



IEEJ e-NEWSLETTER

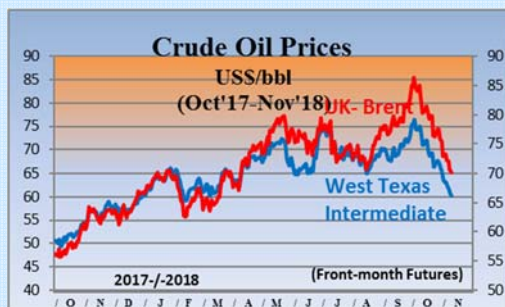
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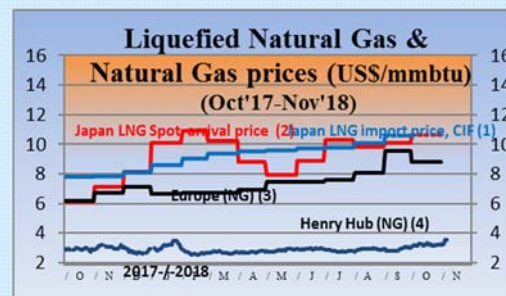
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Source: DOE-EIA, Financial Times, NASDAQ



Sources:

- (1) Ministry of Finance "Japan Trade Statistics"
- (2) Ministry of Economy, Trade and Industry (arrival month basis)
- (3) Estimated by World Bank (Netherland Title Transfer Facility)
- (4) DOE-EIA, NYMEX (Front-month Futures)
- (5) Investing.com



Source: x-rates.com



Source: Financial Times

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Summary

【Energy Market and Policy Trends】

1. IEEJ Outlook 2019

The IEEJ Outlook 2019 forecasts the global supply and demand for energy through 2050 and the issues in global energy transformation from the 3E perspective.

2. Developments in Nuclear Power

An inauguration ceremony celebrating the start of a new build project using a Russian reactor was held in Uzbekistan. Developments in this project for Central Asia's first commercial nuclear power plant, which is due to commence operation in 2028, will be monitored with keen interest.

3. Recent Developments in the LNG and Oil Markets

It is important to secure LNG supplies while improving market liquidity by easing destination clauses, by utilizing the enhanced governmental assistance measures for LNG projects announced at the Producer-Consumer Conference.

4. Update on Policies Related to Climate Change

The Intergovernmental Panel on Climate Change (IPCC) approved its Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways.

5. Update on Renewable Energies

The Hydrogen Energy Ministerial Meeting held on October 23 issued the Tokyo Statement, which recognizes the need for international cooperation and collaboration for achieving a global hydrogen society.



1. IEEJ Outlook 2019

Shigeru Suehiro, Senior Economist
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Energy Data and Modelling Center

Overview of the global energy market and global warming measures through 2050

In the Reference Scenario which assumes that current trends will continue, the world's electricity consumption will double and the economy and society will become even more dependent on electricity. Cheap and abundant coal will play an important role in meeting the soaring electricity demand in Asia. Further, Asia's robust demand for oil and natural gas will far exceed regional production, boosting imports. The energy self-sufficiency rate will fall, with energy imports from outside the region growing to 3.0% of GDP from 1.6%.

In the Advanced Technology Scenario under which energy and environmental policies are bolstered, CO₂ emissions will peak by the mid-2020s and then start to decline. However, further reduction measures and the development of innovative technologies are required to achieve an emissions path to keep the rise in temperature under 2°C. It is essential to utilize knowledge and ideas for minimizing overall climate change-related costs in the long term.

Under the Reference Scenario, investments of \$67 trillion or 1.5% of GDP will be required in total for energy supply. The Advanced Technology Scenario will require additional investments of \$8 trillion, including in energy conservation, but this amount can be recovered comfortably in Asia through a smaller import bill. Meanwhile, the Middle East will lose export income worth around 5% of its GDP.

Need to re-establish oil and electricity supply security

The risk of disruption to oil supplies persists, and threats to the supply of electricity must also be discussed seriously as the economy and society become increasingly electrified. To secure a stable supply of electricity, new risks need to be addressed, including: (1) the growing dependence on particular energy sources, (2) the “duck curve” of the net load as solar PV increases, (3) the shutdown of unprofitable power plants, and (4) cyber-attacks.

