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Japan

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Overview of the current energy mix, and the place in the market of different energy sources

The Japanese government enacted the Sixth Fundamental Energy Plan in October 2021, setting the following percentages for power generation mix in 2030: 36–38% renewables; 1% hydrogen and ammonia; 20–22% nuclear; 20% natural gas; 19% coal; and 2% oil. The breakdown of the 36–38% total for renewables is 11% hydro, 14–16% solar, 5% wind, 1% geothermal, and 5% biomass.

In comparison, power generation mix in 2021 was composed as follows: 7% nuclear power; 34% natural gas; 31% coal; 7% petroleum; and 20% renewables, made up of 7.5% hydro-power, 8.3% solar power, 0.9% wind power, 0.3% geothermal power, and 3.2% biomass.

There is no change in the direction of the government, including the composition of the power generation mix shown in the Sixth Fundamental Energy Plan.

Changes in the energy situation in the last 12 months that are likely to have an impact on future direction or policy

Long-term decarbonised power resource auction

This is a bidding system for new investments in decarbonised power resources. The bidding system implements bidding for mixed types of power resources. The successful bidder receives the advantage of predictable long-term income for the recovery of a large initial investment, by making capacity revenue with a fixed cost level, in principle, earned over 20 years.

It is positioned as a type of capacity market, as it provides the predictability of long-term income by making the period for obtaining capacity revenue multiple years rather than a single year. The first auction is scheduled to be conducted in FY 2023.

The bidding system targets new investments in the construction and replacement of decarbonised power resources, and the renovation of existing thermal power plants for decarbonisation. The targets include storage batteries and thermal power generation by mono-firing and co-firing of hydrogen and ammonia.

In FY 2023, the total of the initial auction for decarbonised power resources is 4GW on a bid-volume basis, projects for the renovation of existing thermal power plants (co-firing of ammonia and hydrogen and mono-firing of biomass) is 1GW, and the sum of storage batteries and pumped hydropower is 1GW.

Although, in principle, the minimum bidding volume is 100MW, the minimum bidding volume is reduced to 10MW for storage batteries and to 50MW for renovation projects for mono-firing and co-firing of ammonia and hydrogen in existing thermal power plants, and

new construction and replacement projects for mono-firing and co-firing of hydrogen and ammonia are considered 100MW.

The business operator bids at a price that contributes to the recovery of the investment, and a maximum bid price is set for each auction. A multiple-price method is adopted, whereby the winning bid price for the power resources is the contracted price. As a general rule, power resources are awarded in priority order, by lowest bid price.

After the bid, the bid price is monitored by the Electricity and Gas Market Surveillance Commission. Monitoring requires the submission of contracts, estimates, etc., as well as an explanation of the methods and grounds for calculating bid prices.

The deadline for starting capacity supply for the storage battery projects is the end of the fiscal year four years after the date of the contract to be executed in relation to the successful bidding, and the deadline for the installation, replacement, and renovation of new projects involving mono-firing and co-firing of hydrogen and ammonia is the end of the fiscal year 11 years after the date of the contract to be executed in relation to the successful bidding (for projects that have implemented an environmental impact assessment pursuant to applicable laws or ordinances, the deadline is the end of the fiscal year seven years after the date of the contract to be executed in relation to the successful bidding). If the deadline for starting capacity supply is exceeded, the period during which the bid price can be received will be reduced by a period equal to the excess period. During that excess period, the award price for the current capacity market shall be the capacity revenue. In addition to this and the current capacity market requirements, unique requirements and penalties are established for the long-term decarbonised power resource auction.

The successful bidder executes a capacity securing agreement with the Organization for Cross-regional Coordination of Transmission Operators, and is paid the amount of the capacity securing contract. Capacity contributions paid by electricity retailers, etc., will be used as financial resources to cover the amount of the capacity securing contract. Fixed-cost equivalents are paid over 20 years.

The long-term decarbonised power resource auction is expected to be utilised in future project finance for storage batteries and thermal power plants that operate by mono-firing and co-firing of hydrogen and ammonia.

