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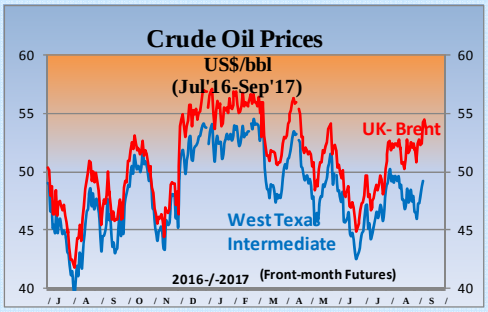
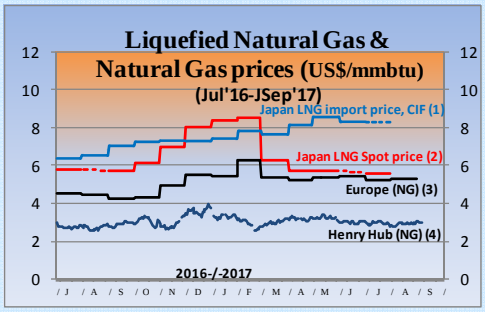
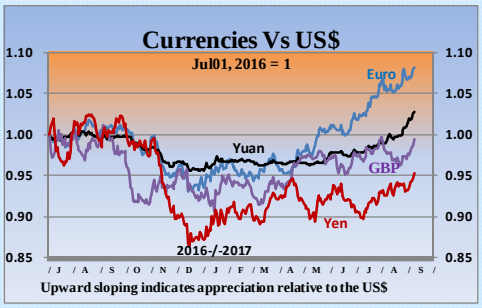


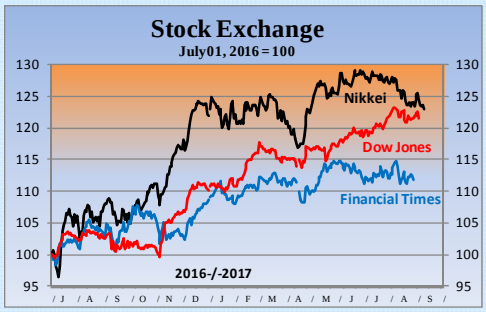
Source: DOE-EIA, NASDAQ



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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A steam generator was installed in Vogtle Unit 3, a US nuclear new build, paving the way for completion. The construction plan for Summer Units 2 and 3, which was once abandoned, is being reviewed at the request of the governor.

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In Europe, a project to study the possibility of producing CO_2-free hydrogen from natural gas at promising CCS sites and supplying it for hydrogen-fired power plant will be launched. The developments in Europe must be monitored, as well as those in Japan.

1. Review of Energy Policies

Akira Yanagisawa, Senior Economist
The Energy Data and Modelling Center

On August 9, the Strategic Policy Committee of the Advisory Committee for Natural Resources and Energy held its 21st meeting after an 18-month hiatus. Going forward, the Committee will discuss the evaluation and possible revision of the current Strategic Energy Plan three years after its formulation and Cabinet approval. At the meeting on the 9th titled "Consideration of the Strategic Energy Plan," 15 members including new ones discussed the analysis of the current status. Meanwhile, the energy policy issues for 2050 will be discussed in the newly established Round Table for Studying Energy Situations held by the Minister of Economy, Trade and Industry.

The opening remark by METI Minister Seko at the Strategic Policy Committee that "We are not at the stage of changing the framework of the Strategic Energy Plan" was met with divided opinions. Even among the members supporting the change, opinions varied as to the direction of the change. At the closing, METI Director-General Noriaki Ozawa commented that "Although the details should be adjusted in line with the times, we also believe that there is no need to change the framework," which is assumed to be the stance of the organizers.

In terms of not changing, many members reiterated their own comments at past meetings of the Strategic Policy Committee and Subcommittee on Long-term Energy Supply-demand Outlook, reflecting their firm beliefs and should be listened to with respect. However, some comments, such as one arguing that "LNG should be considered not only as a medium load power source but also as a base load source as its price has come down" is not economically rational considering that its price per calorie is still twice that of steam coal. Such opinions could be misleading and must be handled carefully.

