

THE ENERGY
REGULATION
AND MARKETS
REVIEW

NINTH EDITION

Editor
David L Schwartz

THE LAWREVIEWS

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PREFACE

In our ninth year of writing and publishing *The Energy Regulation and Markets Review*, the most pressing global concerns have revolved around the covid-19 pandemic. Accordingly, many of our contributing authors have emphasised concerns associated with the effects of the crisis on energy demand and consumption, and delays in the development of infrastructure. Beyond this crisis, we have seen many other significant geopolitical changes that have added uncertainties to global energy policies. For example, oil prices have hit record lows, which has slowed exploration and production efforts, and has threatened economic stability for countries that depend upon oil revenues. The United Kingdom is now within its 11-month transition period to exit from the European Union (a process known as Brexit), creating uncertainties regarding the future of the UK's energy policies and its coordination and cooperation with the European Union, including with respect to commitments to reduce greenhouse gases (GHGs). The Trump administration's 'America First' trade policies have continued to alienate US allies and historical trading partners. Despite its withdrawal from the Paris Agreement and expressions of support from the Trump administration for the coal industry, the United States has continued its extensive investment in renewable generation resources. The 2011 Fukushima nuclear incident continues to affect energy policy in many countries. Finally, there are continued efforts to liberalise the energy sector globally.

I CLIMATE CHANGE DEVELOPMENTS

Despite the US withdrawal from the Paris Agreement, we continue to see significant carbon reduction efforts globally, including increased use of renewable resources, and measures to improve energy efficiency and reduce demand.

In the United States, despite the Trump administration's support for the US coal industry, coal and other aged fossil fuel plants are retiring at an unprecedented rate. Additionally, many states have pushed for the procurement of thousands of megawatts of renewable resources, including from new offshore wind development projects on the east coast. However, the US Bureau of Ocean Energy Management has delayed granting approvals for offshore wind projects, and the Federal Energy Regulatory Commission has imposed regulatory restrictions on the ability of state-subsidised renewable energy projects to clear in the regional capacity markets through a minimum offer price rule to mitigate buyer market power.

The European Union issued a revised Renewable Energy Directive, which will take effect in 2021, targeting 32 per cent renewable consumption by 2030. Despite continued efforts to follow through on Brexit, the United Kingdom's renewable energy targets already exceed those of the European Union. France is seeking to double its wind and solar capacity and President Macron has announced a goal to close the remaining coal plants by 2022.

Italy had previously targeted a 28 per cent reliance on renewable energy by 2030 but is now working to reach the 32 per cent target adopted by the European Union. Belgium has continued its significant offshore wind procurement efforts, and is seeking to reduce subsidies in future procurements. In Denmark, renewables already constitute 40 per cent of electricity consumption and the aim is to have all energy demand met by renewables by 2050. Germany will not meet its goal of reducing emissions by 40 per cent by 2020, or its goal to reduce energy consumption by 20 per cent as compared with 2008, but remains focused on the continued development of renewable generation, energy efficiency and conservation, as well as energy storage technologies. Poland has been struggling to meet the European Union renewable energy targets but has plans to develop offshore wind generation.

Japan has continued its efforts to develop solar and wind resources, including opening new sea areas for offshore wind. But the shutdown of most of its nuclear generation has resulted in a significant reliance upon natural gas, including liquefied natural gas, and reductions in renewable energy prices has caused a slowdown in new solar and wind development. China continues to have ambitious renewable energy goals, capping energy from coal generation to an amount equivalent to 5 billion tonnes and aiming to have 15 per cent of generation supplied by non-fossil fuel generation. Korea aims to generate 20 per cent of its power needs from renewable energy and has committed to cut GHGs by 37 per cent by 2030.

This year, Australia has reached almost 20 per cent reliance on renewable energy resources, including significant amounts of energy storage capacity (battery and pumped water) and South Africa increased its renewable independent power procurement efforts, with a goal of producing 17,800MW of renewable energy by 2030.

The United Arab Emirates aims to reduce its carbon footprint by 70 per cent by relying on 50 per cent renewable energy by 2050, and Abu Dhabi is seeking to reduce electricity consumption by 22 per cent by 2030. In Brazil, hydroelectric resources already constitute more than 60 per cent of its installed generation capacity, and efforts continue to increase wind and solar generation as the cost of renewable generation has decreased. Colombia has significant renewable energy resources and recently completed its first auctions for renewable projects, with 1,398MW awarded and installed.

II INFRASTRUCTURE DEVELOPMENT

For many countries, a reliable energy supply remains the primary concern, regardless of fuel source. As only 35 per cent of Myanmar is connected to the grid, there are continued efforts to electrify remote parts of the country. Lebanon is hoping to solicit bids for the development of 890MW on floating barges to increase electricity supply. Panama and Colombia continue to seek foreign investment.

South Africa is utilising its Integrated Resource Planning process with a goal of doubling its generation and transmission capacity by 2030. Australia is developing the Snowy Hydro Project, which, at 2,000MW, will be one of the largest pumped hydroelectric storage projects in the world. Colombia is developing a large hydroelectric project that is expected to produce up to 17 per cent of the country's energy needs, but that effort is hindered by construction delays.

In its eighth licensing round for oil and gas exploration in the North Sea, Denmark received five new applications, but owing to political pressure relating to GHGs, Denmark has put this licensing round on hold indefinitely.

