IEEJ e-NEWSLETTER

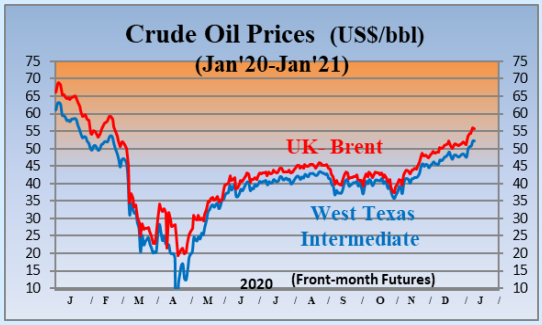
No. 200

(Based on Japanese No. 208)

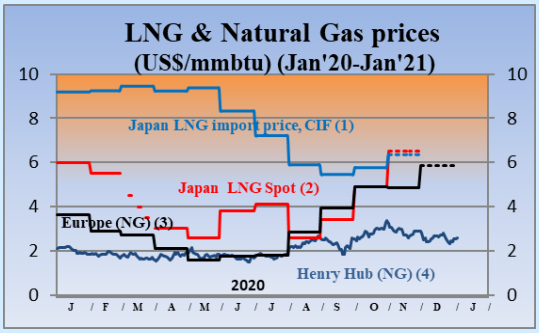
Published: January 18, 2020

The Institute of Energy Economics, Japan

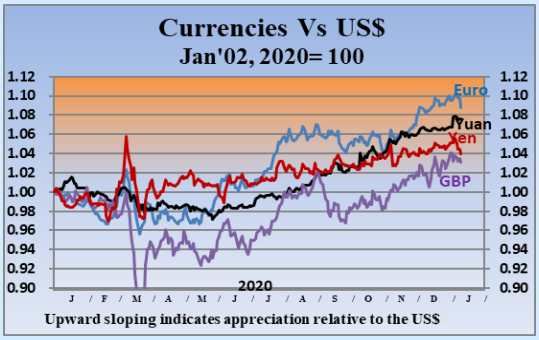
(As of January 11, 2020)



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

Contents

2021 New Year Message
from
IEEJ Chairman & CEO Masakazu Toyoda

Expectations for Japan's leadership in 2021

Happy New Year.

2020 was a year of constant battle against Covid-19. Even in terms of energy alone, the year can only be described as overcast at best, with occasional storms. Will we see clear skies in 2021? The answer will depend on the policies of countries and the will of those concerned. I would like to propose an agenda for the seven areas in which Japan is expected to exert leadership.

First is preparing for the post-Covid world. I will not discuss economic stimulus measures in this message, since the pandemic is an exogenous factor for energy. It is possible that a vaccine will become widely available by spring, heralding better times ahead. What is important is not to confuse new trends such as accelerating digitalization with the structural issue of the stability of energy supplies. Investment in energy is declining quickly. Japan needs to raise its independent development ratio for oil and natural gas which is currently set at 40% and invest steadily. The demand for energy will eventually start rising again, particularly in Asia. Japan has supply chains spread across Asia. While the country has enough oil stockpiles to cover over 200 days of consumption, India and ASEAN countries have just 10 to 40 days' worth. Natural gas reserves last only for two to three weeks due to the difficulty of storage. Building joint stockpiles for Asia is a pressing issue.

Second is climate actions that suit Japan. 2020 was the year in which all major countries declared the target of carbon neutrality. Declarations came first from European countries, followed by China, Japan, and South Korea, and perhaps by the United States when Joe Biden becomes president toward the end of January. Can Japan really achieve this target? The answer lies in the decarbonization of fossil fuels. This is done by producing zero-carbon hydrogen and ammonia from fossil fuels using carbon capture and storage (CCS), and through the use of carbon recycling technologies. Renewable energy will naturally become a major power source, while 2030 target level of nuclear power must be maintained as a zero-carbon energy. However, both are power sources, and power consumption accounts for barely 30% of final energy consumption. Achieving 50% of total consumption will be difficult even if electrification makes substantial progress. Thus, we must rely on the decarbonization of fossil fuels for the remainder.

