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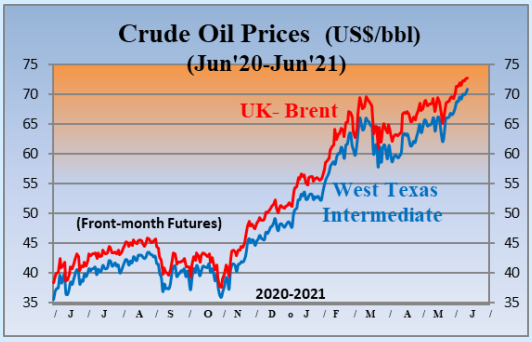
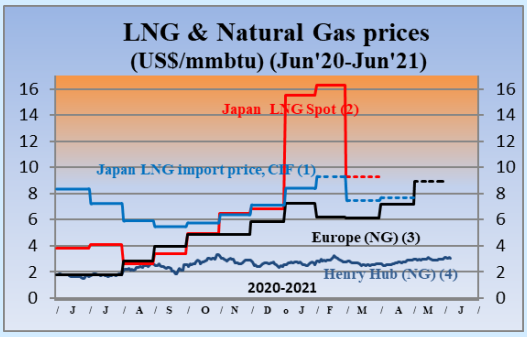
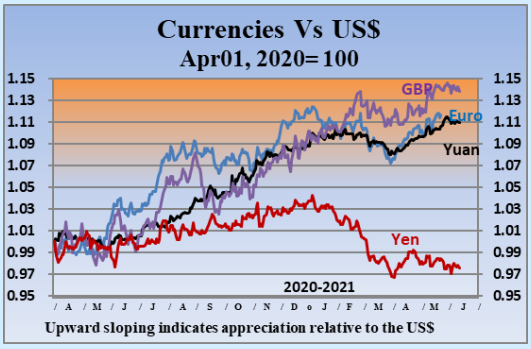


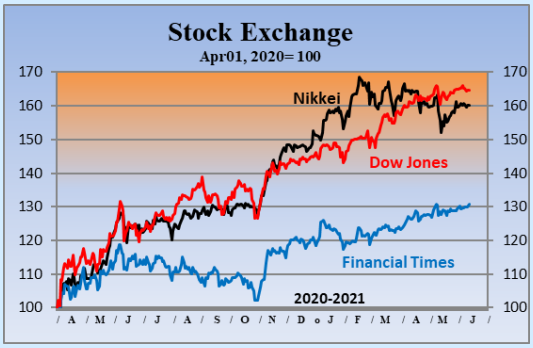
Sources:
(1) DOE-EIA
(2) Investing.com



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)



Source: x-rates.com



Sources:
(1) Finance. Yahoo.com
(2) Investing.com

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Summary

【Energy Market and Policy Trends】

1. Energy Policies

The 46% reduction target announced by Prime Minister Suga is not an exact accumulation of reduction initiatives, unlike previous targets. At the Strategic Policy Committee, there were many opinions calling for intensive introduction of nuclear and solar PV capacities.

2. Developments in Nuclear Energy

The government decided on the basic policy of releasing the treated water currently stored at the Fukushima Daiichi Nuclear Power Station, into the sea in two years. Meanwhile, the Governor of Fukui Prefecture announced his agreement with continuing to operate nuclear power plants beyond 40 years.

3. Recent Developments in the Oil and LNG Markets

While delay of a year or so is expected in a greenfield LNG project in Mozambique due to security situation, progress has been observed in new project development activities elsewhere.

4. Update on Policies Related to Climate Change and Energy Conservation

As efforts toward decarbonization accelerate globally, UK Prime Minister Boris Johnson announced plans to set climate action as a main agenda item of the G7 Summit in June. In Japan, additional measures for enhancing the 2030 energy conservation target were presented.

5. Update on Renewable Energies

At the April meeting of the Subcommittee on Large-scale Renewable Energy Introduction and the Next-Generation Power Network, the outlook for the capacity of various renewable energy sources was presented to facilitate in-depth discussion on how the 2030 targets and policies should be set.

1. Energy Policies

Seiya ENDO, Economist
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Energy Data and Modelling Center (EDMC)

On April 22, Prime Minister Yoshihide Suga announced an increase of Japan's 2030 GHG reduction target to minus 46% from 2013 levels. At the press conference on the 30th, METI Minister Hiroshi Kajiyama explained that this target was "being discussed even though it is not an exact accumulation of reduction initiatives; it was a rather unconventional approach aimed at announcing a respectably high target in time for the US-Japan Summit and the G7." The new target is extraordinary in that it was announced without accumulating reduction initiatives in the Strategic Policy Committee and other government councils to back it up, unlike previous targets.