Masakazu Toyoda, a member of the Committee and IEEJ Chairman and CEO, commented as follows:

- While I believe that the current Strategic Energy Plan is being steadily achieved, I have two concerns: Japan's renewable energy prices which are markedly higher than those of other countries, and the delay in restarting nuclear power plants.
- Regarding renewable energy costs, efforts are being made, including the revision of the Feed-In-Tariff law, but the public burden of FIT, which was 58 trillion yen before the cancellation of approval, is still around 45 trillion yen. While this is difficult to eliminate, efforts must be made to prevent further rises in electricity tariffs.
- Regarding the delay in restarting nuclear power plants, while restoring public trust and reconstructing Fukushima remain as basic policies, it is necessary to discuss the real risks with the public. In the US, regulations have been rationalized in the past at the initiative of Congress, and similar efforts are expected from the Japanese Diet.
- The prolonged absence of nuclear new builds will result in a loss of know-how, while China and Russia are steadily building new plants, which may be introduced by Asian countries. This is a concern in terms of nuclear proliferation, and thus it is necessary to secure technologies for low-cost and highly-safe nuclear power.

2. Developments in Nuclear Power

Tomoko Murakami, Manager
Nuclear Energy Group, Strategy Research Unit

On July 28, the Agency for Natural Resources and Energy released a "scientific characteristic map," a color-coded nationwide map indicating areas that have suitable geological conditions for geological disposal of high-level radioactive wastes. The current generation which has been using nuclear power has a responsibility to pave the way to geological disposal. It is hoped the map will accelerate forward-looking discussions on nuclear waste disposal and other challenges arising from the use of nuclear power.

Regarding the real "use of nuclear power," there has been little progress. Only twelve plants have obtained reactor installation licenses, including three that acquired life extension licenses. All twelve plants are pressurized water reactors (PWRs); no boiling water reactors (BWRs) have yet been licensed. The main reason why the assessment of BWRs is not progressing compared to PWRs is because the BWRs were slightly late in applying for the assessment and have been "put aside" as the PWR plants took priority. The Nuclear Regulation Authority is once again urged to return to the initial purpose of the safety assessment and proceed with the assessment appropriately by narrowing the assessment items to basic requirements.

Meanwhile, there was a new move in the US new nuclear build project which had become uncertain following the bankruptcy of Westinghouse. On August 16, Georgia Power announced that they have installed one steam generator in Vogtle Unit 3 currently under construction. The company was conducting a On August 31, Georgia Power filed a recommendation with the Georgia Public Service Commission to complete construction of Vogtle units 3 and 4 as the most economic choice for customers after the comprehensive reassessment of the cost and schedule for the completion of Vogtle Units 3 and 4 and the cost incurred in case the plan is abandoned. The company expects unit 3 to begin commercial operation in November 2021 and unit 4 in November 2022.The financial situation remains tough, but the installation of a steam generator, an essential component, has increased the prospects for completion of Unit 3.

Regarding Summer Units 2 and 3, the other Westinghouse plants under construction, the owner, SCANA Corporation, which had submitted a new nuclear abandonment petition to the Public Service Commission of South Carolina, announced its tentative withdrawal on August 15. The petition had been submitted at the strong request of state-run company Santee Cooper which has invested 45% of the project, but a decision was made to thoroughly reexamine the plan after Governor McMaster strongly supported the option to complete at least one of the plants for the sake of employment. The Governor is working hard to move the project forward, calling for investors who can replace Santee Cooper. This case will be an interesting test of how far a local community's will to secure jobs can influence projects which a regular company considers to be high risk and is withdrawing from. The developments of discussions must be closely monitored.

3. Recent Developments in the Oil and LNG Markets

Tetsuo Morikawa, Senior Economist, Manager
Oil Group
Fossil Fuels & Electric Power Industry Unit

Oil prices have been in a small range in August. The downward trend since the OPEC meeting at the end of May (see the June Edition of this Newsletter for details) bottomed out in late June, and prices have risen in June and July. However, Brent has been hovering in the $50-53/bbl range in August.