Third is Japan-US collaboration in the energy and environment areas. Japan needs to cooperate with the incoming Biden administration to implement realistic energy and environmental policies. One such policy is the decarbonization of fossil fuels. The US public has high expectations for renewables such as solar PV and wind power, but renewable energy accounted for just 7.8% of primary energy as of 2018, no different from Japan's 7.3%, whereas fossil fuels accounted for 82%. The US has become one of the world's major oil and gas producers through the shale revolution and is now a net exporter. It is also one of the top producers and consumers of coal. The country has an abundance of locations suitable for CCS and is interested in carbon recycling technologies. Japan and the US should cooperate with each other and involve other Asian countries in the decarbonization of fossil fuels as part of the Indo-

Pacific cooperation framework.

Fourth is collaboration between Japan, China and South Korea on climate action. Regrettably, the trilateral summit of the three countries may not go ahead due to differences in understanding of history. However, the three countries rank fifth, first, and eighth in the world in terms of energy-related carbon emissions and their net-zero-carbon targets have a similar timeline. If they cannot solve their territorial disputes and the wartime labor issue, the countries should persistently seek a resolution in international courts.

Fifth is achieving stability in the Middle East, which will continue to remain important. Japan depends on the Middle East for over 80% of its oil and over 20% of its gas supplies. Further, the region has high growth potential once Covid-19 subsides. For several years, former Prime Minister Abe has made great effort toward achieving peace. Japan is the Middle East's major partner in decarbonizing fossil fuels, and in autumn last year, the IEEJ conducted joint demonstration tests on the mixed and non-mixed combustion of zero-carbon ammonia with Aramco and others. If the US returns to the Iran nuclear deal under the Biden administration, the entire region may become more stable. Japan should continue to be at the forefront of working toward stability in the Middle East.

Sixth is nuclear measures, which are also important in terms of geopolitics. Nuclear power has excellent characteristics in terms of the 3Es of energy security, economic efficiency, environment, but the confidence on safety is still not fully restored after the Fukushima Daiichi accident in 2011. The Nuclear Regulation Authority has steadily conducted reactor safety assessments, and as a result, nine reactors have restarted and four more may restart in 2020. Some of the court rulings should be challenged fairly and properly. The Atlantic Council issued an insightful geopolitical analysis last month, predicting that without success in Japan's nuclear policy and without US cooperation, China and Russia are likely to take the lead in forming the global nuclear order.

Last is the response to the Sixth Strategic Energy Plan. The deliberations begun at the Strategic Policy Committee in mid-October last year will be in full swing this year. The world is paying attention to Japan now that it has declared its target of carbon neutrality, which is a change from its previous stance of promising only to do what it can do . Why the change? One reason may be that Japan has gained some confidence in its ability to decarbonize fossil fuels. 2020 was the third year since the launch of METI's Hydrogen Ministerial Meeting and the second year of the International Conference on Carbon Recycling. Regarding hydrogen and ammonia, there are two types of ammonia: green ammonia produced by water electrolysis using renewable electricity, and blue ammonia which is made with fossil fuels using CCS. Nuclear-based hydrogen will eventually be launched, too. The color is not important; the point is how to secure large amounts at low cost. Low price in particular is the key for emerging and developing countries mainly in Asia. No country can be criticized for putting better education and economic growth before climate action. The role of developed countries is to prepare climate actions at minimum cost through innovation and international cooperation.

Japan is expected to demonstrate leadership in preparing a realistic prescription for the world in the seven areas above. This is the most viable way of creating clear skies in the energy area.

In closing, I would like to wish everyone a prosperous new year.

【 Special Feature: Key Points for 2021 (1) 】

Summary

I. Overall Energy Policy

Discussions on a maximum effort to achieve carbon neutrality by 2050 began, headed for the sixth revision to the Strategic Energy Plan. Carbon recycling technologies including CCUS and hydrogen are receiving attention.

II. World Energy and the Environment

1. Oil

The key issues for the 2021 oil market are the timing of bringing the Covid crisis to an end, the Biden administration's policy toward Iran, the compliance rate with the OPEC Plus production cut, and geopolitical risks. Oil prices are predicted to be at $50/tonne for Brent.