Until now, the basic tone of energy policy discussions was that "the 2030 target should be an accumulation of highly certain reduction initiatives, and the 2050 target should be an ambitious one." However, the new reduction target calls for ambitious initiatives for 2030 as well. At the 42nd meeting of the Strategic Policy Committee held on April 28, the draft composition of the Strategic Energy Plan and the direction of energy policies for 2030 were discussed. In connection with the 46% reduction target announced the week before, several members said it will be necessary to maximize the use of nuclear power and drastically increase solar PV, which has a short lead-time, to rapidly accelerate reductions. As for the target itself, a measure of understanding was expressed for setting the target without accumulating reduction initiatives, unlike previous ones, but questions were also raised regarding the point of discussing the energy mix in this Committee after a reduction target has been set.

At the 43rd Strategic Policy Committee meeting held on May 13, discussions focused on an interim report on the carbon neutrality scenario analysis presented by the Research Institute of Innovative Technology for the Earth (RITE) as a discussion material for the new Strategic Energy Plan. The analysis set various scenarios for achieving the 2050 carbon neutrality target, including the expanded renewables scenario, expanded nuclear scenario, and demand transformation scenario, and presented the supply and demand for energy under each scenario and its impact on costs in quantitative terms. By 2050, electricity costs would rise, by varying amounts among the scenarios, to at least 20 yen/kWh in any scenario from the current 13 yen (and to about 53 yen for the 100% renewable scenario), highlighting the need to mitigate their impact. It was also argued that it would be extremely difficult to achieve carbon neutrality unless innovative technologies such as hydrogen reduction steelmaking and direct air capture (DAC) of carbon dioxide are implemented, since some emission sources for non-electric demand are extremely difficult to decarbonize. The presentation concluded that it is necessary to pursue a wide range of innovations while utilizing established technologies such as renewables and nuclear power. It is hoped that scenario analyses such as these will be continued in order to identify problems and formulate a more feasible Strategic Energy Plan.

IEEJ Chairman and CEO Masakazu Toyoda commented at the meeting as follows:

- It is shocking that Japan's electricity cost is expected to almost double when it is already more than twice as high as that in the US and 30–50% higher than in other Asian countries. This will significantly affect the international competitiveness of Japan's manufacturing industry.
- The 20–22% share of nuclear power in the current energy mix should be maintained as a minimum. To do so, the Strategic Plan should commit explicitly to rebuilding existing plants and building new ones, and amend the expression "reduce dependency on." Furthermore, the decarbonization of fossil fuels should be accelerated for the sake of supply stability.
- For the future, steps should be taken to develop new technologies such as DAC and space-based solar power.

2. Developments in Nuclear Energy

Kenji KIMURA, PhD
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On April 13, the government decided on the basic policy of releasing the treated water, currently stored in tanks at TEPCO's Fukushima Daiichi Nuclear Power Plant, into the sea in two years. The treated water is the contaminated water from the Fukushima Daiichi NPS that has been purified in an Advanced Liquid Processing System (ALPS), and from which most of the radionuclides have been removed apart from tritium.

This decision came after six years of discussions by government expert committees. In the process, discharge into the sea was compared with other alternatives such as evaporation into the atmosphere and injection into the ground. Discharge into the sea was eventually selected in view of past practices at nuclear plants and the applicability of regulatory standards. The treated water must be purified again as necessary to lower the radionuclide concentration to below the levels stipulated by law and diluted at least 100-fold by sea water. Further, the total amount of tritium to be released will be capped at 22 trillion becquerels per year (the release control level of Fukushima Daiichi before the accident).

According to a document compiled by the Ministry of Economy, Trade, and Industry, compared to about 51 trillion becquerels of tritium from the US Diablo Canyon Power Plant and about 45 trillion becquerels from South Korea's Kori Nuclear Power Plant being released per year in liquid form, the amount to be discharged from Fukushima Daiichi is not that large. However, rumors could be damaging and some neighboring countries have criticized the decision. It will be important to arrange regular checks by third parties such as the International Atomic Energy Agency (IAEA) and publish the results widely.

On April 28, Governor Sugimoto of Fukui Prefecture announced his agreement with continuing to operate KEPCO's nuclear power plants (three reactors at two power stations) that have been operating for 40 years. The current system that limits the basic power plant life cycle to 40 years was established after the Fukushima Daiichi accident, and this decision was the first by any plant-hosting municipality to agree to its extension.

