Special Bulletin

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Japanese and Global Energy Outlook for 2017

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On July 26, the Institute of Energy Economics, Japan, opened the 423rd forum on research work where a report was given on the economic and energy outlook of Japan through FY2017 and the latest international oil, natural gas, oil and renewable energy situations. As indicated by the title, the report analyzed and forecast the oil, natural gas, coal and renewable energy situations through 2017 and presented a short-term Japanese energy supply and demand outlook based on the global energy situations. The following summarizes key points of each market outlook and provides an overall short-term outlook through 2017.

First, we expect that the international oil market will see gradual rebalancing of supply and demand through 2017 with moderate upward pressure being exerted on crude oil prices. We forecast that global oil demand in 2017 will post a moderate increase of 1.1 million barrels per day driven by gasoline demand growth mainly in the United States, China and India. Meanwhile, oil production in oil producing countries outside the Organization of the Petroleum Exporting Countries will remain weak as U.S. shale oil production continues to stagnate. OPEC production has remained and will remain high with declines in Nigeria, Libya and Venezuela offset by increases in major Middle Eastern OPEC members. Supply and demand rebalancing will lead crude oil prices to moderately rise. The average West Texas Intermediate crude futures price will rise from $40 per barrel in the first half of 2016 to $49/bbl in the second half and $54/bbl in the whole of 2017. However, the market has various turbulence and disturbance factors that would lead crude oil prices to fluctuate wildly. Downside risks for crude oil prices include economic and financial destabilizing factors such as the impacts of Brexit. There are also some factors to cap crude oil prices, including very high oil inventories at present and a possible brake on the shale oil production fall.

Second, the international natural gas market will also go in the direction of rebalancing over a medium term as is the case with the oil market, mainly due to the impact of current low gas/LNG prices on reduction in investment on the supply side. However, we expect that it would be difficult to eliminate oversupply through 2017. A factor behind the expectation is that the presence of strong competition from coal, renewable energy and nuclear in the power generation sector is leading gas and liquefied natural gas demand to grow more slowly than earlier expected. A golden age of gas in which abundant gas supply meets a smooth, robust increase in gas demand has been seen only in the United States. Gas demand is struggling to grow in Asia and Europe. In the Asian LNG market, demand is growing more slowly than expected earlier. Meanwhile, LNG projects that were subjected to investment decisions amid high prices will launch production one after another. As a result, oversupply will continue or accelerate until 2017 (or a later year). As Asian

LNG prices for long-term contracts are basically indexed to oil prices, however, the average price of LNG landed in Japan will fall from $7 per million British thermal units in the first half of 2016 to $6.6/mmbtu in the second half and rise back to $7.4/mmbtu in the whole of 2017. On the other hand, Asian spot LNG prices reflecting supply and demand will remain around $5/mmbtu through 2017. A gap between long-term LNG contract and spot LNG prices in Asia will widen, exerting various influences on discussions or negotiations between LNG sellers and buyers.

Third, coal prices are stopping their downtrend since 2011 and signal an upward turn. This is because coalmine shutdown and coal production suspension amid prolonged low prices and coal mining companies' production cuts have reduced supply, with a decline in Chinese imports coming to a halt after making great contributions to lowering prices on the demand side. While coal demand remains weak, slumping production through coalmine shutdown is leading imports to stop declining. Although both the supply and demand sides have various uncertainties, prices are likely to gradually go upward. Spot prices for steam coal for power generation, which slipped below $50 per ton in January 2016, are likely to rise back above $55/t in the second half of 2016 and to around $60/t in 2017. Similarly, spot coking coal prices are likely to rise from levels below $95/t in the second half of 2016 to those above $95/t in 2017.

Fourth, renewable energy has rapidly expanded so far thanks to policy support and decline in power generation cost. At present, the expansion is shifting from Europe to Asia. In Europe, the expansion is decelerating as the feed-in-tariff system has been modified to hold down an increase in national burden through surcharge hikes and address the integration of wind and solar power generation into the electricity market. In European and other deregulated electricity markets, massive renewable energy (wind power and solar photovoltaics) expansion has brought about a decline in wholesale electricity prices, reducing capacity utilization ratios and profitability for fossil fuel power plants. Capacity mechanisms are being introduced or considered to secure operating and reserve supply capacity for stable electricity supply. Japan should learn from these changes. In Japan, power generation capacity authorized under the FIT system has reached 87 gigawatts at the end of March 2016, of which only 19 GW is in operation. As operation makes progress, operating capacity is expected to reach 65 GW at the end of FY 2017. If all the authorized capacity of 87 GW is operated, the total surcharge amount in 20 years will swell to 56 trillion yen (or 3.2 yen per kilowatt-hour) and how to hold down the national burden will become a challenge. Therefore, how to address the issues related to non-operating portion of the authorized capacity and how to realize cost-efficient supply systems for growing renewable energy will become important.

Fifth, Japan's primary energy supply is likely to continue a slight decline mainly due to energy efficiency improvement as the economy grows at an annual rate of a little less than 1% through FY2017. In that process, Japan will continue a structural change in which non-fossil energy demand would grow on the restart of nuclear power plants and the expansion of renewable energy with oil and gas demand falling. Sales for electricity and gas among energy sources will expand while fuel oil sales will continue declining due to the sustained improvement of vehicle fuel efficiency and the restart of nuclear power plants leading to a decline in fuel oil sales for power generation. In the baseline scenario where 19 nuclear reactors will be restarted by the end of FY2017, fossil fuel import bill in FY2017 will decline by 4.7 trillion yen from FY2010, with carbon dioxide

emissions falling by 45 million tons. Due to a FIT related cost expansion, however, the unit electricity cost including the FIT cost in FY2017 will increase by 1.1 yen/kWh from FY2010. A sensitivity analysis using lower and higher nuclear power generation scenarios indicates that fossil fuel imports, CO_2 emissions and the unit electricity cost in the higher nuclear power generation scenario will be far lower. We attempted to indicate the importance of analyzing the impact of nuclear power generation on a region-by-region basis as well as a nationwide basis. The analysis indicates that if a 1 GW nuclear reactor is closed for one year in a region with power generation totaling 100 billion kWh, fuel costs will increase by 60 billion yen from a case in which the reactor is in operation and the region's unit electricity cost will increase by 0.4 yen/kWh or about 10-fold faster than on a nationwide basis.

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