III NUCLEAR POWER GENERATION

Nine years after the Fukushima disaster, Japan has stopped operations at all but nine of its 48 nuclear power stations, and 11 nuclear power stations are in the process of being reviewed for restart under Japan's new stringent safety standards. Germany continues efforts to phase out all nuclear generation by 2022, and Belgium's nuclear plants have often been offline for maintenance for technical issues in the past few years. France was seeking to eliminate nuclear generation by 2025 but has extended that date to 2035. South Korea has continued its efforts to phase out nuclear power (replacing nuclear plants with new renewable facilities over time). South Africa's nuclear ambitions appear to be on hold at least until 2030.

However, the phasing out of nuclear energy is not universal. The United Arab Emirates' new 5,600MW Barakh nuclear power station is almost complete and one of its units is already operational. When all units are on-line, Barakh will supply 25 per cent of the emirates' electrical needs. Poland still intends to explore the development of nuclear power in the future. In the United States, even though the early retirement of certain nuclear plants has been driven by cost and power market considerations (rather than safety concerns), some states have passed legislation to subsidise nuclear energy to allow owners to continue to operate through zero emissions credit programmes, including Illinois, New York, New Jersey and Ohio, with similar legislation being considered in Pennsylvania.

IV LIBERALISATION OF THE ENERGY SECTOR

We have seen significant energy sector regulatory reforms in many countries. The European Union has sought to continue efforts to centralise the regulation of the EU energy sector. France has taken significant steps towards further liberalisation of its energy sector. Japan has fully liberalised its electricity and gas sectors and is encouraging market entry. Australia has opened access to transmission through regulatory reforms to encourage entry into the generation market and is undertaking significant energy market reforms to send more accurate price signals to market participants. Brazil continues its efforts to implement net metering regulations this year. China has reduced subsidies for renewable energy, prices transmission and distribution rates based upon a cost-plus regulatory methodology, and has implemented a market-priced mechanism for pricing coal-based generation. The United Kingdom has implemented a competitive tender process for the development of offshore transmission. In the United States, while states have continued to subsidise nuclear and renewable generation, the Federal Energy Regulatory Commission has permitted regional markets to implement minimum offer price rules to combat buyer-side mitigation in an effort to maintain competitive capacity markets.

I would like to thank all the authors for their thoughtful consideration of the myriad interesting, yet challenging, issues that they have identified in their chapters in this ninth edition of *The Energy Regulation and Markets Review*.

David L Schwartz

Latham & Watkins LLP

Washington, DC

May 2020

JAPAN

Reiji Takahashi, Norifumi Takeuchi, Wataru Higuchi, Kunihiko Yokoi, Keisuke Hayashi and Kei Takada¹

I OVERVIEW

Japan is a country with limited natural energy resources and, as such, energy legislation can essentially be divided into that concerning electricity and gas, respectively.

Given the high level of public interest attached to the provision of electric utilities, certain market entry regulations have long been in place. However, because of the Great East Japan earthquake and the subsequent accident at the Fukushima Daiichi nuclear power plant, both in 2011, government energy policy has been undergoing vast and rapid structural change. As of 23 March 2020, all but six nuclear power plants are currently under suspension in Japan and other measures to secure alternative resources (including increasing the supply of renewable energy sources and traditional thermal power), conserve existing energy supplies and increase local energy production have been discussed concurrently with a review of the current industry regulations. As a result, the current legislation is in a transitional phase.

There are three headline changes affecting the regulation of electricity markets. First, under the Electricity System Reform programme, entry into the electricity retail business was fully liberalised as of 1 April 2016. In preparation for this, a new regulatory authority for monitoring the new liberalised market was established in 2015. Second, the legal unbundling of the electric power transmission function and sector from the existing dominant power suppliers was implemented on 1 April 2020. In addition to these two changes, feed-in tariffs (FITs) were introduced in 2012 and the renewable energy market has expanded rapidly since then. In response, the FIT system has been continuously revised to address several problems.

The gas industry in Japan can be divided into two major enterprises: the town gas industry, which is the primary source of natural gas to consumer residences through piping, and the liquefied petroleum gas (LPG) industry, which provides LPG via cylinders to consumers in areas where piped gas is not yet available. Significant reform liberalising the town gas retail business was implemented on 1 April 2017. As a result, subcategories of the town gas-related business was reorganised and entry into the retail gas business has been relaxed (i.e., only registration is required). Entry into the LPG industry requires registration with the relevant authority, and the prices for the provision of LPG may be freely set by the provider.

¹ Reiji Takahashi, Norifumi Takeuchi, Wataru Higuchi and Kunihiko Yokoi are partners and Keisuke Hayashi and Kei Takada are associates at Anderson Mōri & Tomotsune.

II REGULATION

i The regulators

The energy industry in Japan, which encompasses electric power, gas and other energy resources, is regulated by the Ministry of Economy, Trade and Industry (METI) or, more specifically, the Ministry's Agency for Natural Resources and Energy and the Electricity and Gas Market Surveillance Commission. The Ministry of Economy, Trade and Industries Establishment Act grants the METI jurisdiction over various matters, including comprehensive policies in relation to energy and mineral resources and the securing of the stable and efficient provision of gas, electric power and heating to Japan. In addition to these matters, comprehensive policies in relation to energy and mineral resources and the securing of the stable supply of energy are handled by the Ministry's Agency for Natural Resources and Energy, and the monitoring of the liberalised electricity markets, as well as compliance with a code of conduct for network sectors, is handled by the Electricity and Gas Market Surveillance Commission.