Like in Japan, the initial operating license is valid for 40 years in the US as well, but many nuclear power plants have been granted their first extensions (20 years) and some operators have even received their second (an additional 20 years). Long-term operation of existing reactors is considered to be the cheapest low-carbon power option by the International Energy Agency (IEA) and the Nuclear Energy Agency of the Organisation for Economic Cooperation and Development (OECD/NEA). According to a past statement in the official gazette of the federal government, the license was set to 40 years not because of safety but rather to prevent market monopoly.

Maximizing the use of existing large-scale, stable, low-carbon power sources will be crucial for Japan as it steps up its climate actions, including by raising its 2030 GHG reduction target to 46%, while also dealing appropriately with plant aging and performing the required assessments.

3. Recent Developments in the Oil and LNG Markets

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Delay of a year or more is expected in construction of the onshore LNG production project in Mozambique that was sanctioned in 2019. Total, as the operator of the project, withdrew all LNG project personnel from the site in late April due to deteriorating security situation, only a month after the company announced plans to resume project activities. The operation was targeted in 2024 at the time of the investment decision. The project's planned capacity is 13 million tonnes per year, out of which Japanese companies had agreed to offtake up to 4 million tonnes.

Total, in the meantime, announced in early May that the Papua LNG project teams had been remobilized in Papua New Guinea. The project aims a final investment decision (FID) in 2023. The gas produced from the onshore Elk and Antelope fields will be liquefied through 2 trains to be built with a total capacity of 5.6 million tonnes per year which will be integrated to the existing PNG LNG facilities in late 2020s.

Santos, as the operator of the Barossa gas field development in Northern Australia, has revealed its intention to consider carbon-neutral LNG supply after the investment decision on the field development in late March 2021. Sempra Energy has said that it is more likely that the final investment decision (FID) on the Port Arthur LNG project in Texas would move to 2022 partly because the company works on options to reduce the projects' greenhouse gas profile. GHG emission management is looming as large as ever in the LNG supply front.

LNG imports in the four major markets in Northeast Asia (Japan, Korea, China and Chinese Taipei) during the first quarters of 2021 amounted to 61.19 million tonnes, increasing by 15% year-on-year. The monthly total imports in the four markets were larger year-on-year for each month of the quarter. According to preliminary figures from the central government, China consumed 92.6 bcm of natural gas during the first quarter, increasing by 18% year-on-year, returning to a steady growth phase.

According to GIIGNL's (International Group of LNG Importers) Annual Report published in April, the world imported 356.10 million tonnes of LNG in 2020, an increase of 1.40 million tonnes or 0.4%. Spot and short-term volumes amounted 142.50 million tonnes, representing 40% of the total, compared to 34% a year earlier.

Crude oil prices (Brent Futures) have been steady in the high of USD 60s. While global oil demand has been recovering since 2020, OPEC Plus members have been considered highly compliant to the alliance's coordinated production cuts. Rising oil production in the United States has not been large enough to ease the demand and supply balance yet. With commercial crude inventories in OECD members descending to the past five-year average as of March 2021 and OPEC Plus keeping coordinated production cuts until July, crude oil prices are expected to be stable in the short-term.

4. Update on Policies Related to Climate Change and Energy Conservation

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Climate Change and Energy Efficiency Unit

On May 6, Prime Minister Boris Johnson of the UK, which will host the G7 Summit in June, announced plans to set climate action as a main agenda item of the Summit. He seeks to unite the G7 heading toward COP26 scheduled for November this year.

Developed countries have a goal of collectively providing 100 billion US dollars per year in climate change-related financial assistance to developing countries from 2020 through 2025. In 2018, the actual financial assistance was 79 billion US dollars. Prime Minister Johnson has said he hopes to bring the G7 to a consensus on launching the green industrial revolution, to ensure that the funding proceeds on target and the impact of climate change can be dealt with.

On May 21, the G7 Climate and Environment Ministers' Meeting adopted a joint communique. The joint statement explicitly mentioned the target of limiting the increase in the global average temperature to 1.5 degrees Celsius above pre-industrial levels, and that the G7 will lead by example to achieve net zero GHG emissions as soon as possible and by 2050 at the latest. The G7 members further agreed to phase out new direct government support for carbon-intensive international fossil fuel energy. However, a note to this agreement reads: "except in limited circumstances at the discretion of each country." For unabated international thermal coal power generation, the communique states that G7 members will review their policies on supporting further development and exports, aiming to terminate new direct government support by the end of 2021.