Many of the approaches to dealing with supply disruptions are common to oil and electricity, such as diversification, securing redundancy, and dispersal. However, while countermeasures for disruptions including stockpiling and international collaboration by IEA member states are in place for oil, there is no guaranteed backup generation capacity for electricity in case of power cuts due to the liberalized environment. It is necessary to establish a security system for electricity by leveraging AI, IoT, and other new technologies.

Analyzing the impact of moves against coal thermal power

In recent years, there have been moves to limit investment and loans for coal thermal power plants. If new builds are abandoned completely, CO₂ emissions can be reduced by up to 7 Gt in 2050. However, reducing coal consumption would require massive amounts of additional alternative energy supplies, causing major energy security issues that would need to be resolved, such as securing stable supplies and the economic efficiency of natural gas and electricity.

The impact of building no new coal thermal power plants will differ by country and will be particularly felt in Asia, which depends heavily on coal. Phasing out coal will require developed countries to be willing to provide financial and technological assistance. Countries that cannot abolish coal thermal power generation in practice must prioritize other efficient measures for reducing CO₂. However, even those countries must introduce high-efficiency coal power technologies while working hard to improve the environment for reducing coal thermal power.



2. Developments in Nuclear Power

Tomoko Murakami, Manager
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On September 26, the Japan Atomic Power Company (JAPC) obtained permission from the Nuclear Regulation Authority (NRA) to make changes to its Tokai Unit 2 reactor installation based on the new regulation criteria. The company also obtained a construction plan license for the plant on October 18.

On November 7, JAPC obtained permission for the lifetime extension up to 20 years. JAPC has carried out special inspections of the reactor and related equipment for several years and, based on the results, has proceeded to the final stage of the review for extending the operational life. An agreement by 6 local municipalities is the condition to restart Tokai Unit 2, which is the first and the only case in Japan. No one knows how much time is necessary.

In the United States, three applications for operational life extension of up to 80 years have been submitted for six plants, of which two are currently under review. Dominion's Surry Units 1 and 2, for which the third application was submitted on October 16, started commercial operation in 1972 and 1973, respectively, and are allowed to operate until 2032 and 2033 under the first operational life extension license. The operator presumably decided to apply for a second extension as the plants have attained a capacity factor of over 90% almost every year after the 40th year since the start of commercial operation.

On October 25, Tohoku Electric announced the decommissioning of Onagawa Unit 1 which started operation in 1984, citing "comprehensive judgment considering the output level and the number of years of operation after restarting" as the main reason. While nuclear plants are called "decrepit plants" in Japan when they have been in operation for nearly 40 years, it should be more widely recognized in Japan that it is technically possible to operate a nuclear power plant for 60 years or more, as is allowed in other countries.

Russia's state-run nuclear company Rosatom remains very active outside of the country. On October 19, a ceremony to celebrate the start of Uzbekistan's first nuclear power project was held at one of the prospective sites for a nuclear new build, with the presidents of both countries attending via video. Under the plan, two Russian VVER reactors (1200 MW) will be built by 2028 at one of the sites, meeting one-fifth of Uzbekistan's electricity demand. The estimated construction cost of approximately \$11 billion will be financed through loans from the Russian government. Developments in Central Asia's first commercial nuclear power plant project will be monitored with keen interest.

On October 13, China's Haiyang Unit 2 started to transmit power, the last of China's four Westinghouse AP-1000s (1250 MW) to do so. Sanmen Unit 1 and Haiyang Unit 1 began commercial operation on September 21 and October 22, respectively, while Sanmen Unit 2 began to transmit power on August 24 and plans to start commercial operation within this year. The operational experience of the world's first AP-1000s should be shared with other countries for the sustainable development of nuclear technologies, and China is highly expected to actively share such information.

3. Recent Developments in the LNG and Oil Markets

Tetsuo Morikawa, Senior Economist, Manager
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Oil is turning into a bear market. From mid-August to early October, Brent climbed by as much as \$17 (24%) due to concerns over a drop in Iranian oil, marking \$86.07/bbl on October 6. However, it has remained around \$76/bbl as of late October due to the slump on New York stock market on October 10 and concerns over an oversupply.

