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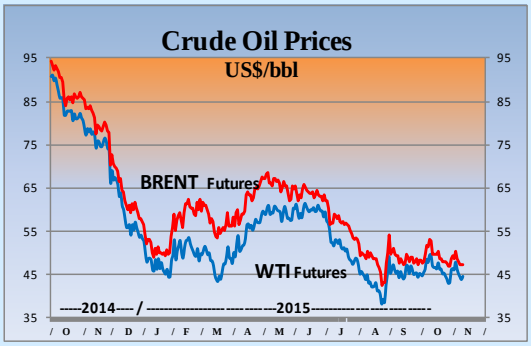
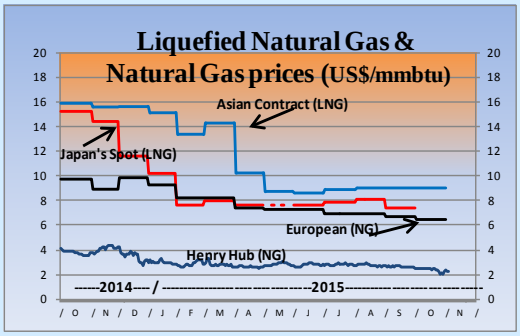
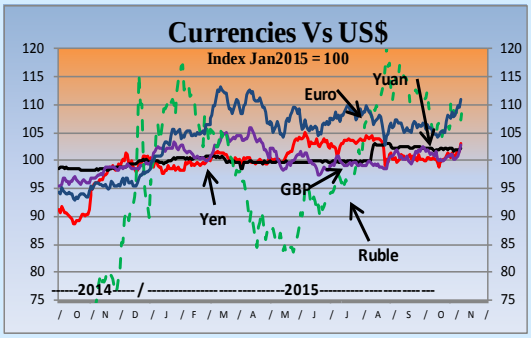


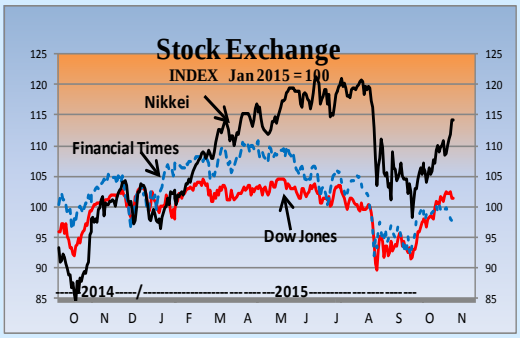
Source: Financial Times



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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Summary

【Energy Market and Policy Trends】

1. Asia/World Energy Outlook 2015

In the Asia/World Energy Outlook 2015, in addition to the standard Reference Scenario, analyses were performed based on the Lower Price Scenario, in which oil prices continue to remain lower than the Reference Scenario, and by incorporating climate change issues.

2. Developments in Nuclear Power

Following Pilgrim Nuclear Power Plant of the US, the early closure of four nuclear power plants was announced in Sweden. As electricity prices drop in the liberalized market, the business environment is becoming tougher for nuclear power.

3. Recent Developments in the Oil and LNG Markets

As the supply and demand situation continues to ease, oil prices are likely to remain low for some time. Competition between oil producers for sales and market share is intensifying in the European market, too.

4. Second ICEF Conference: Boosting Climate Change Mitigation through Innovation

The second annual conference of the Innovation for Cool Earth Forum (ICEF) was held. New sessions such as Artificial Photosynthesis and "International Framework for Complementing UN" were established, and the new direction for reducing GHGs was discussed.

5. Developments in Renewable Energy Policy

Discussions are being held in a council (subcommittee) on how to maximize the introduction of renewable energies as a sustainable and stable long-term energy source, headed for finalization within this year.

1. Asia/World Energy Outlook 2015

Akira Yanagisawa, Senior Economist
The Energy Data and Modelling Center

The Reference Scenario, which serves as the basis for the Asia/World Energy Outlook 2015, projects that global primary energy demand will grow by 1.3% per annum till 2040. Fossil fuels will remain by far the most important fuel with a share of 78%. As a result, energy-related CO_2 emissions will reach 42.7 billion tonnes in 2040, up 30% from 2013.