2. LNG

Expansion of emerging markets backed by LNG supply expansion and relative low prices should attract attention. Utilization of existing facilities, cost reduction through duplication of designs and modular approach could encourage more investment.

3. Energy Efficiency

Progress will be seen in establishing the system and international standards for battery reuse and recycling, in addition to the global electrification of transportation. Alongside energy-saving renovations, efforts on the electrification and digitalization of buildings will continue.

4. Renewable Energy

There are many points to be watched in 2021, including the discussions on the detailed design of the FIP system, moves toward the full-scale introduction of offshore wind power, the next-generation electricity network, and demonstration tests for renewable hydrogen in Japan.

5. Nuclear Power

Not only technical factors but also court decisions determine whether a domestic nuclear power plant will operate or shut down, hindering predictability. Attention must be paid to the selection of a site for the HLW disposal facility.

6. Hydrogen and Carbon Recycling

Regarding the use of hydrogen, the use of fuel ammonia for power generation and the impact of bans on gasoline-only vehicles in the transportation sector are worth watching. For carbon recycling, there are high expectations for substitute aviation fuels.

I. Overall Energy Policy

Shigeru Suehiro, Senior Economist, Manager
Econometric and Statistical Analysis Group
Energy Data and Modelling Center

Discussions on the Sixth Strategic Energy Plan started last year. The focus of the Fifth Strategic Energy Plan approved by the Cabinet in July 2018 featured the 26% GHG reduction target submitted to the United Nations and the energy mix as actions for 2030, and energy conversion aiming for an 80% GHG reduction and net carbon neutrality by 2050.

Two and a half years on, the energy situation is becoming tougher than ever. ESG investment is highly regarded in advanced Western countries and activist investors are demanding that companies abandon fossil fuels, with divestment as an option. At the state level, more and more countries are aiming for carbon neutrality, in which emissions are reduced to net zero. The trend was ignited by announcements from the EU, the UK, and other countries that they would achieve carbon neutrality by 2050, followed, surprisingly, by China's announcement that it would go carbon neutral by 2060. Carbon neutrality by 2050 was also a campaign promise of the incoming US President Joe Biden. Japan, too, declared its target of net carbon neutrality by 2050 in Prime Minister Suga's first policy speech on October 26, 2020.

The fundamental approach to achieving carbon neutrality is to first save energy wherever possible, introduce the maximum level of renewables, and implement a safety-first nuclear policy, and then decarbonize the remaining fossil fuels with zero-emission and carbon recycling technologies. Since it is difficult for various reasons to cover energy demand entirely with renewables and nuclear power, innovative technologies including carbon capture, use, and storage (CCUS), CO_2-free hydrogen, and ammonia power are essential. However, the development and practical application of such technologies is still uncertain and so naturally, the Strategic Policy Committee of the Advisory Committee for Natural Resources and Energy, which is discussing the revision of the Energy Plan, described carbon neutrality by 2050 as a desirable objective rather than a binding target. Meanwhile, R&D for such technologies will require enormous funds. The government plans to launch a two trillion yen fund for researching decarbonization and is considering tax cuts for investments in this area to encourage sustainable growth.

Meanwhile, the demand side must also be considered. The Covid-19 pandemic shows no sign of ending and is affecting lifestyles greatly. Society and the economy are shifting toward remote access and digitalization, which may drastically transform energy consumption, as seen in the acceleration of electrification. Aiming for carbon neutrality, the demand for heat will increasingly be met with electricity in a growing number of areas. Despite such efforts, some areas will remain unelectrified; for these, decarbonization technologies such as methanation will be the key.

Although expectations for innovative technologies are high, so too is the wall that must be surmounted to reach carbon neutrality; considering the 3E+S principle, all measures must be taken with no exception. The Strategic Policy Committee is set to consider multiple scenarios for 2050 to allow for various uncertainties. Meanwhile, as for the 2030 target, realistic discussions are necessary. These discussions are expected to include nuclear energy, which is facing delays in restarting plants, raising the renewable surcharge, the impact of Covid-19, as well as the pros and cons of revising the energy mix, all aiming toward the year 2050.