The Organization for Cross-regional Coordination of Transmission Operators (OCCTO) is an independent organisation constituted by all the electricity business entities pursuant to the Electricity Business Act (EBA). OCCTO's remit is to monitor the electricity supply–demand balance and frequency, and order electricity business entities to supply electricity to other electricity business entities. OCCTO has the power to instruct or recommend electricity business entities to ensure stable electricity supply, subject to Article 28-40, Item 6 of the EBA.

Other government agencies regulate certain aspects of the energy industry in Japan, including the Ministry of Environment, the Nuclear Regulation Authority and relevant local governments.

Main sources of law and regulation

The EBA is the main source of legislation regulating businesses involved in the generation, transmission and distribution, and sale of electric power. In addition, the Electricity Business Act Enforcement Orders and the Ordinance for Enforcement of the Electricity Business Act further provide detailed regulations for the enforcement and governance of the system provided under the EBA. A number of relevant orders and ordinances ruling the generation, transmission and sale of electricity have also been enacted.

As regards nuclear power, regulation is provided in the Atomic Energy Fundamental Act, the Act on Compensation for Nuclear Damage and other specialised legislation.

The Gas Business Act (GBA) is the primary source of legislation regulating businesses involving town gas. In addition, the Gas Business Act Enforcement Orders and the Ordinance for Enforcement of the Gas Business Act further provide detailed regulations for the enforcement and government of the system provided under the GBA.

The primary source of legislation regulating businesses involving LPG is the Act Concerning the Securing of Safety and the Optimisation of Transaction of Liquefied Petroleum Gas (the LP Gas Act). In addition, the LP Gas Act Enforcement Orders and the Ordinance for Enforcement of the LP Gas Act further provide detailed regulations for the enforcement and government of the system provided under the LP Gas Act.

ii Regulated activities

Electricity

After the Fukushima incident in 2011, the Japanese government decided to undertake significant reform of the energy regulation system. Prior to the new EBA (which came into effect on 1 April 2016), licences for electricity businesses were required when the intended activities fell within one of five categories, and only 10 prominent regional companies (which used to be categorised as general electricity utilities) were allowed to supply electricity to general consumers and businesses (low-voltage electricity) in their respective markets. However, the amendment to the EBA to liberalise the entire retail electricity market has streamlined regulated electricity business into just three categories (i.e., electricity retail businesses, generation businesses, and transmission and distribution businesses) to adjust to the liberalised retail market and promote a level playing field for competition between the general electricity utilities and other electricity business entities.

Electricity retail business

A company running an electricity retail business (the sale of electricity to general and large-scale consumers and businesses) is required to be registered by the METI. For a company to be registered as a retail company, it is first required to become a member of OCCTO. Then an application document must be filed with the METI. The METI and the Electricity and Gas Market Surveillance Commission will then examine the application. An application for the register will be accepted unless the business entity's activities are found to comply with certain negative requirements, including a lack of ability to procure electricity to respond to the maximum demand of its customers and being unable to properly operate an electricity retail business. In anticipation of the market liberalisation, many retail entities have entered this new market with various types of electricity price plans. As of 24 March 2020, 646 entities are registered as retail companies.

Following the liberalisation of electric power generation and of retail sectors, there are new plans for electricity fees. The liberalisation has also led to promotion of further competition among electricity suppliers, fairness between consumers, and development of the electric power market.

Electricity generation business

Companies that generate and supply electricity in excess of 10,000kW to retail companies are required to register with the METI to commence their generation business. They are also required to apply for membership of OCCTO before filing their registration. Under the old regulation structure of the EBA, independent power producers did not need approval or to file for the commencement of their generation business (provided they filed the price and met the other required terms of the supply of electricity), but under the new EBA, generation business entities are required to file their generation business and are also subject to certain obligations. For example, generation companies are required to submit a plan stating the amount of electricity generation that can be produced by a unit of the facilities they possess. Additionally, by a standard contract with general transmission and distribution companies, generation business entities are required to report their estimation of supply for the next 30 minutes.

Electricity transmission and distribution business

The electricity wheeling service industry is classified into three subcategories – general transmission and distribution, transmission and specific transmission and distribution by the amended EBA – and each is covered by a different regulatory scheme. Entry to this area has not been liberalised even following the amendment of the EBA because these businesses are responsible for ensuring that all consumers have sufficient access to electricity.

The most prominent of the companies in these three categories are general transmission and distribution companies. These are business entities providing electricity wheeling services through their own transmission lines throughout their service area. Those intending to engage in the general transmission and distribution business are required to obtain approval from the METI in advance. The company must submit a business plan to the METI, which must be satisfied that the plan is feasible. Its facilities also need to be capable of meeting demand. To gain approval, the company must submit a 10-year plan, as do companies in the other two above-mentioned categories.

A transmission company supplies the electricity to general transmission and distribution companies throughout its own grid. Those intending to engage in the wheeling industry are also required to obtain approval from the METI.

In contrast to these two, specific transmission and distribution companies, which transmit electricity to a specific point, are only required to notify the METI.

OCCTO

The three types of electricity business entities are all required to be a member of OCCTO to allow the organisation to monitor and coordinate the whole electricity market. Members of OCCTO have to provide information about the amount of electricity produced by their facilities continuously. OCCTO can instruct its members to maintain a balance of electricity supply and demand in the market to ensure a stable supply of electricity to consumers.

Gas

Town gas businesses

In line with the Electricity System Reform, the amendment to the GBA, which came into effect on 1 April 2017, significantly changed the town gas regulation (called the Gas System Reform). This amendment implements full liberalisation of entry into the gas retail business, which accounts for 36 per cent of the total town gas supply as of October 2016. The amendment includes reform of the business licence categories that streamline the regulated gas business into three simple categories: gas retail business, generation business and transportation (pipeline) business.

