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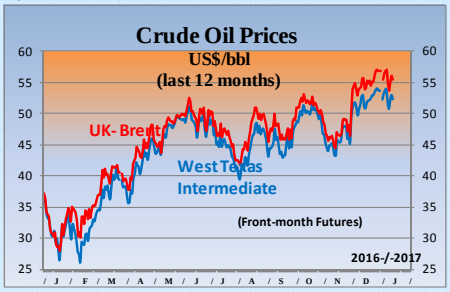
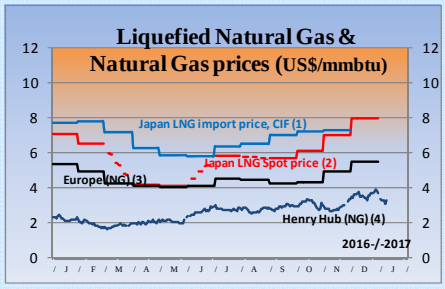
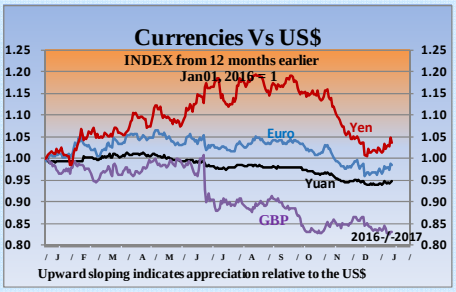


Source: DOE-EIA, Financial Times, NASDAQ



Sources:
(1) Ministry of Finance "Japan Trade Statistics"
(2) Ministry of Economy, Trade and Industry
(contract month basis)
(3) Estimated by World Bank and World Gas Intelligence
(4) DOE-EIA, NYMEX (Front-month Futures)
(5) Investing.com



Source: x-rates.com

Source: Financial Times

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Summary

【Special Feature II: Key Points for 2017】

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In 2017, more PPSs may change the areas of their service based on the regional business environments. The goal for this year will be to set the details of the system design decided by the reform completion subcommittee at the end of 2016.

2. Challenges for the Gas Business

In 2017, it is important to improve supply flexibility in LNG procurement, promote new investment in LNG, and for the domestic market, improve the efficiency of business and reduce the cost of raw material procurement in preparation for the system reforms.

3. Developments in the Coal Market

The price of coal soared in the latter half of 2016 due to the supply-demand situation in China. Among the various factors affecting the international market, the policies of China and changes in its coal production and consumption must continue to be closely monitored.

4. Renewable Energies

The revised FIT Act will take effect on April 1, 2017. This year, efforts for reasonably achieving the renewables capacity target for 2030 such as controlling the growing public burden and maintaining grid stability will be put to the test.

5. Energy Efficiency and Conservation

In 2017, the current policy measures for energy conservation will be enhanced to meet the energy conservation target given in the Energy Mix. New measures such as "collaborative energy conservation" and "energy conservation by using third parties" will also be considered.

6. Climate Change Policy

Now that the Paris Agreement has taken effect, key points overseas are the climate change policy of the Trump administration and China's nationwide emissions trading system, and the discussions on carbon pricing and the long-term low-emissions development strategy for Japan.

1. Challenges for the Electric Power Business

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The expansion of the scope of retail liberalization to the residential sector since April 2016 and the jump in the number of new entrants have promoted competition in retail, mainly in the high voltage category. The switching rate of all consumers including commercial-scale customers has increased from 5.2% as of end of March 2016 to 7.9% by August, rising by 2.7 points in just five months. The overall switching rate has almost doubled in the region under Hokkaido Electric Power from 5.4% in April 2016 to 10.5% in August, while that for the newly liberated low voltage demand was 2.2% as a national average.

Many newcomers expected market conditions to remain the same as last year, but the competitive environment changed drastically in FY 2016, especially after the avoidable cost of FIT electricity was pegged to the market. In the highly competitive high voltage category, profitability has presumably fallen in many regions due to the lower electricity tariffs caused by tougher competition. While many new entrants decided to enter the business assuming the environment as it was last year, in 2017 more newcomers may change their areas of service as a result of the change in competitive conditions and the lower profitability caused by competition.

At the Policy Subcommittee for Acceleration of the Electricity System Reform (reform completion subcommittee), a drastic review of the electricity business system is currently underway. The reform is planned to include the establishment of new markets and revision of the operation method, including the introduction of a base load electricity market, gross-bidding (two-way bidding by major companies), indirect auction of the use of inter-regional connection lines (through spot transactions at the power exchange), the capacity market (kW value market), and the non-fossil-fuel-value market (securitization of non-fossil-fuel-value). However, few measures will be implemented in 2017 and thus there will be little impact on the competitive environment until FY 2018 or later. In 2017, the focus will be mainly on ensuring consistency between the systems and deciding on the details of the systems.

