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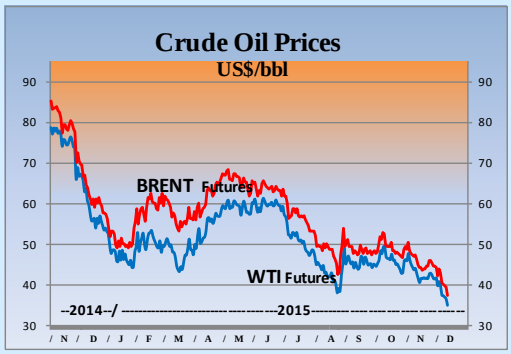
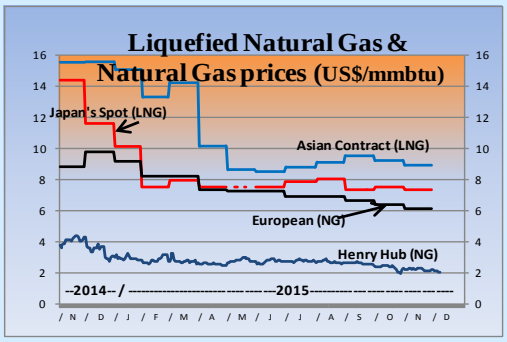
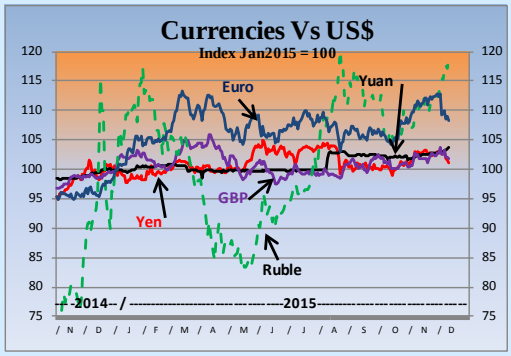


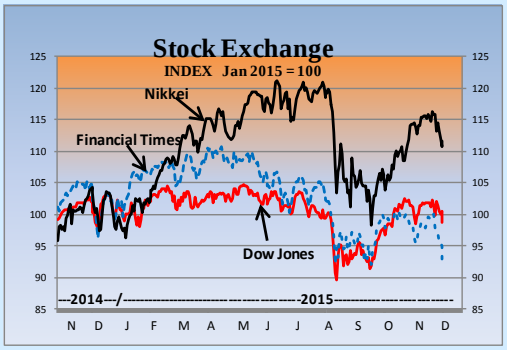
Source: Financial Times



Sources: Henry Hub NG/DOE-EIA, European NG/WB
LNG spot/METI, LNG contract/WB



Source: x-rates.com



Source: Financial Times

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2. Developments in Nuclear Power

Nuclear Regulation Authority ordered MEXT to reselect the organization in charge of managing Monju, the prototype fast-breeder reactor. While recognizing the inherent difficulties of introducing advanced technologies, valuable discussions on the future of Monju are expected.

3. Gastech 2015 and Recent Developments in LNG and Crude Oil Prices

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4. Fierce Opposition to the Clean Power Plan in the United States

Opposition in Congress and in the court room to the Clean Power Plan (CPP), which seeks to regulate CO_2 emissions from existing fossil-fired power plants in the United States, has been growing. This may undermine U.S. leadership in international negotiations.

5. Developments in Renewable Energy

As Japan strives to achieve its targets in the Long-Term Energy Supply-Demand Outlook, the removal of power system restrictions on the interconnection of renewable-based power is being discussed in the Subcommittee for Reforming Systems Related to Introduction of Renewable Energy, seeking progress firstly in discussions on institutional frameworks and rules.

1. IEA's World Energy Outlook 2015

Akira Yanagisawa, Senior Economist
The Energy Data and Modelling Center

On November 10, the International Energy Agency (IEA) released the 2015 edition of its World Energy Outlook (WEO). The IEA's flagship publication on the long-term world energy outlook is one of the most intensively read reports in the global energy industry.

With crude oil prices falling since the second half of last year, WEO-2015's assumptions for crude oil prices have also been keenly awaited. Under the New Policies Scenario (NPS), which is the central scenario taking into account the policies that are actually implemented or expected to be implemented, WEO-2015 makes a premise that crude oil prices in 2040 at $128/barrel in 2014 prices, down from $132/barrel in 2013 prices in WEO-2014, but the reduction remains moderate in view of the recent sharp falls. As to prices in 2020, however, WEO-2015 assumes $80/barrel, approximately $30 lower than the $112/barrel in WEO-2014. Thus, the IEA sees oil prices rising in the long term to a level similar to that assumed in earlier outlooks, but this upward movement will not be strong in the short to medium term.

