensure the security of electricity supply in Japan, as historically demonstrated.