The stock market drop was triggered by the possibility of an economic slowdown induced by rising long-term interest rates in the US and the US-China trade war. The appreciation of the US dollar resulting from the interest rate increase causes the cost of foreign currency-denominated oil imports to soar, curbing oil demand growth particularly in emerging countries. US oil output is increasing steadily, and the Department of Energy expects the average output to increase by as much as 1.4 mb/d (15%) in 2018 and reach 10.76 mb/d. President Donald Trump has accused Saudi Arabia of the murder of Saudi Arabian journalist Jamal Khashoggi. However, the risk of worsening US-Saudi ties and Saudi Arabia's production cutback has subsided for now after Saudi Energy, Industry and Mineral Resources Minister Khalid Al-Falih stressed OPEC's intention to boost output on October 23. However, as Iran's output will inevitably be cut heavily, whether OPEC actually boosts production will be a major factor determining future oil price levels.

On October 22, the Seventh LNG Producer-Consumer Conference was held in Nagoya, attended by over 1,000 participants. In the opening address, Economy, Trade and Industry Minister Hiroshige Seko announced that JOGMEC will assist Japanese companies participating only in liquefaction projects (and not gas field development projects) and that the JBIC and NEXI will offer preferential support for liquefaction plants exporting LNG to third countries and Japanese companies participating in third-country LNG terminals. Further, the IEEJ and the US Energy Policy Research Foundation Inc. (EPRINC) reported the result of joint research and suggested that the competition authorities of importing countries should engage in deeper discussions to ease destination clauses.

China imposed a 10% tariff on American LNG starting on September 24. It is not difficult for China to find alternative LNG supplies as American LNG accounts for just 4% of China's LNG imports. Spot LNG prices for Northeast Asia are stable at around \$10-11/MMBtu. However, not having access to the demand in China until the trade war is resolved is a blow for US LNG projects and the launch of new projects in the US may be delayed. On the other hand, this will be a tailwind for new projects in countries like Canada, Mozambique, Australia, and Russia. Importers must help ensure that the risk of a trade war does not disrupt sustained investment in LNG projects by developing demand and through resource finance. It is important to secure LNG supplies while also improving market liquidity by further easing destination clauses, by utilizing the enhanced governmental assistance measures for LNG projects announced at the LNG Producer-Consumer Conference.

4. Update on Policies Related to Climate Change

Takahiko Tagami, Senior Coordinator, Manager
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The 48th session of the Intergovernmental Panel on Climate Change (IPCC) convened from October 1-6 in Incheon, South Korea and approved the Special Report on Global Warming of 1.5 °C and the Summary for Policymakers. The special report reviewed and assessed scientific studies on the impacts of global warming of 1.5 °C above the reference period 1850-1900 levels and related global greenhouse gas emission pathways. Discussions were held on the Summary for Policymakers between the authors of the special report and delegates from the member countries of the IPCC.

The United States reportedly submitted comments to stress there were significant uncertainties including on the carbon budget (estimated cumulative CO₂ emissions in limiting global warming to a given level), and that the report and the Summary did not present a balanced assessment of the costs associated with the trade-offs of pursuing actions consistent with limiting global warming to 1.5°C. At the IPCC session, the United States requested to describe not only the share of renewables in the energy mix in pathways to 1.5°C but also shares of nuclear, gas and fossil fuels with CCS, while European countries attempted to describe just the precipitous decline of coal in that mix. Further, Saudi Arabia requested to express the difference in marginal abatement costs between a 1.5°C and a 2°C target.

The Summary states that in model pathways with no or limited overshoot of 1.5°C, global net anthropogenic CO₂ emissions decline by 40-60% from 2010 levels by 2030. For limiting global warming to below 2°C, CO₂ emissions are projected to decline by 10-30% by 2030 in most pathways. Carbon dioxide removal (CDR) such as biological sinks and direct air capture would be used in most cases to return global warming to 1.5°C following a peak. This report will be inputted to the Talanoa Dialog which take stock of the collective efforts of Parties' nationally determined contributions up to 2030 in COP24. The Special Report 1.5°C will be used by many countries for different ends in the climate negotiations.