2016 saw an expansion of renewable electricity capacity and a wider recognition of the impact of mass construction of new thermal power plants, resulting in the revision of many thermal power plant construction plans. The Organization for Cross-regional Coordination of Transmission Operators (OCCTO), which is currently studying the enhancement of the Tokyo-Tohoku inter-regional connection line, is now required to partially revise the enhancement plan as the operators wishing to transmit electricity from Tohoku to Tokyo decreased to 3,860 MW from the initially planned 5,280 MW. The impact of the reforms by the reform completion subcommittee on these power investment plans must be closely monitored.

On December 1, 2016, the European Commission announced a new proposal for the reforms of the electric power system. The proposal includes various ideas that would affect Japan's energy policies, such as the transition from a centralized system to a dispersed one, using smart-meters to generate near-real-time wholesale electricity prices reflecting actual supply and demand which was not possible until now, reflecting the above-mentioned wholesale prices on the electricity tariffs, and digitizing the distribution grid. The proposal is expected to influence the detailed system design and technological development strategy of Japan.

2. Challenges of the Gas Business

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Regarding the gas business in 2017, the market environment is likely to remain favorable for buyers as supply capacity far exceeds demand in the international LNG market. However, for Japan overall, as the percentage of long-term contracts in the total purchase amount rises with the launch of a series of new projects involving Japanese companies, buyers will face the major near-term challenge of preparing to flexibly respond to demand fluctuations, such as seasonal factors, by securing outlets in overseas markets and enhancing trading functions.

Since December 2016, the spot LNG price of Northeast Asia has been soaring, surpassing $9/MMbtu at the time of writing. This is partly due to the unexpected shutdown of a large production plant in Australia in the current high demand season, and the price should gradually lower in 2017 as the supply-demand balance eases. However, this surge in price clearly shows that the operation of new projects like this one is a significant risk factor in the future spot market.

Other challenges include securing investment in new LNG projects. Although an investment decision was made for just one new project in 2016, it is crucial for Japan to continue to invest steadily in new projects as many long-term contracts will be renewed in 2020 and beyond. Past experience shows that an excessive rise in LNG price undermines the energy's competitiveness and hampers the stable development of the LNG market. All parties concerned including sellers, buyers, and the financial institutions providing loans should thoroughly discuss how to share the risk of new investments.

In the domestic gas market, the retail sector including residential use will be fully liberalized in April 2017. The entry of new players will certainly put pressure on existing gas companies to improve their business efficiency and lower material costs further. In terms of material procurement, existing companies will likely form alliances to optimize procurement and strengthen trading functions.

Meanwhile, as of December 20, 2016 at the time of writing, only eight operators including electric power companies have signed up as gas retailers, far less than the number of electricity retailers (more than 60) that had signed up by the same time in 2015. This is because starting a gas retail business requires procuring LNG competitively and selling a certain amount of gas. Regarding demand, supplier switching may increase to a certain extent for industrial suppliers as the current restriction on installing a second gas pipe will ease from April 2017 as part of the gas system reforms, but the rate of households switching supplier is likely to remain low. Nevertheless, the impact of competitive pressure on gas prices must continue to be closely monitored.

3. Developments in the Coal Market

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In 2016, coal prices fluctuated wildly in line with China's moves. The spot price for steam coal (FOB, shipped from Port of Newcastle, Australia), which dipped below $50/tonne in January 2016 and remained in the lower $50/tonne range thereafter, then soared from July, peaking at over $110/tonne in November (before falling to the lower $80/tonne range by mid-December). Meanwhile, the spot price of coking coal (FOB, Australian premium hard coking coal), which had fallen to $75/tonne at the end of 2015, was around $80-100/tonne at the beginning of 2016, but then soared from September 2016, surpassing $310/tonne in mid-November (before falling to around $250/tonne in late December).

Behind the skyrocketing coal prices is the growth in imports by China in 2016. This increase was caused by (1) the rise in consumption associated with the increase in power generation and pig iron output due to economic recovery, (2) production capacity cuts and production adjustments (reduction of days of operation) of coal, (3) supply disruption due to rain in July, and (4) the increase in spot purchases due to concerns about domestic supplies of coal. On the supply side, there were accidents at two coking coal mines in Australia and more rain than usual in the area, in addition to a series of permanent or temporary coal mine closures and asset consolidation by coal owners in the supplier countries due to the decline in prices and demand. The rebound from the prolonged decline in prices could be another factor behind the price hike.