II-1. Oil

Tetsuo MORIKAWA, Senior Economist, Manager
Oil Group
Fossil Energies & International Cooperation Unit

At the regular research reporting session on December 24, 2020, the IEEJ forecasted the average Brent price at $50/bbl for 2021. However, there are many uncertainties including when the Covid-19 pandemic will subside, the Iran policy of the incoming Biden administration, the compliance rate of OPEC Plus' production cuts, and geopolitical risks. Therefore, these are points of focus in 2021.

The number of Covid-19 infections is approaching 100 million, rising sharply mainly in Europe and the US. Vaccination has begun in the UK and the US, raising hopes that the pandemic will subside. However, scenario for containing the pandemic is still unclear because of possible delays in vaccination due to the need for a low-temperature distribution network and expected low uptake of vaccinations for fears over the vaccines' safety. If these concerns materialize, the pandemic may continue for longer, slowing the recovery of oil demand and in turn imposing downward pressure on oil prices.

As mentioned in last month's edition, the incoming Biden administration's oil-related policies include expanding the use of EVs, regulations on oil and natural gas development on federal lands, licensing the construction of pipelines in the country, environmental regulations related to hydraulic fracturing essential for shale development, and sanctions on Iran and Venezuela. Regarding federal land development, pipeline construction, and shale oil development, the impact on oil prices is likely to be limited. In contrast, the expanded use of EVs will drive down oil demand in the medium to long term, while the shift in policy toward Iran and Venezuela may boost oil exports of both countries in the short to medium term. Particularly, the easing of sanctions on Iran, even if gradual, could drive prices lower if Iran can boost its oil exports in the process. Furthermore, under the incoming Biden administration, US oil companies could strengthen their GHG emission reduction targets.

On December 3, OPEC Plus agreed to roll back the production cut by 0.5 mb/d starting from January 2021. Saudi Arabia argued that the roll-back should be postponed considering the rapid increase in Covid-19 cases, but Russia, the UAE, and Iraq reportedly opposed. The market welcomed this decision, and a price collapse has been avoided for now. However, this agreement might soon be reversed, as OPEC Plus will review the production cut every month starting in January, fueling fresh uncertainty. The prolonged production cut and price slump are draining the economies of oil producers; if OPEC Plus cannot remain united in 2021, the compliance rate may fall, pushing down oil prices.

Perhaps partly because the US government is currently in transition, geopolitical risks in the Middle East are resurfacing, as shown by the attacks on Saudi Arabia's oil facilities and tanker, and the assassination of an Iranian nuclear scientist. The incoming Biden administration is expected to reverse the Trump administration's policy of containing Iran and cozying up to Saudi Arabia, and instead move closer to Iran and distance itself from Saudi Arabia. Furthermore, any weakening of the US commitment to the Middle East may create a power vacuum, resulting in more terrorism and a greater risk of oil supply disruptions.

II-2. Natural Gas (LNG)

Hiroshi Hashimoto
Senior Analyst, Head of Gas Group
Fossil Energies & International Cooperation Unit

Although the global natural gas consumption is estimated to have decreased by 3% in 2020, the global LNG market is estimated to have expanded by 2% in the year underpinned by the increasing production capacity. However, the actual exports during the year fell short of the potential production capability over the year by 15 million tonnes. The slowdown impact on demand for natural gas and LNG was relatively small against the slowdown of global energy demand. Potential recovery of demand in 2021 attracts attention. While the year-round capacity of LNG export will reach 400 million tonnes, the actual traded volumes are expected to be 395 million tonnes, continuing a trend of surplus supply capacity against demand.

Meanwhile, investment is needed to increase LNG supply which will be necessary beyond the middle of the 2020s notably in the emerging markets in Asia. However, city-gas and electric power companies which should provide final demand for LNG in comsuming markets find it difficult to make a long-term purchase commitment due to uncertain demand outlook. In 2020, therefore, many LNG export project developers postponed their investment decisions. The need to bridge the gap between the uncertainty in consuming markets and investment requirement highlights the important role of those major players with financial strenghth and marketing capability combined with extensive portfolios to enable investment, commit offtakes and conduct marketing.

In late November 2020, a final investment decision (FID) - the first in the year for a large-scale LNG export project in the world - was announced on the Energía Costa Azul LNG Phase 1 (ECA1) export project which will be built at the site of an existing LNG import terminal. From the export project, Total and Mitsui & Co. have respectively signed separate 20-year purchase agreements for volumes to be incorporated into their respective supply portfolios without specifying final destinations at this moment.