Town gas retail business

A company operating a town gas retail business is required to be registered with the METI from 1 April 2017. Before 1 April 2017, approval from the METI was required to do business and removing this requirement is one of the main purposes of the Gas System Reform. Applications for the relevant registration involve the necessary submission of application forms in which statutorily required data, such as gas generating facility and other necessary information, are described. As in the case of an electricity retail business, an application for registration will be accepted unless the applicant's activities are found to comply with certain

negative requirements, including the lack of ability to procure gas to meet the demand of its customers and being unable to properly operate a gas retail business. In principle, the entire application and registration process will require around one month to complete.

As of 1 April 2020, the number of town gas retail business operators was 1,334. Regional monopolies have been recognised in relation to town gas retail business operators and, accordingly, the percentage of operators for the service areas in large metropolitan areas is understandably high. The share of the largest operator, Tokyo Gas (service area: Kanto region with Tokyo as its main focus), currently accounts for about 38 per cent of the market whereas the combined share of the three major corporations (Tokyo Gas, Osaka Gas and Toho Gas), providing service areas in large metropolitan areas, accounts for about 73 per cent (based on sales volume as of March 2016). The Gas System Reform aims to change the situation by furthering competition in the town gas retail business under the relaxed requirements for entry into the gas retail business.

Town gas generation business

Before 1 April 2017, a town gas generation business was not required to obtain a registration or licence, or file other documents with the METI. However, as of 1 April 2017, companies that generate town gas are required to register with the METI.

Town gas transportation business

Under the new regulation, a town gas transportation business is categorised in one of two subcategories under the new GBA: general gas transportation business or specific gas transportation business. A general gas transportation business is one that transports gas through its gas pipeline throughout its service areas. To operate a general gas transportation business, approval from the METI is required and the business is subject to certain regulations and controls by the METI, as explained below. A specific gas transportation business is one that transports gas through its gas pipeline to a specific point. Only notification to the METI is required to operate a specific gas transportation business.

The purpose of this two-tier regulation is to expand the gas pipeline network, which is established on an area basis (especially in urban areas) by separating the gas between the various networks. General gas transportation business operators now have to make their gas pipelines readily available in line with strict regulations imposed by the METI, while specific gas transportation business operators may operate their businesses without strict control by the METI.

Sellers of LPG

The LP Gas Act stipulates that the necessary registration for the sale of LPG must be obtained from the METI when intending to establish sales offices serving two or more prefectures and from the prefectural governor when catering to only one prefecture.

Registration involves the necessary submission of application forms in which statutorily required data, such as details of the sales office, gas storage facilities and other necessary information, are described. Applicants will be registered with the corresponding authority (either the METI or the prefectural governor) as long as there are no applicable statutory grounds for denial of the application.

Registrations will require 30 days to process or 15 days if the registration is applied for via the relevant authority's electronic information processing system.

As of 31 March 2019, the number of business operators that had obtained the necessary registrations and were currently engaged in the sale of LPG was 17,805. Entry barriers to this section of the industry are low and a large number of small and medium-sized businesses have been entering into the LPG industry, in which even retail rates are not regulated. While all-electric technology products were widely spread by the electric power companies to replace the use of gas, this figure is approximately one-third of when LPG sales were at their peak (54,000 operators in 1967).

iii Ownership and market access restrictions

The only existing restrictions on foreign investment in the electric power industry or the gas industry are those imposed by the general laws regulating the entry of foreign investment in Japan stipulated in the Foreign Exchange and Foreign Trade Act. For example, if a foreign investor were to obtain 10 per cent or more of the shares (or, if the shares are listed in a financial instruments exchange, 1 per cent or more of the shares) of an electric power or gas utility (including both town gas and LP gas), intend to set up a branch to carry out an electric power or a gas business or otherwise engage in any such activities, the Foreign Exchange and Foreign Trade Act requires that the relevant authorities be notified in advance of any such activities. Furthermore, in the event of the performance of any such activities requiring advance notification to the relevant authorities, a follow-up report after the performance must also be submitted. Both prior notification and follow-up reports must be submitted to the Bank of Japan, which in turn will facilitate the submission of the notifications and reports to the Minister of Finance or other relevant minister in charge. The relevant authorities have the power to provide a recommendation for, or an order to suspend, a foreign investment, if it hinders national security, public policy or public safety.

iv Transfers of control and assignments

Electricity

The prior approval of the METI is necessary in the event of a transfer of the whole business of a general transmission and distribution company, or of a merger or demerger whereby the surviving entity completely absorbs any such business. The criteria for granting this approval are the same as those for the original grant of approval to operate this type of business. A merger or demerger of other types of electricity business entities obliges them to notify the METI. Notification to the METI is also required upon the handover of any equipment or facilities to retail companies, power suppliers and any types of transmission companies.

Gas

The transfer or acquisition of all or part of a general gas transportation business requires authorisation from the METI before it can be effective, as does the merger or demerger of any entity that is a general gas transportation business operator whereby all or part of the business is succeeded by the surviving company. The criteria for the grant of the required authorisation are the same as those for the original grant of approval to operate this type of business. Only *post facto* notification is required for transfer of the business or merger or demerger of a town gas-related business (i.e., town gas retail business, town gas generation business or specific gas transportation business).

In the case of LPG businesses, however, in the event of any transfer of the business in its entirety or of any merger or demerger whereby the surviving entity completely absorbs the business, the succeeding entity is required to notify only the METI or the prefectural governor, whichever is relevant.