Coal imports in 2016 tended to decline except in China. China's imports for January-October 2016 added 7 million tonnes for steam coal and 9 million tonnes for coking coal, both year-on-year (y-o-y). Coal imports for India for January-September 2016 increased y-o-y by 4.7 million tonnes for steam coal but decreased by 4.5 million tonnes for coking coal due to the slower growth in coal demand and the government policy to boost output. Imports for Japan and South Korea for January-October 2016 decreased by 6.8 million tonnes for steam coal but increased by 1.5 million tonnes for coking coal. Imports continue to decline in Europe, with the EU's imports for January-July falling by as much as 27.3 million tonnes y-o-y.

Meanwhile, coal exports dropped only slightly y-o-y for Australia for January-September 2016, but decreased by around 20 million tonnes for Indonesia, and by 6.9 million tonnes for coking coal and 2.1 million tonnes for steam coal for the US for January-October. For other exporters, exports increased for Columbia and Russia, but decreased for South Africa and Canada.

The coal market for 2017 will be strongly influenced by China's coal policy and supply-demand trends. China is now temporarily lifting its policy to reduce the days of coal mine operation due to a supply-demand crunch, but the capacity reduction policy itself will continue in 2017. The high coal prices are causing more exporters to plan to increase production by, for example, reopening temporarily closed mines, and the supply capacity is likely to expand in 2017. Imports are likely to rise in Asia including ASEAN and India, but the decline of coal prices is expected to continue for some time. The spot price could fall below $70/tonne for steam coal and $150/tonne for coking coal. In any case, the production adjustment measures of the Chinese government and changes in the country's imports must be monitored.

4. Renewable Energies

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In 2017, the revised FIT Act (an act to partially revise the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (FIT Act)) will take effect on April 1, starting the actual reforms of the FIT system in Japan.

Adding together the capacity put into operation after the launch of the FIT system in 2012 (32 GW) with the capacity already in operation at that time (20 GW), there was a total installed renewable capacity of 52 GW in operation as of August 2016. While the FIT system contributed significantly to the expansion of renewable energies, the surcharge has risen to 2.25 yen/kWh (12% of the average electricity tariff) by FY2016, ten times the level when the system was launched. The rise in public burden became a great challenge and led to discussions on the specific system design in the revised FIT Act promulgated in June 2016.

The revised FIT Act has two key points: Setting a reduction target for the purchase price, and introducing a bid system. The goal of these measures is to reduce Japan's solar PV and wind power generation cost, which is twice the international level. So far, the purchase price has been decided based on the current cost of generation; however, from April 2017, the purchase price will be lowered according to a time schedule that is based on the future targets for reducing the generation costs. For instance, a clear reduction schedule was indicated showing that the purchase price for solar PV (10 kW or less) will be lowered from 31 yen/kWh in FY2016 to 24 yen/kWh in FY2019, and from 22 yen/kWh in FY2016 to 19 yen/kWh in FY2019 for wind power (20 kW or more). The bid system will be applied to solar PV of 10 kW or more, which is more widely used than other energies and has a greater potential for cost reduction. Bidding will be conducted only for capacities of 2,000 kW or more during the pilot period, and the first bid will be offered around October 2017 for a capacity of 500 MW with an upper price limit of 21 yen/kWh. The effect of these measures in controlling the growing public burden will need to be verified.

Another important challenge alongside controlling the growing public burden is grid stabilization. So far, the grid remains stable with just curtailment of renewable energies, but in the long run, energy storage technologies will be required to deal with the increase in renewable capacity. Battery cells will continue to be an attractive option as their prices have decreased significantly in recent years. Further, in 2016, Power to Gas, or the production of hydrogen from renewable energies, was adopted for consideration as a new technological option, and pilot studies are currently underway. This technology is also linked with building a hydrogen economy which is being studied separately; it will be interesting to see how the pilot studies progress.

The percentage of renewables including large-scale hydropower in total power generation has risen to approx. 15% from 10% before the FIT system was introduced. However, to achieve the 2030 target of 22-24% set forth in the Long-term Energy Supply-Demand Outlook, more renewables must be introduced while ensuring economic rationality. In 2017, the measures for rationally achieving the goals, such as controlling the growing public burden and maintaining grid stability, will be put to the test.

5. Energy Efficiency and Conservation

Naoko Doi, Senior Economist
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To achieve the energy conservation target given in the Energy Mix, it is necessary to improve the energy consumption per unit GDP (energy intensity) by 35% by FY 2030. This is an enormous improvement equivalent to that achieved between 1970 and 1990, and requires an annual average improvement of around 2%. Indeed, after this period of drastic improvement, between 1990 and 2010, the improvement shrank to 12%, or an annual average of 0.63%. In 2017, the existing policy measures for achieving the long-term energy conservation target will be enhanced while some new approaches will be studied.