The sharp decline in crude oil prices is clouding the future consequences. Further, heading toward COP21, climate change mitigating actions and their impacts are receiving increasing attention. In the Outlook, two scenarios were analyzed: the Advanced Technologies Scenario, which is based on the maximum level of energy conservation and low carbon technologies, and the Lower Price Scenario, in which unconventional resources are developed under the Advanced Technologies Scenario.

Possible Decline in Energy Prices and Its Implications

Energy conservation, accelerating development of unconventional resources, and the use of non-fossil fuels may ease the supply-demand balance of fossil fuels. Real oil prices are assumed at $100/barrel in 2030 in the Reference Scenario, but only at $75/barrel in the Lower Price Scenario.

For energy importers, lower prices have a positive economic effect such as paying less for imports. However, they could cause the Middle Eastern and Russian economies to shrink by 3.1% and 1.3%, respectively, unless the countries change their industrial structure, making it critical for them to diversify and sophisticate their economic structure. The Lower Price Scenario is expected to produce a positive effect of 1.9% globally, but there are concerns that the negative effect of lower prices could destabilize certain countries and regions.

If financial factors cause price fluctuations to increase in tandem with supply-demand factors, with short-term price fluctuations slowing the development of new supply capacity, then the destabilization of some countries and regions could cause risks such as a supply-demand mismatch and price hikes in the future.

Response to the Climate Change Issue

Assuming that CO_2 emissions reduction measures will be fully implemented based on the opportunities and acceptability postulated in the Advanced Technologies Scenario, and taking Carbon Capture and Storage (CCS) into consideration, global CO_2 emissions will decrease to 23.3 billion tonnes in 2050, down 29%, but not quite halving, from current levels.

According to the Reference Scenario, the GHG concentration in the atmosphere would reach 760-860 ppm in CO_2 equivalent in 2100, and air temperature would rise by 2.8-4.0°C compared with the second half of the 19th century. In comparison, in the Advanced Technologies Scenario + CCS, the GHG concentration would only be 540-600 ppm, and the air temperature rise would be kept at 1.7-2.4°C. By keeping the temperature rise less than 2.5°C, and possibly even less than 2°C, the latter scenario could provide a realistic reduction target for 2050, and if new technologies such as next-generation nuclear power and artificial photosynthesis become available, could become a viable option for approaching zero GHG emissions by 2100. It would also be effective to combine the Scenario with the appropriate “adaptation measures” that deal with the damages caused by climate change.

Promoting mitigation measures such as reducing CO_2 emissions would increase the cost of mitigation, but reduce adaptation costs and damage. As there is a trade-off between them, keeping these three factors in balance is a realistic perspective that should be taken into account in considering long-term climate actions.

2. Developments in Nuclear Power

Tomoko Murakami, Manager
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On October 13, US electricity producer Entergy announced the closure of its Pilgrim Nuclear Power Station (Massachusetts) by June 2019. The company states that the shutdown is due to low electricity prices in its supply areas, the lack of prospects for recovery, and the fall in profits due to rising operation costs, and plans to decide the final date of closing in early 2016.

Pilgrim Nuclear Power Plant is a 711 MW BWR which went into operation in 1972. Belonging to the same generation of plants as Fukushima Unit 1, it has an excellent operational record, achieving a capacity factor of 97% in 2014. The fact that even such a high level of excellence is not sufficiently profitable demonstrates the tough business environment for nuclear power operators in the US. Further, South Texas Project owner NINA is withholding the final investment decision on its Units 3 and 4 despite receiving approval from the Nuclear Regulatory Commission (NRC) for its final safety assessment report on October 1. The deteriorating business conditions for American nuclear operators caused by low energy prices are likely to continue for some time.

Sweden is also seeing a spate of announcements concerning nuclear decommissioning. On October 15, E.ON, the majority stakeholder of Oskarshamn Nuclear Power Plant, announced early closure of Units 1 and 2. Then on the 19th, Vattenfall, the majority stakeholder of Ringhals Nuclear Power Plant, announced its decision to close Unit 1 in 2020 and Unit 2 in 2019. The 17% hike in the nuclear power tax last August dealt a heavy blow to the profitability of the nuclear operators, which had already been hit by low electricity prices. A drastic drop in electricity prices could make it difficult even for the relatively low-cost existing plants to continue operating, and Japan is no exception. This is yet another problem for nuclear power as it faces full liberalization of retail electricity.