As a similar portfolio LNG sales transaction, Australia’s Santos signed a long-term sales agreement in early December 2020 with Diamond Gas International, a Mitsubishi Corporation subsidiary, for Santos equity volumes from the proposed Barossa LNG project with pricing based on a spot LNG price index. The project is planned to be tied into the existing Darwin LNG export plant in Northern Australia via sbusea pipeline.

The two projects above have advantage of utilising existing facilities. ECA1 will be built alongside an existing import terminal to share exisiting infrastructure, while Barossa LNGwill backfill an existing LNG export plant with an alternative feedgas source via subsea pipeline. Cost reduction through duplication of designs and modular approach could help more investment.

The European Commission published its Methane Strategy in October 2020, including its intention to impose methane emmission management on suppliers of LNG and natural gas from other regions. As more detailed regulations will be considered in 2021, their global impacts should attract attention.

II-3. Energy Efficiency

Naoko DOI, Senior Economist, Manager
Energy Efficiency Group
Climate Change and Energy Efficiency Unit

The Covid-19 pandemic made the world realize once again that energy efficiency is important for job creation, economic recovery, climate action, and stronger energy resilience all at the same time. Energy conservation initiatives will continue this year while pursuing cost-efficient options. This report discusses moves related to energy conservation in 2021, focusing on the transportation and residential/commercial sectors.

In the transportation sector, EV sales will increase further, boosted by major European cities, China, and the ZEV regulations in 14 US states including California. Secondary use of batteries, such as reusing aged and worn-out EV batteries as stationary batteries, and the efficient use of cobalt and other rare resources will become increasingly important considering the sale of EVs in the future. Accordingly, various countries will continue working on the reuse and recycling of batteries, and discussions on establishing an international standard will be held.

The European Commission is proposing revisions to the EU law on batteries, which will be deliberated in the European Parliament this year for approval. The key revisions are (1) presenting carbon footprint information by labeling, (2) targets and obligations for the collection of used batteries, (3) indicating the recycling rates of rare metals such as cobalt and lithium, and (4) indicating the product durable life. Further, the proposed revision will introduce a mechanism called Battery Passport, which enables the battery lifecycle to be tracked online, for the purpose of establishing a framework for checking when the battery should be collected for reuse and recycling.

China already publishes information online regarding the manufacturing, sale, use, and recycling of EV batteries for businesses and consumers, and will continue rolling out the system. The state of California will continue discussions on setting a target to reuse 100% of its EV batteries by 2022.

In the residential/commercial sector, in 2020, various countries announced measures to encourage energy-saving renovations of buildings and switching to high-efficiency equipment to support economic recovery. This year, these measures will be put into practice. It is notable that the energy-saving renovations for buildings suggested by the EU include, alongside the conventional insulation renovations and renewal of equipment, integration of buildings with nearby renewable energy sources, the use of building materials that meet the principles for building a circular economy, and renovations that encourage the use of digital technologies. To respond to these renovations, the EU will conduct assessments using the Smart Readiness Indicator, a measure of a building's ability to adapt to advanced technologies, smart appliances installment, and its performances to cope with energy flexibility. Also, the EU will make preparations for revising regulations related to building materials.

This year, the United Kingdom will formulate the Heat and Buildings Strategy for buildings, which are an important part of the UK's Green Industrial Revolution, and will continue to implement measures to improve the energy efficiency of new buildings and replace inefficient boilers with heat pumps for electrification.

II-4. Renewable Energies

Yoshiaki Shibata, Senior Economist, Manager
New and Renewable Energy Group
Electric Power Industry & New and Renewable Energy Unit

In the first half of 2020, the global spread of Covid-19 disrupted supply chains and caused delays in securing labor, particularly in China, slightly slowing down the installation of new renewable capacity worldwide. These roadblocks were gradually resolved in the second half, and the speed of installation is expected to return to normal in 2021 as interrupted projects are restarted. Various countries, particularly in Europe, released post-Covid economic recovery plans that set renewables at the center (green recovery), and many countries and companies pledged to become carbon neutral by 2050. Japan, too, suffered delays in the construction of non-residential solar PV plants due to Covid-19 but the situation is expected to normalize in 2021. There is now even more attention to making renewables a main power source for Japan after Prime Minister Suga announced a target of achieving net-zero GHG emissions by 2050.

