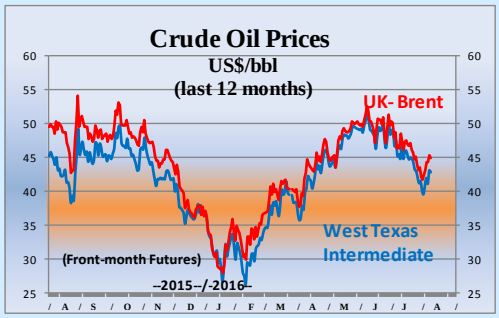
IEE JAPAN MAPPING THE ENERGY FUTURE 50th ANNIVERSARY

IEEJ e-NEWSLETTER

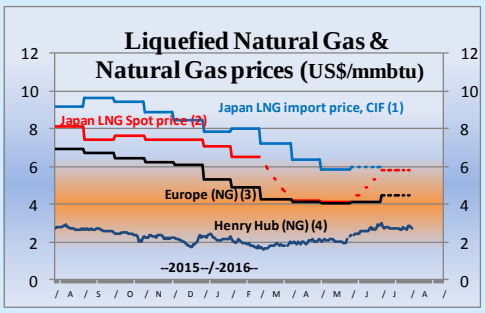
No. 91

(Based on Japanese No. 155)
Published: August 9, 2016
The Institute of Energy Economics, Japan

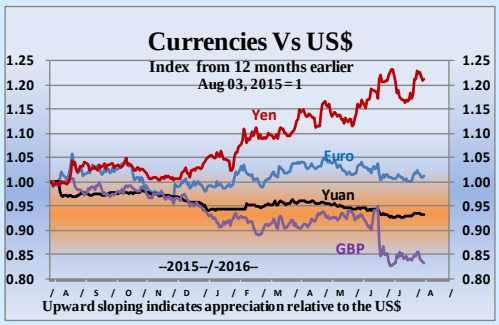
(As of August 9, 2016)



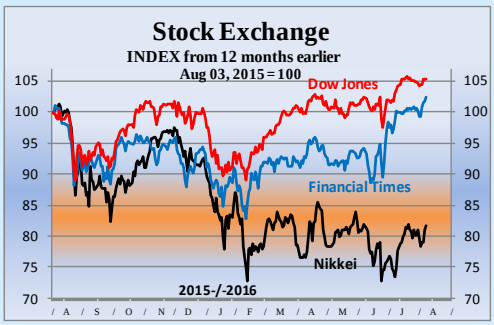
Source: DOE-EIA, Financial Times, NASDAQ



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)



Source: x-rates.com



Source: Financial Times

Contents

Summary

【Energy Market and Policy Trends】

1. Economic and Energy Outlook of Japan through 2017

The IEEJ's Economic and Energy Outlook of Japan through 2017 projects that as the economy gradually recovers, consumption of natural gas and oil for power generation will decrease due to factors such as the restarting of nuclear power plants and that demand for electricity and city gas will rise.

2. Developments in Nuclear Power

In the UK, where investments in new nuclear power plant projects are facing uncertainty due to the low price of wholesale electricity, the Energy Department was restructured, and a new minister was appointed. How the government and industry work to overcome the challenges must be closely monitored.

3. Recent Developments in the LNG and Oil Markets

The supply and demand for oil will slowly head toward equilibrium, and uncertainty regarding the world economy could slow the rise in oil prices via the financial markets, and even via the supply-demand balance, should the world economy actually slow down.

4. Update on Climate Policies

METI held the first meeting of the Long-Term Global Warming Countermeasures Platform attended by industry and academia, and started to consider the long-term measures for reducing GHG beyond 2030.

5. Two Focus Areas for Expanding Hydrogen Use

The national and local governments are ramping up efforts to build a hydrogen society. For the time being, efforts will focus on two areas: using regional hydrogen resources to feed hydrogen to fuel cell vehicles, and supplying imported hydrogen to hydrogen power generation.

1. Economic and Energy Outlook of Japan through 2017

Momoko Aoshima, Senior Economist
Energy and Economic Analysis Group
Energy Data and Modelling Center

On July 26, 2016, the IEEJ released the Energy and Economic Outlook of Japan through FY2017. This article projects the situation through FY2016 and 2017, focusing on the outline of the Reference Scenario. Real GDP growth of Japan for FY2016 is expected to be 0.7%, as overall private demand slows from the previous year despite an upturn in consumer spending for the first time in three years, and as the increase in government consumer expenditure and higher external demand driven by the US economy prop up the Japanese economy. For FY2017, GDP growth is estimated at 0.9% driven by private demand, as capital investment remains solid while consumer spending slows somewhat.