In the EU, steel, cement, and chemicals companies have decided to have carbon border adjustment measures introduced as soon as possible in view of competition with other regions as carbon prices soar. The price of carbon in the EU Emission Trading System (EU-ETS) is currently 50 euros per tonne, double pre-Covid levels. For example, the carbon price accounts for 10% of the price of steel. The European Commission is scheduled to issue a proposal on carbon border adjustment measures in July, to be implemented in 2023 at the earliest. Discussions are under way to impose taxes "under fair conditions" in line with WTO rules, starting with imports of steel, cement, and fertilizer.

The moves of financial institutions toward decarbonization also deserve attention. One of the goals of the Climate Summit in April was to accelerate the transition to net zero emissions by mobilizing public and private funds. In the US, many banks have made climate-related commitments at the request of the White House. For example, J.P. Morgan has announced it will provide 2.5 trillion US dollars in climate-related lending over the next 10 years. Citigroup has similarly released a lending plan worth 1 trillion US dollars.

In Japan, METI's Energy Efficiency and Conservation Subcommittee met on May 21 to discuss incorporating all energies into the scope of the Act on the Rational Use of Energy, including non-fossil energies which have not been included. Further, additional measures to enhance the energy conservation target in the 2030 energy mix (raising the target to 62 million kL from 50.3 million kL) were presented. It is hoped that efforts are enhanced further, by positioning energy conservation as the "First Fuel" in view of its high cost-efficiency in decarbonization.

5. Update on Renewable Energies

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Making renewables one of Japan's main power sources is considered vital for achieving carbon neutrality by 2050. While the share of renewables in the energy mix was 18% in fiscal 2019, a share of 50–60% was presented at the Strategic Policy Committee last December as a guideline target for 2050. To achieve this target, on April 7, outlooks for renewable energy capacities were presented at the Subcommittee on Large-scale Renewable Energy Introduction and the Next-Generation Power Network to facilitate in-depth discussions on how the 2030 targets and policies should be set.

For solar PV, the capacity is 56 GW as of the end of March 2020 and is estimated at 87.6 GW as of 2030 at the current pace of installation and licensing. The equivalent figures for onshore wind power are 4.2 GW as of the end of March 2020 and 13.3 GW in 2030 at the current pace of installation and licensing. Onshore wind power is expected to increase to 15.3 GW if government policies are strengthened such as revising the scope of environmental assessment. For offshore wind power, the capacity remains at just 0.01 GW as of the end of March 2021, but if all licensed capacities of non-operating projects (seven projects worth 0.67 GW) are installed, and if the target in the Vision for Offshore Wind Power Industry (1st) is fully achieved, the capacity is expected to reach 1.7 GW by 2030. This figure is expected to increase to 3.7 GW if the government boosts support such as by helping selected operators launch a business. The capacities for geothermal, hydropower (including large-scale hydropower), and biomass power are estimated at 0.7 GW, 50.6 GW, and 7.2 GW, respectively, at the current pace of installation and licensing. These are expected to increase to 1.0 GW, 50.6 GW, and 7.3 GW, respectively if the government strengthens support toward expanded use. These outlooks take into account any policy that can be factored in at this time.

Based on the above, the total power output from renewable energies is estimated to be 270.7–290.3 TWh in 2030. Accordingly, to raise the share of renewables to 50–60% (achieving about 700–800 TWh) in 2050, it is necessary to overcome challenges such as cutting the cost of renewables further, securing transmission capacity and stable adjustment capacity, and enhancing grid inertia measures.

While enhancing renewable capacities is vital for decarbonizing the power generation sector, to achieve carbon neutrality by 2050, it will be essential to utilize hydrogen and ammonia in those areas in the industrial, residential and commercial, and transport sectors which are considered hard to electrify. For hydrogen and ammonia, an opinion was raised to "set roughly 10% by 2050 as the guideline percentage for hydrogen and ammonia combined in order to encourage deeper discussions" at the Strategic Policy Committee meeting in December last year. At the Committee meeting held on May 13, it was pointed out that 5–10 million tonnes of hydrogen and ammonia must be secured to achieve this guideline level. Since the supply of the two energies for power generation is estimated at 300,000 tonnes and 500,000 tonnes, respectively, in 2030, a massive 6- to 12-fold increase in supply will be needed by 2050

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