III TRANSMISSION/TRANSPORTATION AND DISTRIBUTION SERVICES

i Electric power

Integrated system for the production and transmission of electric power

Between the end of World War II and until 1995, the production and transmission of electric power in Japan, and its assorted related retail operations, were run as a single integrated utility by 10 electric power companies, each with a regional monopoly over one of the country's 10 main regions.

However, amid the institutional reform post-1995, Japan realised the liberalisation of its electric power generation and retail sectors. That being said, the electric power transmission sector is still very much dominated by the aforementioned 10 power companies (former general electricity utilities).

Because the electric power distribution grid is public infrastructure, measures have been implemented to prevent general electricity utilities from abusing their dominant market positions and to ensure the transparency of the electric power industry. Specifically, antitrust measures that have been implemented include the compulsory notification of electric power transmission details, the requirement of equal treatment of consumers, and the compulsory separation of the electric power transmission division accounts of general electric power business operators from their other divisions.

Government policy on separation and unbundling of electric power transmission sectors

As part of the Electricity System Reform, the amendment to the EBA was passed in 2015, the aim being the legal unbundling of the transmission sector to ensure the neutrality of all entities engaged in electricity-related business. No electricity company can run an electricity retail business or generation business with a transmission business in the same entity from 1 April 2020, unless otherwise permitted by the METI. That means that the 10 former general electricity utilities, except for Okinawa Electric Power Company, are required to split those departments to an affiliate or others by that date.

The main obligations and areas of concern for general transmission and distribution companies regarding separation and unbundling are:

- a development of a system for information management;
- b rules concerning company names, trademarks and advertising;
- c entrustment and undertaking by these companies;
- d rules concerning transactions among group companies; and
- e restrictions on directors and employees holding concurrent positions.

Regarding the development of a system for information management, general transmission and distribution companies are required to be physically separated from generation and retail group companies (i.e., being located on different floors with restricted entry) when they share the same building, as well as identifying and limiting access to information systems if the systems are shared. In addition, they are required to develop their own business status monitoring and surveillance systems.

Companies are generally restricted from using company names and trademarks that are likely to be associated with those of generation and retail group companies. They are also prohibited from advertising to take advantage of the generation and retail business of other group companies.

Regarding entrustment and undertaking by general transmission and distribution companies, these companies are in principle prohibited from entrusting their services to their own subsidiary companies. In exceptional cases, they may do so if the subsidiary companies are not under the control of generation or transmission companies. In addition, general transmission and distribution companies are in principle prohibited from undertaking the services of generation and retail group companies. However, in exceptional cases where the undertaking of these services does not impair the competitive relationships among electricity suppliers, the services may be undertaken.

Transactions among group companies are allowed to the extent that the transactions do not impair the competitive relationships thereof.

Directors of generation and retail business group companies are generally prohibited from acting as directors of general transmission and distribution group companies concurrently. In exceptional cases, a concurrent position may be held provided the holding of such a position does not impair the competitive relationships between the businesses. Further, this restriction also applies to any employee who has an important role in either of the group companies.

Obligations undertaken by general transmission and distribution companies

Because transmission facilities and the business conducted with them are mostly owned by the former 10 general electricity companies, to secure the effective liberalisation of other sectors, these companies are required to provide neutral treatment to retail companies. General transmission and distribution companies are not allowed to refuse to execute a grid connection contract without reasonable grounds. The EBA provides that the electricity supply–demand balance and frequency must always be maintained within a certain threshold. General transmission and distribution companies must also provide final assurances to deliver electricity to any consumers who do not have a contract with any of the retail companies. General transmission and distribution relationship companies are also responsible for the delivery of electricity to consumers on Japan's remote islands.

Cybersecurity

As most activities involved in the electricity business are controlled by information technology, it is crucial for businesses in the sector to establish a reliable cybersecurity system. The Basic Act on Cybersecurity stipulates that critical infrastructure information (CII) operators shall make an effort to assure cybersecurity voluntarily and proactively. Because there is no regulation that clearly stipulates the concrete actions a CII should take with regard to IT protection, a strategy for cybersecurity committee established by the Cabinet has announced that the security criteria for CII operators will be clarified. It is clear that electricity business entities, especially general transmission and distribution companies, fall within the definition of CII operators, and will almost certainly be required to adapt their processes in line with any changes to the security requirements. Under the EBA, an entity that installs electric facilities for business use must maintain those electric facilities to ensure that they conform to certain

technical standards. According to the guidelines for security of electric power control systems and smart meter systems, that entity is required, among other things, to instal a security operations organisation, develop management systems and implement training.

Independent electric power grid

Two approaches are under consideration as methods to secure a stable supply of electric power in the event of a disaster. First, the introduction of a remote distributed grid that is independent from the main electric power grid, rather than maintenance of the current grids of electricity transmission and distribution, will enable the cost-effective provision of electric power and will reinforce disaster resistance in some rural areas. Second, outside rural areas, a micro electric power grid could connect with the main electric power grid at ordinary times, but then work independently from the main electric power grid in the event of a disaster. In addition, permitting new business operators to engage in the electricity distribution business will be required in some specific areas. The requirements of the electricity distribution business and the associated cost burdens are under discussion.