Domestic primary energy supply will decrease in both FY2016 and 2017 as energy conservation accelerates and the recovery of production activities remains moderate, marking four consecutive years of decline. Natural gas and oil for power generation will be the main contributors to the decline, due to the restarting of some nuclear power plants and the increased use of renewables. Final energy consumption will also shrink for both fiscal years, marking seven consecutive years of decline mainly because fuel-efficient vehicles are gaining share in the transportation sector.

By type of energy, electricity sales will grow in both FY2016 and 2017 as production activities gradually recover. City gas sales will post record highs for two consecutive years, driven by industrial use. Fuel oil sales will fall in both years, marking five consecutive years of decline, due to the drop in Bunker C for power generation as nuclear power plants restart, and to the drop in kerosene sales. Cumulative capacity of renewable-based electricity will reach 65 GW by the end of FY2017. If all 87 gigawatts of renewable capacity licensed as of the end of March 2016 go into operation, the cumulative cost to consumers over 20 years will reach 56 trillion yen, equivalent to a ¥3.2/kWh rise in electricity tariffs.

Under the energy supply and demand situation described above, energy-derived CO_2 emissions would decrease for four consecutive years after reaching a record high in FY2013. It will fall to as low as 1,094 Mt-CO_2 in FY2017 as oil and natural gas consumption fall as energy conservation accelerates, more nuclear power plants are restarted, and more renewable energy is introduced. This is equivalent to a reduction of 141 Mt-CO_2 or 11.4% from FY2013 levels, compared to the government's Intended Nationally Determined Contribution to reduce emissions by 26.0% from 2013 levels by 2030.

As for the impact of restarting nuclear power plants, if 19 plants are restarted by the end of FY2017 (the Reference Scenario), compared to 2010 levels, total fossil fuel imports will decrease by 4.7 trillion yen and CO_2 emissions will drop by 45 Mt-CO_2, while the unit electricity cost will rise by ¥1.1/kWh due to the increase in FIT purchase cost. In comparison to the Low Level Scenario, in which only 12 plants are restarted by FY2017, the High Level Scenario, in which 25 plants are restarted, will cut total fossil fuel imports by 700 billion yen, unit electricity cost by ¥0.6/kWh, and CO_2 emissions by 52 Mt-CO_2, while increasing GDP by 600 billion yen. Regarding the ongoing shutdown of plants by court rulings, it is important to consider the impact from the local viewpoint. Shutting down one 1 GW nuclear power plant for one year in a region with an electricity output of 100 TWh translates into an additional fuel cost of 60 billion yen, additional CO_2 emissions of 4 Mt-CO_2 (7% of the region's emissions), and a rise in unit electricity cost of ¥0.4/kWh (2% of average unit electricity cost), approximately 10 times that of the national level.

2. Developments in Nuclear Power

Tomoko Murakami, Manager
Nuclear Energy Group, Strategy Research Unit

On July 13, the UK's new prime minister Theresa May announced that the Department of Energy & Climate Change (DECC) overseeing the nuclear department had been abolished and integrated into the newly established Department for Business, Energy & Industrial Strategy (BEIS) together with parts of other abolished ministries. Conservative MP Greg Clark was appointed as the first BEIS Minister on the following day, July 14.

New nuclear build projects, which are expected to play an important role in achieving a low-carbon society, are facing headwinds. On July 12, the independent safety regulator, Office for Nuclear Regulation (ONR), announced that it was due to complete the Generic Design Assessment (GDA) of the AP-1000 and ABWR, two reactor types planned for construction in the UK, within 2017. However, the current wholesale electricity price is too low for operators to forecast sufficient profitability to make a final investment decision. Further, in a report released on July 13, the National Audit Office revealed that the exercise price of FIT-CfD for Hinkley Point C was decided through agreement between EDF Energy and DECC and not by public tender, and that the exercise price will be fixed for 35 years, which is longer than for other low carbon energies, and criticized that this might increase the burden on UK taxpayers. Accordingly, other projects including Horizon's Wylfa Newydd are likely to face demands for severe cost cuts. It will be interesting to see how the first Minister of BEIS as well as the operators deal with these issues.