The market continues to focus on the supply and demand in the US and the extent of the OPEC and non-OPEC production cut. In the US, the demand for gasoline in the driving season is not strong at minus 1% yoy, but is relatively solid for kerosene and other petroleum products. The US oil production as of August was 9.4-9.5 mb/d, with slower growth since May as oil prices struggled. As a result, the drawdown of oil inventories is accelerating. Commercial petroleum inventories were still at 1.3 billion barrels as of late August, far exceeding the recent five-year average of 1.17 billion barrels. However, weekly statistics of the US Energy Information Administration indicate a decline in inventories of several million barrels in most weeks since July. If this pace continues, the inventories will reach the past five-year average by March 2018, when the joint OPEC and non-OPEC production cut is scheduled to end.

On the other hand, there are some possible barriers to higher prices, including the OPEC oil output which increased to the highest levels since the start of the joint production cut. With increased production in Nigeria and Libya, which are exempt from the production cut, and high output levels in Iraq, compliance with the production cut in July declined to 75%, the lowest since January. Production in Nigeria and Libya could reach 400-500 kb/d by the end of the year. The parties to the joint production cut are scheduled to meet on November 30 to discuss extending the cut beyond March 2018. While an extension would prop up oil prices and incentivize US shale oil production, terminating the cut will cause prices to plunge, at least in the short term. As the finances of most oil producers have little room to absorb lower prices, the production cut is likely to be extended beyond March 2018.

LNG prices are stable at a low level. As of July, Japan's average LNG import price was $8.4/MMBtu, and the spot price is estimated at $5.6/MMBtu for LNG arriving in Japan in the same month. The low volatility of oil prices is helping to stabilize LNG prices which are linked to oil, and the continued oversupply due to a series of new liquefaction plants is also a contributor. The fact that spot prices are 30% lower than the average import price is a clear indication of the scale of oversupply. While the current market situation discourages LNG development projects, there are signs that investment in new projects is restarting. In June, the final investment decision was made for the Coral South LNG in Mozambique made the final investment decision, and in July, Qatar announced a plan to expand LNG capacity to 100 MT/y. To achieve medium- to long-term stability of the market, it is important for LNG importers to encourage investment in new LNG projects such as by developing new demands.

4. Update on Policies Related to Climate Change

Takahiko Tagami, Senior Coordinator, Manager
Climate Change Policy Research Group
Global Environment and Sustainable Development Unit

On August 4, the US submitted a communication to the UN regarding its intent to withdraw from the Paris Agreement as soon as it is eligible to do so. However, a State Department media note stated that the US will continue to participate in international climate change negotiations and meetings to protect US interests and ensure that all future policy options remain open to the administration. The earliest date on which the US can withdraw from the Paris Agreement is November 4, 2020, the day after the next presidential election.

Towards 2020, the international climate change negotiations are scheduled to formulate detailed rules for the implementation of the Paris Agreement, and conduct an ex ante process for the NDCs and an ex post review of the achievements toward the targets for 2020. The formulation of detailed rules is planned to be completed by the end of 2018. Regarding the ex ante process for the NDCs, a "facilitative dialogue" will be held at the end of 2018 to take stock of the collective efforts of Parties in relation to progress toward the long-term mitigation goal of the Paris Agreement, and, based on the results of the dialogue, the Parties will submit their NDCs for 2030 at the beginning of 2020. In 2023, a “global stocktake” will assess the collective progress towards achieving the purpose and long-term goals of the Paris Agreement, and, based on the outcome, the countries will submit their NDCs for 2035 in 2025. This process will be repeated in a five-year cycle thereafter. Further, for the ex post review of achievements, countries’ progress toward achieving their goals as well as information on their mitigation actions will be assessed and analyzed every other year.