Aggregator licence

The introduction of a licence for aggregators under the EBA is under discussion as a way to aggregate the electric power resources and make it possible to connect more electric resources in the event of a disaster. Also under discussion are the cybersecurity of aggregators, the protection of consumers relating to electricity measurement, the scope of the regulation and the content of the obligation.

ii Gas

Terminalling, processing and treatment

After importation, liquefied natural gas (LNG) meant for the town gas industry is converted into gas and sent through pipelines or transported by tanker lorries, and stored in gas storage facilities for supply to consumers. The facilities for processing, transporting and storing are mainly owned by the gas utility business operators, who supply the gas to consumers.

Pipelines that are used for gas transportation and gas holders that are used for storage are regulated by the GBA and the technical standards for gas facilities prescribed by ministerial order. Likewise, tanker lorries are regulated by the High-Pressure Gas Safety Act and the Safety Regulations for General High-Pressure Gas.

The transportation and storage of LPG are regulated by the LP Gas Act and the High-Pressure Gas Safety Act. More particularly, whereas storage and transportation at distribution and wholesale levels are regulated by the High-Pressure Gas Safety Act, the storage and transportation supply level to general end users are regulated by the LP Gas Act.

Government policy on separation and unbundling of town gas transportation sectors

As part of the Gas System Reform, as with the Electric System Reform, for a town gas-related business, the legal unbundling of the transportation sector is scheduled for April 2022 to ensure the neutrality of all entities engaged in a gas-related business. This reform is expected to apply to three major players: Tokyo Gas, Osaka Gas and Toho Gas. By April 2022, these companies will have to separate those sectors and transfer them to an affiliate or other entity.

Obligations undertaken by general gas transportation companies

Since gas pipelines are dominantly owned and operated by a few operators, including the above-mentioned three major players, to secure the effective liberalisation of other sectors, general gas transportation business operators are prohibited from refusing to execute a transportation contract without reasonable grounds. Further, the terms and conditions of these contracts and amendments are required to be approved in advance by the METI.

IV ENERGY MARKETS

i Japan Electric Power Exchange

The Japan Electric Power Exchange (JEPX) exists for the benefit of all electric power-related transactions. It was established on 28 November 2003 as a market for the commodity trading of electric power and serves as an intermediary for electric power spot trading, forward transactions, green power selling transactions, non-fossil value transactions, indirect power transmission right transactions and base load transactions. (It is possible to undertake both buy and sell orders through the JEPX.) To participate in electric power commodity trading on the JEPX, membership as a trade affiliate is necessary and, as of 1 April 2020, 184 companies were trade affiliates. The spot market is open every day of the year. The JEPX has also established a market in which members can trade electricity until one hour prior to its actual use. This market enables electricity business entities to adjust the amount of electricity they provide until the last minute.

The JEPX is managed by a general incorporated association comprising electric power companies and other such entities. It is a private exchange that operates and is regulated by its own market rules.

ii Terms and conditions of supply

Electricity

As has been explained, the amendment to the EBA that came into effect on 1 April 2016 liberalised entry into the electricity retail business, but provides a provisional measure that requires former general electric utilities (those allowed to retail electricity at low voltage market before the liberalisation) to continue to provide the existing terms and conditions for the time being to ensure that the price of electricity price does not rise unreasonably. Additionally, all retail companies are subject to regulations in certain codes of conduct, such as to deliver explanations and documents in relation to certain matters, for their supply to customers.

Gas

Obligation to supply

Similarly to the electricity sector, on 1 April 2017, entry into the town gas retail business was fully liberalised. However, certain town gas retail business operators specified by the METI shall continue to supply gas under the terms and conditions approved by the METI. Further, gas retail companies are also subject to regulations under certain codes of conduct, such as to deliver explanations and documents regarding the terms of certain matters, for their supply to customers.

No such obligations are imposed on LPG business operators.

iii Market developments

Electricity

In addition to the market for trading electric power commodity on the JEPX, OCCTO is preparing to set up an auction system to trade the capacity to generate electricity in the future, to be called the capacity market. The first auction is expected to be held by the end of March 2021. It is expected that, at the auction, electricity generation business operators will submit bids for the capacity to generate electricity four years after the auction and OCCTO will pick the operators and fix the price of electricity to secure the capacity to generate electricity four years after the auction and then pay the consideration to the operator. The amount of the consideration to be paid by OCCTO to the operator will be borne by electricity retail business operators, who will be required to contribute to OCCTO to fund that amount. In addition, OCCTO is preparing to set up a new market by the end of March 2022, to be called the supply–demand adjustment market. The trading in this market will be of adjustment power, namely the supply capacity used to match supply and demand for electricity.

The Amendment to the Commodity Futures Act that took effect in 2016 provides that electricity becomes subject to commodity futures trading, which enables market participants to avoid the risk of volatility. The Tokyo Commodity Exchange, Inc launched an electricity future market on 17 September 2019.

An infrastructure fund market that enables the listing of funds that invest in certain infrastructure, such as electric generation facilities, established by the Tokyo Stock Exchange, Inc on 30 April 2015 and has developed during the past five years. Following the first listing of an infrastructure fund on 2 June 2016, six additional infrastructure funds have been listed on the market. These all invest in solar power facilities. The market provides opportunities for a broad range of investors, including retail investors, to invest in infrastructure-related investments and adds an option for developers who, in particular, develop large-size power facilities.

Gas

With respect to gas, no particularly noteworthy market developments are currently anticipated or under consideration.