The scenarios analyzed in WEO-2015 include the Low Oil Price Scenario and the Material Efficiency Scenario. Under the former Scenario, WEO-2015 analyzes supply and demand assuming an even lower oil price of $55/barrel in 2020. It is clearly stated that low oil prices may bring economic advantages to energy-consuming countries in the short to medium term, but may cause problems such as increased oil demand and greater dependency on OPEC nations in the long term by discouraging investments in energy supply infrastructure and lowering energy conservation incentives. A substantial portion of WEO-2015, however, is dedicated to analyses for the three main scenarios: the Current Policies Scenario, the New Policies Scenario and the 450 Scenario, particularly the New Policies Scenario, as in the past. The global energy consumption in 2040 predicted by WEO-2015 under the New Policies Scenario differs only slightly (1.9% down) from that predicted by WEO-2014. Still, WEO-2015 is interesting in view of its greater emphasis on the slowing growth of energy consumption in China. This of course could simply be the result of having readjusted the prediction of China's energy consumption in 2040 by 3.9% downward from WEO-2014 in view of the CO_2 emission reduction targets announced by China last autumn during President Obama's visit, as well as the economic slowdown. Still, the IEA appears to foresee a greater slowdown in energy demand in China than is suggested by the predicted figures.

The New Policies Scenario is the central scenario. However, depending on the country and including assumptions based on draft commitments, the Scenario may not provide a probable image of how things are likely to turn out. In Japan, where the draft commitment is based primarily on METI's Long-Term Energy Supply and Demand Forecast which presents the desired scenario, the means to achieve its ambitious targets are already being discussed. On November 20, a meeting of the Strategic Policy Committee at the Agency for Natural Resources and Energy outlined policy measures involving tough investments, to assist the building of hydrogen and other new energy systems while improving the efficiency of and decreasing CO_2 emissions from existing energy infrastructure and technologies. In the process of developing the supply-demand forecast, emphasis was placed on balancing the "3E+S". Will this concept be adhered to in the upcoming discussions on methods to be employed?

2. Developments in Nuclear Power

Tomoko Murakami, Manager
Nuclear Energy Group, Strategy Research Unit

On November 5, the Japan Atomic Power Company (JAPC) applied for a safety assessment of Tsuruga Unit 2 by the Nuclear Regulation Authority (NRA) in accordance with the new regulation standards. Including the one for Tsuruga, applications have thus far been made for twenty-six commercial power reactors in Japan. Among these reactors, two are already operating, three are being prepared for restart after having passed the safety assessment, and twenty-one are undergoing the safety assessment.

On November 19, at the first review meeting in the safety assessment of Tsuruga Unit 2, the NRA indicated their policy to first discuss the impact on the seismic ground motion caused by the Urasoko fault, an active on-site fault premises even though it is not immediately below the reactor, and by the on-site fracture zone strongly suspected by the NRA as being an active fault, before proceeding to the safety assessment of the plant. JAPC agreed with this policy. Since an impact assessment of on-site active faults has not been implemented at any of the plants, rational safety assessment should be conducted with a clear statement on the grounds for judgment.

Japan is also facing a serious situation in the progress of the nuclear fuel cycle program. On November 13, the NRA addressed the problem of the Japan Atomic Energy Agency (JAEA) providing imperfect maintenance and management of Monju, the prototype fast-breeder reactor, by advising the Ministry of Education, Culture, Sports, Science and Technology (MEXT) to find a specific organization that, instead of JAEA, is capable of running the Monju reactor safely, and, if such an organization cannot be found, to perform a fundamental review on reducing the risk for Monju.

On November 17, MEXT responded by announcing its plan to set up a panel to discuss a new entity in charge of running Monju. Considering the uniqueness of Monju as both a technological demonstration facility and a power plant, it would be challenging for any organization to fulfill the expectations of the NRA, whatever the decision. Although it is true that many problems have occurred, it is important to recognize that every advanced technology faces problems in progressing from early development to commercial use. This recognition should be shared by all stakeholders as they discuss the future of the Monju reactor that is expected to play an important international role.