In contrast, China is expanding its nuclear power business both inside and outside the country. On October 11, 12, and 13, Yangjiang Unit 3, Changjiang Unit 1, and Fangchenggang Unit 1 reached initial criticality, respectively, and are expected to start commercial operation early next year. China General Nuclear Power (CGN), which is actively expanding overseas, announced on October 21 that it will invest 6 billion pounds in Hinkley Point C, a new construction project of UK EDF Energy, becoming a 33.5% owner of the project. CGN will also invest in another new construction project by EDF Energy at Bradwell, where China’s PWR Hualong 1 mightreportedly be adopted. Meanwhile, there is a chance that Horizon's new construction project, in which the Japan-US joint venture GE Hitachi Nuclear Energy is investing, could adopt a Japanese ABWR, but the decision has not yet been finalized.

At the governmental committee between France and Japan on nuclear energy held on November 10-11 in Tokyo, , the countries announced plans to continue their active involvement in the overseas expansion of ATMEA, a joint venture between Japan and France. Considering that the impact of overseas expansion of China’s nuclear business is too large to ignore for the overseas nuclear businesses of Japan, France and other developed countries, the two countries need to move from mere diplomatic talk into action.

3. Recent Developments in the Oil and LNG Markets

Yoshikazu Kobayashi, Senior Economist, Manager
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Global oil prices remain sluggish. In the first half of October, Brent Crude temporarily returned to $50 due to the major airstrikes by Russia on Syria, the decline in oil production in the US, and the release of the minutes of meeting on the postponement of a rate raise by the US FOMC. However, oil prices soon fell back below $50 in mid-October as supply-demand appeared to ease. Oil prices are likely to remain low in the near-term considering the recent recovery of oil production in Libya, the weak economic indexes of the world's largest oil consumers US and China, and the strict policy of Saudi Arabia and other OPEC countries to keep focusing on market share.

Under such circumstances, Venezuela has proposed that OPEC set a "floor price" at $70. This could be a variation of the "price band" which OPEC introduced in the 2000s. Venezuela's proposal is that all OPEC members should cut production jointly until oil prices fall to a tentative target of around $70. However, it is not clear whether this would be feasible as the basis of the $70 target is unclear and because, based on current form, Saudi Arabia and other producers are expected to strongly object to abandoning their strategic focus on market share and adjusting production to reach a certain price level.

It is widely known that the shale revolution has caused crude oil supplies from Latin America and Africa to shift from the US market and instead head for Asia. New streams of oil supplies are also emerging in Europe. In mid-September, the first crude oil cargo from Saudi Arabia arrived in Poland, which traditionally has imported mainly Russian oil. This alarmed Russia's Deputy Prime Minister and the CEO of state-run Rosneft Igor Sechin, who said that "Saudi Arabia is actively dumping" and is concerned about Saudi Arabia's strategy to increase its market share in Europe. Further, Colombian oil, which is exported mostly to the Gulf of Mexico area of the US, also seems to be exploring new sales channels in Europe by lowering prices. As Europe is likely to resume imports of Iranian oil after the turn of the year, the fight for market share between oil producers is intensifying in Europe as well as in Asia, which would put additional downward pressure on the European Brent Crude price.

Japan's LNG import price as of August was approximately $9/MMBtu following the previous month, and the prices of spot cargoes arriving in August were estimated at around $7/MMBtu. As the low oil prices of February and March are starting to be reflected in the LNG prices through long-term contracts, and as spot prices remain low, the import price for October to December is likely to fall below $9/MMBtu. With new projects being launched in Australia, the US, and other countries, spot prices in particular will be subject to downward pressure.

4. Second ICEF Conference: Boosting Climate Change Mitigation through Innovation

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On October 7 and 8, the second annual conference of the Innovation for Cool Earth Forum (ICEF) was held in Tokyo. The origin of ICEF is PM Abe's Cool Earth 50, an initiative to halve GHG emissions by 2050 which he advocated during his first term. It is an international conference for experts from industry, government and academia from around the world to discuss how to address climate change and energy issues through innovation.