V RENEWABLE ENERGY AND CONSERVATION

i Electricity

The Renewable Electric Energy Act

Japan has been subject to huge developments in the area of renewable energy. The Act on Special Measures concerning the Procurement of Renewable Energy Sources by Electric Utilities (the Renewable Energy Act) was enacted with the objective of introducing FITs (a system whereby the total volume of electricity should be purchased at a fixed price for a fixed term). The Renewable Energy Act became effective on 1 July 2012 and the FIT scheme has been amended several times since then to address certain issues (see ‘Increase in renewable electric energy generation and associated problems’ below). The major requirements for a generator to sell electricity at the fixed price under the FIT scheme can be summarised as follows:

- a Execute an interconnection agreement with one of the general transmission companies, or one of the specific transmission companies, for its renewable energy generation facility.

- b Obtain certification by the METI for its plan on the generation business relating to the renewable energy generation facility in accordance with the requirements under the Renewable Energy Act. Renewable energy, which is subject to the FIT scheme, is currently limited to certain renewable energy sources: solar, wind, water (currently statutorily limited only to small and medium hydroelectric generators with an output of less than 30,000kW), geothermal and biomass.
- c Execute a power purchase agreement with one of the general transmission companies or the specific transmission companies for a renewable energy generation facility with the above-mentioned certification. These transmission companies are obliged to accept an offer by a generator to execute a power purchase agreement, unless certain exceptions are applicable.

Sales prices and contract terms

Set out below are the changes in sales prices and contract terms granted by the FIT scheme in recent years. In relation to solar power, as a reflection of the sudden drop in the price of solar panels, the sales price is falling (as discussed further below). In comparison, measures have been taken to establish favourable pricing and to support investment in respect of offshore wind power and existing head race tunnel-type medium and small-scale hydroelectric power generators. A bid system, which was newly adopted in 2017, is applicable to facilities with (1) solar power of 250kW or more and (2) biomass power (generated by certain wood or agricultural products with a capacity of 10MW or more or by biomass liquid fuel) as of 2020.

Power source	Installed capacity	Sales price (excluding tax)							Contract term
		2014	2015	2016	2017	2018	2019	2020	
Biomass*		¥13 to ¥39 depending on the material used	¥13 to ¥40 depending on the material used	¥13 to ¥40 depending on the material used	¥13 to ¥40 depending on the material used	¥13 to ¥40 depending on the material used	¥13 to ¥40 depending on the material used	¥13 to ¥40 depending on the material used	20 years
Existing head race† tunnel-type medium and small-scale hydroelectric	<200kWh	¥25	¥25	¥25	¥25	¥25	¥25	¥25	20 years
	≥200kWh <1000kWh	¥21	¥21	¥21	¥21	¥21	¥21	¥21	20 years
	≥1,000kWh <5,000kWh	¥14	¥14	¥14	¥15	¥15	¥15	¥15	20 years
	≥5,000kWh <30,000kWh	¥14	¥14	¥14	¥12	¥12	¥12	¥12	20 years
Geothermal	<15,000kWh	¥40	¥40	¥40	¥19 to ¥40 depending on device used	¥19 to ¥40 depending on device used	¥19 to ¥40 depending on device used	¥19 to ¥40 depending on device used	15 years
	≥15,000kWh	¥26	¥26	¥26	¥12 to ¥26 depending on device used	¥12 to ¥26 depending on device used	¥12 to ¥26 depending on device used	¥12 to ¥26 depending on device used	15 years
Hydroelectric	<200kWh	¥34	¥34	¥34	¥34	¥34	¥34	¥34	20 years
	≥200kWh <1,000kWh	¥29	¥29	¥29	¥29	¥29	¥29	¥29	20 years
	≥1,000kWh <5,000kWh	¥24	¥24	¥24	¥27	¥27	¥27	¥27	20 years
	≥5,000kWh <30,000kWh	¥24	¥24	¥24	¥20	¥20	¥20	¥20	20 years

Power source	Installed capacity	Sales price (excluding tax)							Contract term
		2014	2015	2016	2017	2018	2019	2020	
Solar	<10kWh	¥37	¥33 to ¥35 depending on device used	¥31 to ¥33 depending on device used	¥25 to ¥30 depending on device used	¥25 to ¥28 depending on device used	¥24 to ¥26 depending on device used	¥21	10 years
	≥10kWh <50kWh	¥32	¥29 (1 April to 30 June) or ¥27 (after 1 July)	¥24	¥21	¥18	¥14	¥13	20 years
	≥50kWh <250kWh	¥32	¥29 (1 April to 30 June) or ¥27 (after 1 July)	¥24	¥21	¥18	¥14	¥12	20 years
	≥250kWh <500kWh	¥32	¥29 (1 April to 30 June) or ¥27 (after 1 July)	¥24	¥21	¥18	¥14	Price set through a bid system	20 years
	≥500kWh <2,000kWh	¥32	¥29 (1 April to 30 June) or ¥27 (after 1 July)	¥24	¥21	¥18	Price set through a bid system	Price set through a bid system	20 years
	≥2,000kWh	¥32	¥29 (1 April to 30 June) or ¥27 (after 1 July)	¥24	Price set through a bid system	Price set through a bid system	Price set through a bid system	Price set through a bid system	20 years
	Wind	<20kWh	¥55	¥55	¥55	¥55	¥17 or ¥20 depending on device used	¥17 or ¥20 depending on device used	¥16 or ¥18 depending on device used
	≥20kWh	¥22	¥22	¥22	¥18 or ¥21 depending on device used	¥17 or ¥20 depending on device used	¥16 or ¥19 depending on device used	¥16 or ¥18 depending on device used	20 years
	Offshore wind power** (floating type)	¥36	¥36	¥36	¥36	¥36	¥36	¥36	20 years
	Offshore wind power (bottom-mounted type)	¥36	¥36	¥36	¥36	¥36	¥36	Price set through a bid system	20 years

* Excluding biomass power generated by certain wood or agricultural products with a capacity of 10MW or more and biomass power by biomass liquid fuel, which are subject to a bid system

† Existing head race tunnel-type medium and small-scale hydroelectric power: generators that utilise existing headrace tunnels with renewable electric power equipment and hydraulic steel pipes.