As the prospects for the nuclear business remain unclear in developed European countries and the US, the nuclear power facility and equipment industry is seeking opportunities amid the rapid nuclear development underway in emerging countries. On July 8, Russia's state-run nuclear firm Rosatom signed an MoU with Bolivia's Ministry of Hydrocarbons and Energy on human resource development and technical support in the nuclear area. Further, on July 20, the company emphasized the potential of Russia's nuclear technology to help solve Africa's energy problems at an energy industry meeting, "Power-Gen Africa", held in Johannesburg, South Africa. In regions such as the Middle East, Africa, Latin America, and Asia where electricity demand is soaring, decisions to introduce nuclear power could be made quickly with the help of Russia and China. The operators of developed countries should take into account in their strategies the quick decision-making and risk-taking by state-supported Chinese and Russian companies.

In Japan, there are few signs of progress in either the safety assessments under the new regulation standards or the restarting of nuclear power plants, except for Ikata Unit 3, which will start operation on August 15th. On July 20, the Nuclear Regulation Authority (NRA) made a decision at a regular meeting to redo the review of reference ground motion for Kansai Electric's Ohi Nuclear Power Plant, citing insufficient explanation. At the regular meeting on July 27, the decision was made not to revise the reference ground motion. However, it was unusual that the NRA's decision to redo the review was based on a judgment by a former, not current, member in charge of the assessment. The NRA is expected to improve the consistency and transparency of the assessment process.

3. Recent Developments in the LNG and Oil Markets

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

After recovering to nearly $50/bvl in early June, crude oil prices have been fluctuating in the $40-50 range. This stalemate was apparently first observed in early June, when the US employment statistics for May failed to meet market expectations. Oil prices slid by $3 immediately after Britain's EU referendum on June 23, but returned to pre-referendum levels in a week or so. Unlike the previous month, US employment statistics for June released on July 10 exceeded market expectations, but prices were hardly affected. Little did they move much in mid-July when stock prices posted record highs for seven consecutive days at the New York Stock Exchange.

The market consensus is that supply and demand for oil will reach equilibrium around 2017. If this is correct, prices should be upward. The reason why the recovery and upward movement of prices since February have stalled, however, may be the market's concerns about the uncertain outlook for the global economy, high inventory levels, and possible end of falling US production. In its World Economic Outlook released on July 19, the IMF revised down its GDP growth projection for the fourth straight time. Further, according to the IEA, the inventory level of OECD countries is as much as 9% higher than the 2011-2015 average. Furthermore, despite the decline in US oil output since April, productivity itself is still improving, and the rig count may have bottomed out. These factors suggest that supply and demand will head toward equilibrium, albeit slowly, and yet the uncertain world economy could slow the rise in oil prices via the financial markets, and even via actual demand, should the economy actually slow down. Based on these factors, Brent price will average around $50/bbl for the second half of 2016 and $55/bbl for 2017.

How could the delay in the recovery of oil prices affect the LNG market? First, investment decisions for new projects, especially green-field ones, will remain difficult. However, the supply glut will actually expand toward 2017 as many projects that had FID during high price era, making supply capacity grow much faster than demand. Further, the US LNG is losing competitiveness due to the drop in oil-indexed LNG prices. Even if spot LNG prices fall due to an unprecedented supply glut, the gap between spot and oil-indexed long-term contract prices will not be large enough for buyers to switch to spot purchases. While low LNG price will certainly benefit Asian importers, it could blunt their incentive to diversify away from oil-indexation pricing. Further, though it depends on the delay in upstream investment, it may take at least five years for LNG supply and demand to reach equilibrium.

4. Update on Climate Policies

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

On July 5, the Ministry of Economy, Trade and Industry held the first meeting of "the Long-Term Global Warming Countermeasures Platform", attended by industry and academia. The Platform started discussing sustainable climate policy for long-term GHG reduction beyond 2030 that is compatible with economic growth, in order to establish "a long-term low greenhouse gas emission development strategy" for the future.

Under the Paris Agreement adopted at COP21 last December, the COP invited each country to formulate and communicate, by 2020, a mid-century, long-term low greenhouse gas emission development strategy. Further, the Plan for Global Warming Countermeasures approved by the Cabinet last May set the policy of "aiming to achieve the long-term goal of reducing GHG emissions by 80% by 2050, while keeping climate policy compatible with economic growth", and "working to drastically reduce emissions through long-term strategic efforts and contributing to reduction at the global level, while promoting domestic investment, enhancing Japan's competitiveness, and soliciting public opinion ".