This year, three plenary sessions and nineteen concurrent sessions were held. In the first plenary session, Laurence Tubiana, Special Ambassador of the COP21 chair France, outlined the latest development of negotiations toward an agreement on a new international framework, and expressed the will as the host of COP21 to uplift national targets to more ambitious levels. The concurrent sessions discussed fourteen technologies. One session on artificial photosynthesis, which described the current international race to develop technologies for using CO_2 as a material and fuel and for producing hydrogen, was a great topic for ICEF as the technology could revolutionize the energy system in the long run. The session on the roadmap for solar PV with electricity storage was also interesting as it elaborated on an approach for collaboration between different technologies. Further, the five interdisciplinary sessions actively discussed how climate change mitigation can be achieved by policy reforms, businesses, and the social change.

IEEJ President and CEO Masakazu Toyoda participated in the session on the international framework for complementing UN, and stated that the key to the success of future climate change policies is to focus on technological development and to take a bottom-up approach to policy decisions, to ensure that all stakeholders benefit from the policy and no one ends up losing. This session provided important perspectives for addressing "policy innovations" by squarely addressing issues such as the similarities between trade negotiations and climate change negotiations, and the uncertainty of the so-called 2°C target.

In closing, this year's ICEF Steering Committee Statement was announced by Chair Yoichi Kaya. The statement made recommendations on the policy for promoting investment in innovation, formulation of concrete action plans based on a shared vision among industry, government and academia, and a new funding mechanism. The scope of discussions at COP21 is mostly up to 2030, yet for reducing emissions thereafter, technological innovation is essential. The recommendations will hopefully energize efforts for both long-term and short-term emissions reduction.

Regarding the INDCs (climate change policy targets submitted to the UN), many organizations have released analyses saying that the reduction targets of the countries are not sufficient. However, instead of being pessimistic, it is necessary to strengthen cooperation among the countries on medium- to long-term innovation. This year's ICEF will assist the year-end COP21 and long-term international cooperation thereafter.

The next ICEF will be held on October 5 and 6 next year.

5. Developments in Renewable Energy Policy

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

The first to third meetings of the subcommittee on the reforms of programs for enhanced introduction of renewable energies were held on September 11, 25 and October 20, respectively. The purpose of this subcommittee is to consider reforms to programs such as the Feed-in Tariff (FIT) program that were established to expand the introduction of renewable energies as a sustainable and stable long-term energy source, and to finalize the discussions within this year.

The subcommittee's goals in considering the reforms are to:

1. Build a mechanism for introducing renewable energies in line with the energy mix for 2030, taking into account the characteristics and capacity of each power source.
2. Build the most efficient mechanism for introducing renewable energies while minimizing the public burden.
3. Build a mechanism for expanding the introduction of renewable energies through efficient trading and distribution of electricity, fully leveraging the results of the reforms of the electric power system.

Specific challenges include an improved procedure for the present FIT system, introducing renewable energies cost-efficiently, removing grid restrictions, and R&D and regulatory reforms.

The second meeting mainly discussed (1) the timing for facility licensing under the FIT system, and (2) the change in required purchasers under the system. Regarding (1), the accumulation of non-operating projects is becoming a serious problem for the FIT system especially concerning solar power, and actions such as cancelling licenses are already being taken. In the meeting, the members generally agreed to reduce non-operating projects by further moving back the timing and not granting licenses until "after a grid connection contract has been signed". For (2), although under the current FIT system individual electricity retailers are obliged to become electricity purchasers after the full liberalization of retail electricity next April, a revision was generally approved to change the required purchasers to transmission and distribution companies who will purchase the entire amount, improving grid operation efficiency and facilitating the nationwide exchange of power.

The third meeting mainly discussed (1) the pricing mechanism of the current FIT system, and (2) its surcharge exemption program. For (1), the members generally agreed on presenting the purchase price ahead of time for the next few years, to provide businesses with clearer prospects for profitability. For (2), many members expressed the need to build a system to avoid unfairness between the exempted companies, including electricity-intensive industries, and others by making energy-saving efforts a condition for exemption, rather than granting exemption unconditionally.

Three years into the FIT program, the introduction of renewable energies, mainly solar PV, has exceeded expectations in terms of quantity, but many issues have emerged. The government faces tough decisions on correcting the problems of the FIT system, and ensuring a balance between maximum FIT introduction and economic rationality as well as between the capacities of various sources, and maintaining compatibility with full liberalization of retail electricity. Taking these perspectives into account, the subcommittee's discussions are expected to take a long-term perspective and aim to make renewable energy business sustainable, rather than focus on short-term measures.

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