On November 12, the Ministry of Employment and the Economy of Finland, which leads the world in the final disposal of high-level radioactive waste, issued a license to POSIVA, a company experienced in nuclear waste management, for the construction of a final disposal facility in Olkiluoto. Accordingly, POSIVA will start constructing the final disposal facility in 2016, expecting to commission it in the early 2020s. Likewise in Sweden, where the final disposal site has been selected and is presently undergoing a safety assessment, SSM, the regulatory authority, released the latest preliminary assessment results on November 18, in which the application submitted by SKB, a company experienced in nuclear waste management, was found to be reasonable. Japan, which this year started its investigation preceding the selection of multiple candidate sites technically suited for geological disposal, has much to learn from the siting process that took over two decades in both countries, particularly from discussions regarding public acceptance.

3. Gastech 2015 and Recent Developments in LNG and Crude Oil Prices

Tetsuo Morikawa, Gas Group Manager
Fossil Fuels & Electric Power Industry Unit

Gastech, one of the largest conferences in the LNG industry, was held from October 27 to 30 in Singapore. The following summarizes important points covered in the Commercial Stream of the conference to illustrate issues in the LNG market.

First, there are strong concerns about achieving growth in LNG demand in the short to medium term even though growth is expected in the long term. Factors behind such concerns include the weaker competitiveness of natural gas against other options particularly in the power generation sector due to cheaper coal prices, the promotion of renewable-based power sources and their falling costs. The conference participants shared a sense of crisis that unless the supply cost is sufficiently reduced, the LNG market may fail to expand or may lose market share.

Second, the LNG market structure is becoming more complex. On the supply side, there will be a major inflow, starting from 2016, of U.S. LNG at prices no longer linked to oil prices. Moreover, it is becoming more common for LNG buyers to be directly involved in the marketing of LNG. With this trend and the involvement of some buyers in upstream development, changes can be seen in the traditional activities and role sharing that used to be divided into the state-owned and international oil companies upstream (as sellers) and the electric and gas utilities downstream (as buyers). Furthermore, as the hurdles for LNG imports become lower with the drop in LNG prices and the lowered costs for receiving terminals thanks to the development of floating storage and regasification units (FSRUs), many emerging nations are expected to start importing LNG.

Third, a balancing between a traditional vertically integrated business model and a more market-oriented business model is an issue for market players. The growing interest in supply flexibility, hubs and spot markets reflects the market orientation. On the other hand, the imperative of long-term contracts for launching projects and the trend of buyers becoming involved in upstream development are supportive of a vertical integration. While the strengthening market orientation may be the major trend, individual players will make a strategic choice between those two business models depending on factors like prices, opportunity for investment in upstream projects, the magnitude of risks, and the extent to which the liquidity of the LNG market may increase.

Japan's LNG import price in September remained at $9/MMBtu as in August, while the prices of LNG from spot markets arriving at port in September are estimated to have been around $8/MMBtu. Meanwhile, international crude oil prices have remained around the high $40s/barrel (Brent Oil Price) since August, apparently demonstrating the state of "stabilization at a low level". The geopolitical condition is increasingly turbulent, with the synchronized terrorist attacks in Paris and subsequent attacks on ISIS by Western countries. However, the international crude oil market, where the supply and demand situation remains weak, is not significantly affected. Although the supply-demand situation tends to become tighter in winter, we anticipate a series of events that will likely cause crude oil prices to fall, including an interest rate hike by the U.S. Federal Reserve Bank and the probable return of Iran to the crude oil market. Therefore, at least until the end of this year, crude oil prices are likely to remain flat.

4. Fierce Opposition to the Clean Power Plan in the United States

Shumpei Watanabe, Researcher
Climate Change Policy Research Group
Global Environment & Sustainable Development Unit

In August this year, the U.S. Environmental Protection Agency (EPA) published the finalized Clean Power Plan (CPP) that seeks to regulate CO_2 emissions from existing fossil-fired power plants. Following this, many lawsuits have been filed against the EPA, chiefly by the states that are dependent on coal, claiming that the CPP is illegal. Moreover, a number of congressmen, mostly Republicans, are turning against the CPP.