However, many problems must be solved for renewables to become a major power source. Among them is the FIP system whose detailed design is being discussed by a government council. Under the FIP system, the premium is determined by the difference between the benchmark purchase price of renewable energy decided through bidding, etc. and the market reference price set based on the market price of electricity. Adopting an hourly market reference price would cause the premium to change every hour, making the FIP system almost the same as the FIT system. This would enhance the predictability of profit for renewable energy operators, but not incentivize them to shift generation to peak hours when the market price of electricity is high. Meanwhile, setting a fixed market reference price for one year, for example, would make the premium almost constant, making the profits of renewable energy operators unpredictable because their profits would be linked directly to the market price of electricity. To make profits predictable for operators while incentivizing them to shift generation to peak hours despite the high market electricity prices, the key is to set the market reference price appropriately. Attention must continue to be paid to the system design being discussed by the council ahead of the launch of the system in April 2022.

As for the cost of renewable energy, the average bid price for the sixth bid for large-scale solar PV released in November 2020 was 11.48 yen/kWh, sharply down from 19.64 yen/kWh in the first bid held in 2017. However, this is still twice as high as international levels. It is necessary to consider measures to slim down the multi-layered supply chain, simplify installation procedures, and shorten the construction period.

As for offshore wind power, roughly 18 GW are undergoing environmental assessment as of June 2020 and are expected to start operations in a few years. Under the New Offshore Use Act for Offshore Wind Projects enacted in April 2019, the public invitation and selection of operators is currently under way for the project located off the coast of Goto City, Nagasaki Prefecture, with the selection result to be announced in June. The purchase price for this project is 36 yen/kWh, but the maximum bidding price has been lowered to 29 yen/kWh for subsequent projects in the three zones near Akita Prefecture and one zone near Choshi, Chiba Prefecture. Nevertheless, even greater cost reductions are required.

The points of focus in 2021 include, in addition to the FIP system and further reduction of renewable energy costs, the government council's discussions on enhancing "Connect and Manage" to ease grid connection constraints for renewables, as well as the NEDO demonstration tests under way in Namie, Fukushima and Yamanashi for utilizing renewable hydrogen in Japan, which is necessary in the long run.

II-5. Nuclear Power

Tomoko MURAKAMI, Senior Economist, Manager
Nuclear Energy Group, Strategy Research Unit

As of December 2020, out of the 36 reactors in Japan including those under construction, nine plants have restarted after completing the Nuclear Regulation Authority's safety assessment in accordance with the new regulation standards, seven have acquired a reactor installation and modification permit, 11 are undergoing a safety assessment, and nine have yet to apply for assessment.

Various factors determine whether a plant will operate or shut down. One technical factor is when the grace period for the plant's specialized safety facilities (SSFs) expires. The grace period was set in 2015 and allows plants to operate for five years without having completed their SSFs, provided that they have obtained a construction permit in accordance with the new regulation standards. Beyond the five-year period, plants cannot operate until these SSFs are completed. The grace periods will start to expire in 2021 for construction permits that were obtained in 2016 and later.

Further, another major factor that determines the operation or shutdown of a plant is court decisions such as a provisional injunction to shut down a plant or to cancel an installation permit. Such court decisions are even harder to predict than the NRA's assessment results for a power company. The predictability of power companies' business is facing various challenges, and the moves of nuclear operators must be closely watched in 2021.

In the international nuclear power market, the activities of nuclear exporters, such as Russia, and emerging countries continue to deserve attention in 2021. In the liberalized markets of the US and Europe, meanwhile, reactors are expected to be decommissioned due to low profitability, and so the world's nuclear power capacity is expected to remain flat or slightly decline.