Hydrogen and ammonia

In 2017, Japan formulated the “Basic Hydrogen Strategy”, the world’s first national hydrogen strategy, and by 2022, 26 countries and regions, including Japan, had formulated a hydrogen strategy. Five years have passed since the establishment of the Basic Hydrogen Strategy, during which time we have witnessed two landmark events. The first is Japan’s declaration on carbon neutrality by 2050. The Sixth Fundamental Energy Plan, which was revised based on this declaration, states that approximately 1% of the power generation mix for FY 2030 will be covered by hydrogen and ammonia. Hydrogen and ammonia are positioned to play a role in the future of Japan’s energy supply. The second is Russia’s aggression against Ukraine in February 2022. Consideration is being given to building a large-scale and resilient supply chain for hydrogen and ammonia, and to supporting the development of supply infrastructure.

In view of Japan’s energy demand, while there is a limit to the expansion of the domestic hydrogen market, the Basic Hydrogen Strategy has been revised on the grounds that it is necessary while keeping in mind the incorporation of overseas markets, in light of the fact that the market is spreading at once, with the global hydrogen market expected to generate annual revenues of USD 2.5 trillion and job creation of 30 million people by 2050.

In this strategy, in addition to the country's overall policy on hydrogen policy, the "hydrogen industry strategy", which is a new policy for strengthening the industrial competitiveness of hydrogen, and the "hydrogen safety strategy", which is a policy for the safe utilisation of hydrogen, will be incorporated as important pillars. The strategy is to be reviewed at an appropriate time, within roughly five years. Ammonia and synthetic fuels are also subject to this strategy.

With the situation in Ukraine and the global energy crisis, countries are making huge investments in hydrogen. As a country with advanced hydrogen technology, Japan is calling for the transition to low-carbon hydrogen, and it is urgently proceeding with the development of a pioneering system, leading Asia in integrated forms of regulation and support.

Specifically, the development of a system for building a large-scale and resilient supply chain is under consideration. The scheme is to provide long-term support (in part or in whole) for the difference between the base price (the price at which it is expected to earn a reasonable return while recovering the cost of business continuity) and the reference price (the equivalent price of existing fuel) for hydrogen and ammonia supplied by a business operator (the first mover), in which the business operator invests, taking its own risks ahead of other business operators, and starts supplying low-carbon hydrogen and ammonia in Japan by around 2030. At present, public-private investment in the supply chain is projected to exceed JPY 15 trillion in 15 years.

In addition, support for the development of supply infrastructure, such as tanks and pipelines, will be provided in order to create large-scale demand and realise an efficient supply chain that enables stable and inexpensive supplies of hydrogen and ammonia and encourages internationally competitive industrial clusters.

Developments in government policy/strategy/approach

Basic policy for the realisation of GX

In February 2023, the basic policy for the realisation of the Green Transformation ("GX") was formulated based on the Sixth Fundamental Energy Plan. The transformation of fossil energy-centric industrial and social structures to clean energy-centric, which is the concept behind GX, represents a major shift in post-war industrial and energy policies.

GX aims to reduce greenhouse gases by 46% by FY 2030 and fulfil the 2050 carbon-neutral international pledge. At the same time, the policy for the next 10 years is set with a view to realising a shift in the energy supply-demand structure that will lead to a stable and inexpensive energy supply.

One of the policies is to make renewable energy a major power source, while mitigating the burdens on private citizens and seeking harmonious coexistence with local communities. It aims for steady growth to achieve a level of 36–38% renewable energy in the power generation mix by FY 2030, based on the premise of S+3Es (Safety, Energy security, Economic efficiency, and Environment).

In addition, nuclear power generation, which does not emit CO₂ and is stable in terms of output, contributes to the realisation of carbon-neutral and stable energy supplies; in the 2030 power generation mix set forth in the Sixth Fundamental Energy Plan, the percentage of power generated by nuclear energy sources is 20–22%. To advance this goal, while making safety a top priority, Japan is proceeding with the reopening of nuclear reactors that have passed a safety review by the Nuclear Regulation Authority and have gained the understanding of local communities.