Immediately after the publication of the finalized CPP on a public bulletin, twenty-four states, led by West Virginia, filed a joint lawsuit against the CPP. These states insist that the CPP will cause higher electricity prices and hence a loss of jobs, and that the EPA is going beyond its authority since the CPP imposes rules also concerning renewable energy and energy efficiency. In addition, the State of North Dakota and the State of Oklahoma are both independently suing the EPA. Thus, twenty-six out of the fifty states are against the EPA. In the former lawsuit, the plaintiffs requested that the court suspend the execution of the CPP until the completion of all CPP-related lawsuits and if the court accepts this, the CPP will have to be delayed. The Obama Administration, as it prepared for COP21, feared that this may have an impact on the international negotiations, and therefore asked the court to suspend the decision until the end of COP21, to which the court agreed. With such proceedings, no hearing has been held since the filing of lawsuits, yet intense battles are already being fought around the trials. The court rulings cannot be predicted at this moment, therefore the EPA cannot be optimistic about winning the case. The states that are suing the EPA, on the other hand, are not sure they will win. Nearly half of these states are preparing their implementation plan in case the court upholds CPP, in parallel with lawsuit.

The Republican Party, holding a majority in both houses of congress, has passed a resolution based on the Congressional Review Act to stop the CPP on the grounds that the EPA is exceeding its authority. President Obama will certainly veto. Such as this, attempts to block the CPP are also gaining ground in Congress. Senator Majority Leader McConnell (from the State of Kentucky) expressed his intention to fight the CPP, and is expected to take various actions to stop it.

For the Obama Administration, the CPP is a key policy in achieving the GHG reduction targets in the Intended Nationally Determined Contributions to the United Nations. Failure to execute the CPP as scheduled may affect the United States' commitment to international efforts to curb global warming. Particularly if the United States faces domestic difficulties in implementing global warming measures even after international consensus is gained at COP21 in Paris this year, this might impact global warming measures in other countries as well. This risk must be considered when predicting the future of the global warming policy of the United States.

5. Developments in Renewable Energy Policy

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

The fourth meeting of the Subcommittee for Reforming Systems Related to the Introduction of Renewable Energy was held on November 11 to discuss mainly the removal of restrictions on power systems. In trying to expand the use of renewable energies, efficiency is demanded under the major premise of "maximizing the use of renewable energies while reducing the burden on the public" as stated in the Long-Term Energy Supply-Demand Outlook. The Subcommittee discussed measures to eliminate obstacles to the introduction of output variable renewable power generation by removing power system restrictions and clarifying the rules concerning the construction and management of power systems. Specifically, the following challenges have been identified: (1) Establishment of bulk power systems; (2) Solving local power system restrictions; (3) Establishment of rules for power system operations and output control; and (4) Fair distribution of power system stabilization costs.

For the establishment of bulk power systems, the Organization for Cross-Regional Coordination of Transmission Operations is conducting simulations on cross-regional power flows using region-specific scenarios of renewable energy deployment in order to determine excess or shortage of interconnecting transmission line capacities and the power system enhancement costs. Based on the results of these analyses, measures for building a wide-area power system such as enhancing interconnecting line capacities will be taken to enable greater use of renewable energies according to the Long-Term Energy Supply-Demand Outlook in a cost-effective manner.

Local power system restrictions are becoming evident. In certain localities where photovoltaic generators are densely located, it is becoming difficult for the power system to accept their interconnection. To improve the situation by discouraging investments by renewable power generators in congested localities, the rules on power system information disclosure have been revised to disclose information regarding the reserve capacities of major power systems.

As to the establishment of power system operations and output control rules, a rule-making initiative has begun under the premise of transmitting power to other regions before imposing curbs on output. Also, considering the difficulty and complexity of concurrently imposing curtailment on a large number of renewable power generators including minor ones, it was proposed that output curtailment be imposed mainly on major providers capable of flexible output control, with the cost shared by all renewable power generators.

To cope with the increased introduction of renewables, it is necessary to stabilize power systems backed up by fossil-fired power plants. Fair distribution of the ensuing costs was also discussed in the meeting. The first point was the necessity of characterizing the mechanisms behind the appearance of power system stabilization costs such as losses from the worsening of generation efficiency due to reduced usage of fossil-fired power plants and higher costs due to the increase in startup and shutdown operations.

In the short term, the examination of programs and rules will proceed first, followed by discussions on specific solutions. For the long term, attention will focus on various technologies for power system enhancement such as output control, enhancement of wide-area interconnecting transmission lines, power storage devices, demand mobilization and hydrogen utilization. It is important that analyses on these technologies consider economic rationality examining the optimal combinations, rather than discussing them individually, while considering the development lead time.

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IEEJ e-Newsletter Editor: Yukari Yamashita, Director
IEEJ Newsletter Editor: Ken Koyama, Managing Director
Inui Bldg. Kachidoki, 13-1 Kachidoki 1-chome, Chuo-ku, Tokyo 104-0054
Tel: +81-3-5547-0211 Fax: +81-3-5547-0223