2020 saw significant action in the siting of a high-level waste (HLW) disposal facility in Japan and overseas. On November 17, 2020, literature surveys, which are the first phase for selecting a site, began at Hokkaido's Suttsu Town, which applied at its own initiative, and at Kamoenai Village, also in Hokkaido, which accepted the government's request. According to the Nuclear Waste Management Organization of Japan (NUMO), the entity in charge of the HLW project, the survey period including the preliminary investigation (second phase) and detailed investigation (third phase) is expected to take around 20 years; the outcome of the selection process is expected around 2040. The start of the selection process, which finally began after the Designated Radioactive Waste Final Disposal Act was legislated in 2007, should be closely watched.

Prior to the start of literature surveys in Japan, in October 2020, the city council of Sweden's Östhammar voted to approve the hosting of an HLW disposal facility. Östhammar City has been studying and discussing the HLW disposal issue for 25 years after accepting a request by the Swedish Nuclear Fuel and Waste Management Company (SKB) for a feasibility study as the first step of the site selection process in 1995. The parties in charge and power companies need to make steady efforts, bearing in mind that accepting a nuclear facility takes a very long time.

II-6. Hydrogen and Carbon Recycling

Yoshikazu Kobayashi, Senior Economist
Planning & Administration Unit

As efforts for carbon neutrality gain steam around the world, 2020 was a year in which hydrogen received global attention as a clean energy, with major countries and regions including the US, the EU, Germany and Australia announcing strategies and plans for introducing hydrogen one after another. Japan is also conducting demonstration tests on green hydrogen in Fukushima and Yamanashi Prefectures, with technological assessments toward commercialization scheduled for 2021 onwards. Regarding the establishment of an international hydrogen supply chain, hydrogen was successfully transported from Brunei as cyclohexane and from Saudi Arabia as blue ammonia in 2020 (we participated in the latter), and demonstration tests were conducted for both. The potential of various hydrogen supply sources is now emerging, with plans to transport brown coal-sourced liquefied hydrogen from Australia in 2021. Regarding fuel ammonia, a public-private council for introducing fuel ammonia was established in October 2020 under the auspices of the Agency for Natural Resources and Energy, and efforts will accelerate aiming to supply 3 million tonnes of fuel ammonia per year by 2030.

Though a major challenge for the auto industry, restrictions on the sale of new gasoline-only vehicles are expected to boost the demand for hydrogen in the transportation sector. Reports emerged in December 2020 that the Ministry of Economy, Trade and Industry is considering a ban on the sales of gasoline-only vehicles from the mid-2030s, after which the Governor of Tokyo, Yuriko Koike, unveiled a policy to end the sales of gasoline-only cars by 2030. Problems such as price and fuel supply infrastructure have been pointed out regarding accelerating the spread of fuel-cell vehicles, but these policies of the central and regional governments should help the spread of these vehicles going forward.

To establish a hydrogen energy society in which hydrogen is a main fuel, it is essential to introduce blue hydrogen, which is produced from fossil fuels using CCS, alongside green hydrogen made with renewable electricity. Meanwhile, many existing CCS projects are part of efforts to enhance the recovery of oil from oil fields. Therefore, there has been little progress on introducing CCS for storage, despite the high expectations for blue hydrogen. Major challenges for CCS in 2021 include accelerating public-private efforts and international cooperation for the wider use of CCS, and establishing standards and certification systems for appropriately evaluating the environmental value of blue hydrogen that uses CCS.

Regarding carbon recycling, Prime Minister Suga noted in his first policy speech in October 2020 that the technology is essential for reaching net carbon neutrality, and that technological development is expected to make progress going forward. Carbon recycling spans various technological areas including use as a material for chemical products, fuels, and mineralization, but what would significantly reduce emissions is using the technology for producing fuels to replace existing fossil fuels and for concrete curing. In this respect, the aviation industry has recently started introducing bio-based fuels and fuels produced by fermentation, and such fuels are expected to be used even more widely in future.

Past IEEJ Events

Energy and Economy 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, Managing Director**
IEEJ j-Newsletter **Editor: Ken Koyama, Senior Managing Director**
The Institute of Energy Economics, Japan (IEEJ)
Inui Bldg. Kachidoki, 13-1 Kachidoki 1-chome, Chuo-ku, Tokyo 104-0054, Japan
Tel: +81-3-5547-0211 Fax: +81-3-5547-0223