As an enhancement of the existing policy measures, from April 2017, a new energy efficiency standard will take effect for large buildings with a floor area of 2,000 m^2 or more under the Act on Improvement of Energy Consumption Performance of Buildings. This is the first mandatory energy conservation standard in Japan to be applied to buildings, and is also extremely strict in that it prohibits any building to be constructed that does not comply with the Act. In future, some measures will be desirable, such as informing the industry that any qualified buildings can obtain and display a label of high performance to increase their asset value in the market.

Regarding the 1% energy intensity improvement target currently applied to business operators with an annual energy consumption of over 1,500 kL, the system of classifying operators began in April 2016. Operators are being classified based on the progress in meeting their nonbinding targets, and are being given encouragement and instructions for further energy conservation based on their class. In 2017, the evaluation and selection criteria for classification are expected to be reviewed and a support system considered, to make the system more effective.

Further, the study for expanding the scope of the commercial sector benchmarking system will continue in 2017. The aim of this system is to evaluate the energy conservation efforts of business operators in a sector using a common index, and to encourage them to achieve their goals. Launched in 2009, this system has so far only included energy-intensive industries and, since 2016, convenience stores. In 2017, studies will be conducted on including the logistics and services sectors.

To explore new potential areas of energy conservation, studies will continue on (1) promoting collaborative energy conservation by multiple business operators and (2) further energy conservation by using "third parties".

Under the current Energy Conservation Act, the efforts of business operators are evaluated individually; evaluations do not cover collective efforts, such as improving productivity and energy efficiency by integrating parts of the production processes of multiple operators, and saving energy by multiple operators jointly introducing a co-generation system. In 2017, the Energy Conservation Act and the supporting measures will be reviewed to define such joint efforts as a new energy conservation approach called "collaborative energy conservation" and to additionally evaluate them. For further energy conservation using "third parties", studies will continue on the promotion of the Zero Energy House (ZEH) through home builders and the provision of information and services by energy retailers (considered as third parties) to enable consumers to continue to save energy even under a more liberalized environment.

6. Climate Change Policy

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The Paris Agreement became effective in November 2016, and at COP22 in the same month, it was decided to conclude the work program to implement the Paris Agreement by COP24 in 2018. However, developing countries think that the agenda is leaning toward mitigation-related issues, and are requesting that adaptation and mitigation be better balanced. Further, for those matters for which it had not been decided which body would conduct the discussion, the Ad Hoc Working Group on the Paris Agreement (APA) will continue considering them as possible additional matters relating to the implementation of the Paris Agreement. Accordingly, the work program for implementing the Paris Agreement may make little actual progress in 2017.

In the US, the Trump transition team has announced that it will scrap the Obama administration's Climate Action Plan and the Clean Power Plan. However, the prospects are not clear, including the new government's decision on the Paris Agreement and the US's contribution to the UNFCCC.

In China, the State Council announced the Thirteenth 5-Year Work Plan for Greenhouse Gas Emission Control, which is a sub-plan of the Thirteenth 5-Year Plan, in November 2016. Regarding the national emissions trading system, emissions allowances will be allocated by the first quarter of 2017, after which trading will begin. There will be another plan, including the double regulation of energy consumption by total amount and energy intensity, as well as a trading system for energy consumption allowances. It will be worth watching how consistency among these systems is ensured.

In the EU, the proposals for the revision of the EU Emissions Trading System Directive, the Effort Sharing Regulation, the Energy Efficiency Directive, and the Renewable Energy Directive were all put on the table by November 2016 toward achieving the 2030 climate and energy framework. The proposals are and will be discussed by the European Parliament and with the member states.

In Japan, discussions are continuing on whether or not to introduce carbon pricing (the domestic emissions trading system, carbon tax, etc.) for achieving the 2030 goal. The discussions need to consider the experiences of countries that have introduced carbon pricing. Further, to achieve the target non-fossil electricity percentage of 44%, which was stipulated in the Act on Sophisticated Methods of Energy Supply Structures, a non-fossil value market for trading the non-fossil value of such electricity is being considered. The design of the market will be important.

Heading for 2050, the Paris Agreement invited each country to formulate and communicate a long-term low-emission development strategy, and discussions will also continue in Japan on this topic. Regarding carbon pricing and the long-term low-emission development strategy, discussions are being conducted by the Ministry of Economy, Trade and Industry and the Ministry of the Environment, aiming for finalization by March 2017. Attention must be paid to the discussions in the carbon pricing study committee that the Environment Ministry will start in 2017, and how the strategies of the two ministries will be integrated.

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