In addition, hydrogen/ammonia, which can be co-fired with fossil fuels, is expected to reduce CO₂ emissions from thermal power generation and support the transition period toward carbon neutrality. In order to build a large-scale and resilient supply chain domestically and internationally, consideration will be given to increasing the predictability of businesses, focusing on differences in prices compared to existing fuels.

In addition, in order to improve the business climate for the commencement of carbon capture and storage (“CCS”) projects by 2030, the development of legislation that takes into account the business risks and safety associated with the storage of CO₂ underground will be accelerated.

Developments in legislation or regulation

Consideration of a CCS law system

In March 2023, the council of the Ministry of Economy, Trade and Industry (“METI”) published a report regarding the CCS Business Act (tentative name).

In order to smoothly implement CCS projects, it is necessary to include certain businesses in the value chain, from the separation and capture of carbon dioxide to the underground storage in the range of the law.

In addition to underground storage businesses, which are key to CCS business, transportation businesses (pipelines, ships, and tank trucks) and separation and capture businesses are considered appropriate targets for coordination.

In particular, it is necessary to pay attention to the fact that, for the time being, the number of companies with knowledge and technology on underground structures is limited, and natural monopolisation is likely to occur in underground storage businesses.

There are many issues relating to the CCS legislation, and further consideration is required.

Revision of the Act on Special Measures Concerning Promotion of Utilization of Electricity from Renewable Energy Sources

The Law for Partially Amending the Electricity Business Act and Other Acts to Establish an Electricity Supply System to Achieve a Decarbonized Society was promulgated on June 7, 2023, and will come into force on April 1, 2024. Article 4 of the Act partially revises the Act on Special Measures Concerning Promotion of Utilization of Electricity from Renewable Energy Sources (“Renewable Energy Special Measures Act”).

The specific contents of the amendment are as follows:

- (1) In the event that a renewable energy power generation facility satisfies the requirements specified by an Ordinance of METI with regard to output and other matters, the renewable energy power generation business plan must record that an explanatory meeting has been held for residents in the area surrounding the site where the renewable energy power generation facility will be located, along with a description of the state of implementation of other measures, as specified in an Ordinance of METI, in order to resolve the lack of communication with, and address the concerns of, the region. Implementation of the measures will be a requirement for certification of the business plan.

The METI council materials state that explanatory meetings are required for certification of the business plan of large-scale power sources, and will serve as a preliminary method of notification for the relevant local community. For small-scale power sources, measures such as prior installation of signs containing certain items, such as the content of business plans, posting them on the websites or in the leaflets of business operators, or publicising them in advance, are being considered, and may be requirements for

certification of the business plans of those smaller operators. Methods of preliminary notification of briefings and the contents of common requests for briefings are being considered, and also may be set forth in the Ordinance of METI and the Guidelines.

- (2) The Act also states that a certified business operator shall carry out the power generation business in accordance with the certified business plan, and that if the business related to the power generation business is to be consigned, necessary and appropriate supervision of the consignee shall be carried out so that the power generation business is carried out in accordance with the certified plan.

According to the METI council materials, the certified business operator's responsibility under the current system when a consignee violates the certified plan is unclear. Thus, the purpose of the Act is to clarify this responsibility in the text of the statute. A guideline establishing the matters to be included in the contract between the certified business operator and the consignee (e.g., a periodic reporting system, prior consent of the certified business operator at the time of re-consignment, etc.) is being considered.

- (3) As a mechanism for helping to prevent violations of laws and regulations by certified business operators, or to resolve any violations promptly, it was decided that if a certified business operator violates its certified plan, it will be subject to a new obligation to reserve funds, based on a reserve order, that will suspend the payment of the FIT/FIP premium. In addition, an obligation to set aside reserve funds for decommissioning, which is being imposed from the perspective of securing costs for proper decommissioning of facilities, will be imposed separately from this measure.

If the Minister of METI rescinds a certified business plan due to non-compliance, the certified business operator shall return an amount equal to the whole or part of the total FIP premium subsidies obtained.