The US withdrawal from the Paris Agreement could weaken the forces to repel developing countries’ undertakings to set differentiated obligations for developed and developing countries. Developing countries may demand that developed countries raise their ambitions in the facilitative dialogue in 2018. However, a US government official has reportedly said that a major priority for the US in the international climate change negotiations is to force back developing countries’ attempts to have separate standards for themselves and developed countries in the implementation guidance for the Paris Agreement. If the US remains at the negotiating table to protect its interests and all future policy options, the impact of its withdrawal on the negotiations may be small in the near term.

Meanwhile, the expert review of the First Order Draft of the IPCC (Intergovernmental Panel on Climate Change) Special Report on Global Warming of 1.5°C began on July 31, and is scheduled to end on September 24. The IPCC had been invited by the Conference of the Parties to the UN Framework Convention on Climate Change (UNFCCC) on its 21st session (COP21), held in Paris in 2015, to provide a special report on the impacts of global warming of 1.5°C and related global GHG emission pathways in 2018. The Special Report is planned to be approved and accepted at the 48th session of the IPCC in October 2018 following several review processes. Attention must be paid to any impact of this report, which will be submitted before COP24 at the end of 2018, on the international climate change negotiations.

5. Update on Hydrogen Energy and CCS in Europe

Yoshiaki Shibata, Senior Economist, Manager
New and Renewable Energy Group
New and Renewable Energy & International Cooperation Unit

On July 27, the Advanced Hydrogen Energy Chain Association for Technology Development (AHEAD) was established in Japan. The Association is scheduled to conduct a demonstration test on an international hydrogen supply chain in 2020, in which hydrogen is transported and stored using methylcyclohexane between Japan and Brunei. The test is in line with a technical demonstration of the ocean transport of liquefied hydrogen also scheduled for 2020, to be conducted by the CO_2-free Hydrogen Energy Supply-Chain Technology Research Association (HySTRA) established last year. The test is another step toward establishing a CO_2-free hydrogen supply chain, on which efforts began with NEDO's demonstration a few years ago. Both programs aim to supply large amounts of CO_2-free hydrogen primarily for hydrogen-fired power plant, which could help significantly decarbonize electricity.

Japan is working to establish a CO_2-free hydrogen supply chain ahead of other countries, but similar efforts may now start in Europe.

In July, three companies, namely Statoil, Vattenfall and Gasunie, signed an MOU to evaluate the possibility of converting an existing natural gas-fired thermal power plant into a hydrogen-fired power plant. The target natural gas thermal power plant is Vattenfall's three 440 megawatt-unit combined cycle plant in Eemshaven, Holland. The hydrogen will be produced by steam reforming natural gas, and the carbon dioxide produced in the process will be captured and stored by CCS. The MOU also includes a study on the infrastructure, large-scale hydrogen supply chain and business model which will be necessary for transporting and storing hydrogen. The details of the feasibility study to be conducted are unknown but it is assumed that the study will be based on conducting CCS off the coast of Norway using Norwegian natural gas. There are many suitable sites for CCS in Norway, and the choice of location suggests that large amounts of CO_2-free hydrogen could be supplied using domestic natural gas.

Of course, conversion into a hydrogen-fired power plant will not be necessary if there are technically and economically feasible sites for CCS in the vicinity of gas- and coal-fired power plants. However, suitable sites for CCS are unevenly distributed in Europe and have varying economic efficiency, and one CCS project is struggling: the CCS demonstration project ROAD (Rotterdam Afvang en Opslag Demonstratieproject) in Rotterdam. The project was to collect 1.1 million tonnes of CO_2 each year from the Uniper coal-fired power plant in the Rotterdam port area and store it in a depleted gas field 20 km offshore. However, the project could be cancelled following the withdrawal of the implementation bodies Engie and Uniper in June, which is widely thought to be due to the soaring cost of the project. For such cases, shifting from coal-fired power to hydrogen-fired power may be an option.

As explained above, shifting from fossil fuel power generation to hydrogen and supplying CO_2-free hydrogen produced in resource-rich countries with a high CCS potential like Norway may also progress in Europe in areas without suitable CCS sites nearby or where CCS is not economically viable. Developments in hydrogen power in Europe, as well as in Japan, must be closely monitored.

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