Meanwhile, the Ministry of the Environment established the Roundtable on Long-Term Climate Change Strategy last October, and last February, the Roundtable finalized "A Proposal: for achieving the simultaneous solution of a substantial reduction of GHG in the longer term and economic and social challenges". As a means to create a green market and to achieve a high value-added economy by making environmental values explicit, the proposal listed: carbon pricing (e.g. carbon taxation combined with corporate tax cut and social security reform); the use of regulatory approaches which include innovation targets; information measures to achieve "life style innovation"; and promoting environmental finance.

The Long-Term Global Warming Countermeasures Platform identified three themes: the compatibility of environment with economic growth (how to expand domestic investment), climate policy on a global scale (how to disseminate excellent environmental technologies), and drastic GHG reduction technologies (how to induce innovation). In future, the Platform will establish an expert taskforce for each theme. Regarding the theme of ensuring compatibility between environment and economic growth, the areas studied will include the assessment of different policy approaches including economic instruments (e.g. carbon pricing), regulatory, and voluntary approaches, and the relationship between climate change and investors.

The Environment Ministry, too, has taken action. Based on the Proposal in February 2015, the Ministry established the Long-Term Low Carbon Vision Subcommittee under the Global Environment Committee of the Central Environment Council in order to discuss a detailed roadmap and options for the long-term strategy, and held its first meeting on July 29. The respective platform/committee of METI and the Environment Ministry will each hold discussions, aiming to reach a conclusion within this fiscal year.

5. Two Focus Areas for Expanding Hydrogen Use

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

Municipalities are ramping up efforts to build a hydrogen economy In the Tokyo metropolitan area, aiming to expand the use of hydrogen in time for the 2020 Tokyo Olympic and Paralympic Games, Tokyo is setting a target for the number of fuel cell vehicles and a plan for building hydrogen refueling stations, while Kanagawa, Saitama, and Chiba prefectures are developing their own hydrogen roadmaps. Other metropolitan areas including Osaka, Hyogo, and Aichi prefectures, the cities of Yokohama and Kawasaki, as well as the prefectures of Hokkaido, Miyagi, Yamanashi, Yamaguchi, Fukuoka, Saga and Kumamoto and Shunan city are establishing unique regional action plans and visions for expanding hydrogen use and offering support for introducing the technologies.

On June 16, the government released the gist of the Fukushima New Energy Society Initiative. Led by Prime Minister Abe himself, the initiative was put together in March by the council responsible for achieving the initiative. To support the reconstruction of Fukushima in terms of energy, the initiative aims to build a model for producing, storing, transporting, and using renewable-derived hydrogen in Fukushima, while introducing renewable energies to the maximum extent.

Many of these municipalities' plans assume fuel cell vehicles as the main hydrogen-using device, while featuring unique sources of hydrogen in the regions such as byproduct hydrogen and renewable energies. While the amount of hydrogen used by fuel cell vehicles is limited (hydrogen consumption by 800,000 fuel cell vehicles, the target for 2030, is 800 million Nm^3/year, equivalent to only 0.1% of current final energy consumption), these efforts will serve to drive the construction of a domestic hydrogen supply network.

Meanwhile, the hydrogen turbine power generation, which is a technology expected to contribute to mass hydrogen consumption, consumes 2.5 billion Nm^3 of hydrogen per 1 GW unit, which is equivalent to 2.5 million fuel cell vehicles. To meet this mass hydrogen consumption, hydrogen imports are being considered. Mass consumption would lead to reductions in the price of hydrogen.

As described above, the efforts for building a hydrogen economy have two pillars: mainstream technologies for using hydrogen (fuel cell vehicles and hydrogen power generation), and hydrogen sources (regional hydrogen resources and hydrogen imports). Based on these two pillars, two focus areas are currently drawing attention: (1) using regional hydrogen resources to feed hydrogen to fuel cell vehicles, and (2) supplying imported hydrogen to hydrogen power generation. These two areas may generate synergies in the long run in promoting the use of hydrogen, but this is unlikely to happen soon, considering the timing of implementation and technological maturity. Thus, it is important to enhance efforts for these areas individually. However, both areas clearly need the involvement of the central and regional governments and private companies.

Past IEEJ Events

Energy Indicators of Japan

IEEJ Homepage Top

Back Numbers of *IEEJ e-Newsletter*

Back Numbers of *IEEJ Newsletter* (Original Japanese Version - Members Only)

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

IEEJ：August 2016　© IEEJ 2016