- (4) With the aim of encouraging the renewal and expansion of solar panels, the current legislation states that when the output increases, the procurement price or standard price of the power generation facility shall be adjusted in its entirety to the latest price, in order to prevent an increase in the burden on the public. However, under the new Act, when there is an expansion or partial renewal of a power generation facility that is specified by an Ordinance of METI, and when an application for certification of changes to the certified business plan is filed, the portion of the application relating to the existing facility and the portion relating to the expansion may be stated separately. If the change is certified based on this distinction, the standard price or procurement price for the existing facility shall be deemed to fall within the prior and existing category of delivery target or procurement target, and the procurement price or standard price is calculated using the method specified in an Ordinance of METI, based on the procurement price or standard price of the existing portion and the part relating to the expansion.

- (5) The following is not included in the amendment to the Renewable Energy Special Measures Act but will be established by an Ordinance of METI.

The current law does not require the acquisition of approvals and licences for various related laws and regulations at the stage of application for certification of the business plan. However, there have been cases in which compliance with the relevant laws and regulations has not been carried out thoroughly, although a pledge to comply with the relevant laws and regulations is a required part of the form for application for certification. The following types of land development-related licences that may directly affect the risk of disasters are particularly closely related to the safety of the surrounding area, and it is extremely difficult to restore the land to its original state once the actions

subject to the licence have been conducted. Therefore, it is necessary to enforce the procedures for the certification strictly, for example, by requiring the acquisition of licences to apply for FIT/FIP certification:

- (a) Forest land development permit under the Forest Act.
- (b) Permission under the Act on Regulation of Residential Land Development and Specified Embankments.
- (c) Permission under the Erosion Control Act, Landslide Prevention Act and Act on Prevention of Disasters Caused by Steep Slope Collapses.

All renewable energy generation facilities located in areas where it is necessary to obtain approvals and licences above will be required to obtain the relevant approvals and licences before applying for certification of the relevant business plan. However, approvals and licences for wind power and geothermal power generation projects that are subject to environmental impact assessment procedures based on laws or ordinances may be obtained after certification.

Revisions to METI Ordinances and guidelines to implement stricter certification procedures are being considered, with a certain period in place to allow for public awareness, in order to implement them promptly. Further approvals and licences may be added.

Generation charge

According to an interim report by the METI council, a generation charge is scheduled to be introduced in April 2024.

A generation charge is part of the cost necessary for maintenance and expansion of the transmission and distribution facilities, in order to utilise and expand the utility grid efficiently and reliably for the introduction and expansion of renewable energy; this charge is borne by electricity generation utilities, which are users of the utility grid together with consumers.

Under the current wheeling charge system, the cost of grid enhancements associated with the introduction of renewable energy power sources is borne by consumers in the relevant area, through wheeling charges imposed on electricity retailers in that area. However, after the introduction of the generation charge, the electricity generation utility will bear part of the cost of expansion of the utility grid, and by adding an amount equivalent to that generation charge to electricity charges, it will be possible for consumers who purchase electricity from the relevant electricity generation utilities to bear the cost.

The chargeable target of the generation charges is basically all power sources connected to the grid and having reverse power flow to the grid. This will be done from the perspective of benefit and burden, so as not to give an advantage or disadvantage to a specific power source. The generation charge will be carried out by two methods: a kW-based charge; and a kWh-based charge.

The METI council is discussing how to pass on generation charges from electricity generation utilities to electricity retailers, and is considering formulating guidelines for this purpose, to ensure that the utility grid will be utilised efficiently and expanded steadily, by passing on the charges to electricity retailers (as part of the electricity generation charge) and then passing the cost on to consumers.

Some corporate power purchase agreement contracts also contain provisions for the introduction of a generation charge, and some agreements have been reached that require the consumer to bear costs equivalent to the generation charges incurred by the electricity generation utility.

Judicial decisions, court judgments, results of public enquiries

An example of a recent conflict with a neighbourhood in which there are solar power plants involves the problem of reflected light by solar panels.

In the case of wind power plants, there has been a dispute between the construction company for offshore wind power generation facilities and the fishermen who opposed it. Since fishery rights are property rights, and are regarded as real rights, it is possible to institute a lawsuit against infringement of these rights, such as the exercise of the right to eliminate obstruction and the right to prevent obstruction, and the right to claim compensation for damages in tort. There are cases in which an injunction on construction work has been requested.

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