On October 8, the Sveriges Riksbank Prize in Economic Sciences in Memory of Alfred Nobel 2018 was awarded to Professor William Nordhaus of Yale University for integrating climate change into long-run macroeconomic analysis. Professor Nordhaus is known for developing the DICE model which integrate climate and economic models to weigh the costs and benefits of climate actions. With the latest DICE2016R model, he states that the international target for climate change with a limit of 2°C appears to be infeasible with reasonably accessible technologies. The IEEJ's analysis of a minimum cost emission pathway is also based on the concept of the DICE.

The Innovation for Cool Earth Forum (ICEF), an international conference established at Japan's initiative to discuss innovations for climate action, held its fifth annual meeting on October 10 and 11 in Tokyo. For the Innovation Roadmaps which have been developed every year for certain technologies, a draft of Direct Air Capture Roadmap was released. Further, the fourth "Top 10 Innovations," which select ten of the most notable among recent innovative developments in energy and climate change mitigation, voted four as technologies foreseen by 2050 namely: new materials for photocatalysts to produce hydrogen, high efficiency ammonia synthesis from water and nitrogen, capture and conversion of atmospheric CO₂ into carbon nanotubes, and turning carbon dioxide into concrete, which reflected broad interest in hydrogen and CO₂ utilization.

5. Update on Renewable Energies

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On October 23, the Ministry of Economy, Trade and Industry and NEDO co-hosted the Hydrogen Energy Ministerial Meeting in Tokyo attended by the hydrogen ministers, government officials, and private companies of major countries. This was the first hydrogen-related international conference attended by ministers, and was joined by 21 countries, regions, and organizations.

The ministerial meeting in the morning discussed the expansion of hydrogen usage and issued the Tokyo Statement. The Statement defined a “Hydrogen Society” as “a clean, more prosperous and secure energy future worldwide supported by using hydrogen in society where appropriate, across the energy, transportation, and industry sectors.” The importance of international cooperation on the four areas below for achieving a Hydrogen Society was confirmed.

First is collaboration on technologies and coordination on harmonization of regulations, codes, and standards. This refers to promoting technological cooperation on hydrogen-related technologies such as fuel cell electric vehicles, hydrogen stations, and hydrogen transportation and storage, while ensuring international cooperation on regulations and standards to promote the creation of markets and private investment. Second is promoting information sharing and international joint research and development to reduce hydrogen supply chain costs and ensure its safety. Third is studying hydrogen’s potential for reducing environmental burden. The potential of hydrogen and its effect on CO₂ emissions reduction will be analyzed to utilize hydrogen in an economically and environmentally feasible manner. Fourth is outreach and education. Programs will be carried out to educate a broad range of hydrogen and fuel cell stakeholders to increase understanding of hydrogen among the public. In carrying out these actions, the need to collaborate with major organizations including the International Energy Agency (IEA), International Partnership for Hydrogen and Fuel Cells in the Economy (IPHE), and Clean Energy Ministerial (CEM) was emphasized.

In the open session in the afternoon, panelists gave lectures and engaged in discussions in Session 1 (mobility and hydrogen infrastructure), Session 2 (global hydrogen supply chain moderated by IEEJ Chairman & CEO Masakazu Toyoda), and Session 3 (renewable energy-related hydrogen), following keynote speeches on the importance of hydrogen in climate action and energy transformation. Session 1 focused on the idea that while the shift to electrification in mobility is inevitable, EVs and FCVs could exist and prosper together rather than having to choose between them. In Session 2, many expressed the view that renewables-related hydrogen is important in the medium to long term, although the combination of fossil fuels and CCUS-related hydrogen will prevail in the short term. In Session 3, it was agreed that water electrolysis devices will become increasingly large in scale in Europe where renewable-related hydrogen is gaining momentum.

Overall, the Meeting agreed that international cooperation and collaboration is essential for achieving a Hydrogen Society, while focusing on the advantages of hydrogen including decarbonizing the energy system and improving energy security. Hydrogen is also planned to be addressed at the G20 meeting scheduled for next June.



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