** Offshore wind power: generators that require a vessel for access for construction and operational maintenance.

Increase in renewable electric energy generation and associated problems

Following the introduction of FITs, renewable source energy generation – solar power generation in particular – is increasing rapidly. Set out below are recent data on electricity generated by renewable source energy generation facilities and purchased by business operators (in million kWh).

Power source	April 2013 to March 2014	April 2014 to March 2015	April 2015 to March 2016	April 2016 to March 2017	April 2017 to March 2018	April 2018 to March 2019	April 2019 to September 2019
Solar (<10kWh)	485,686.0	578,017.8	648,628.4	711,688.7	782,689.5	674,397.8	523,661.8
Solar (≥10kWh)	425,466.9	1,317,731.0	2,459,108.0	3,454,952.2	4,261,477.4	3,892,502.2	3,192,577.0
Wind	489,638.3	492,082.3	523,259.9	586,179.9	616,663.7	476,081.2	268,898.7
Hydroelectric	93,552.6	107,277.2	147,632.9	200,787.3	245,829.7	224,511.5	185,774.1
Geothermal	570.9	608.1	5,881.1	7,620.2	10,126.9	9,132.5	21,574.6
Biomass	316,940.0	364,438.0	539,014.4	736,506.5	1,024,778.2	890,802.2	714,917.8
Total	1,811,854.7	2,860,154.4	4,323,524.7	5,697,734.8	6,941,565.4	6,167,427.4	4,907,404.0

However, problematic businesses, such as those that used favourable pricing to obtain facility certification from the METI but delayed commencement of work and attempted to obtain fraudulent profits, have been frequently reported. In response, the Renewable Energy Act was amended to introduce a deadline for renewable energy projects to reach the commercial operational stage (the COD deadline).

Under the amendment, if an operator fails to meet the COD deadline, the commencement of the FIT period starts from the day following the COD deadline and the project will not be able to use the full FIT period (for example, one month's delay triggers a one-month deduction from the FIT period). The project will thus directly incur a loss as a result of the delay in commencement. To be specific, the COD deadline shall be:

- a* with the exception of projects described in point (c), three years for solar power projects with an output capacity of 10kW or more;
- b* with the exception of projects described in point (e), four years for wind power, biomass power and geothermal heat projects;
- c* five years for solar power projects requiring an environmental impact assessment;
- d* seven years for hydroelectric power projects; and
- e* eight years for wind power projects and geothermal heat projects requiring an environmental impact assessment.

The COD deadline applies to solar power projects that execute a grid connection agreement or receive certification by the METI on or after 1 August 2016, and other renewable energy projects that receive certification by the METI on or after 1 April 2018.

On 5 December 2018, a new regulation was enforced on pre-operation of solar power projects, for which the certification from the METI is issued during the period from April 2012 to March 2015 and to which the COD deadline does not apply because a grid connection agreement was executed before 31 July 2016. Under the new regulation, (1) an application for the start of grid connection construction (GCCA) to a utility should be received by the utility by 31 March 2019 and (2) operation shall commence by 31 March 2020 (or, if the GCCA is received after 31 March 2019, one year after the GCCA is received by the utility).

On 25 February 2020, an amendment to the Renewable Energy Act was submitted to, and is being discussed by, the Diet. The proposed amendment includes more a straightforward

measure against problematic projects, that is to say revocation of certification from the METI when operation does not commence for a certain period to be decided by the METI after the certification is issued.

Further, a rapid increase in renewable energy generation has caused a lack of capacity in transmission lines in some areas. Currently, new solar and wind-power projects in certain areas are subject to unlimited restrictions on the output from renewable energy generation facilities that satisfy certain requirements, including that they expect an oversupply of electricity. Although transmission companies have recently embraced policies to expand the capacity of transmission lines, this issue is yet to be fully resolved.

Environmental impact assessment

The Environmental Impact Assessment Act (EIAA) applies to projects of 7.5MW or more for wind power projects, of 112.5MW or more for biomass power projects, and of 7.5MW or more for geothermal power projects. Furthermore, the EIAA was amended to cover solar power projects of 40MW or more (and solar power projects of 30MW or more, depending on the case) and came into force on 1 April 2020. After the amendment, a survey, forecast and evaluation of the possible environmental changes caused by implementation of a project must be prepared. It takes a considerable time to complete this process and the assessment process could be a considerable burden on solar power projects that are subject to environmental impact assessment.

In addition, some local governments maintain their own environmental impact assessment rules and often require the securing of various permits and licences, depending on the applicable circumstances.

Enactment of the Re-Energy Area Usage Act

As Japan is an island nation, marine renewable energy businesses such as offshore wind power generation have been regarded as key businesses from the perspective of energy policy. However, there was no law providing for unified rules for long-term occupancy of general sea areas that are Japanese territories and inland waters. This had been an obstacle to commencing such businesses in these sea areas. To address this issue, on 30 November 2018, the Act on Promotion of Utilisation of Sea Areas for the Development of Marine Renewable Energy Generation Facilities (the Re-Energy Area Usage Act) was passed by the Diet and came into force on 1 April 2019. The Re-Energy Area Usage Act allows for the long-term use of certain designated general sea areas for the purpose of offshore wind renewable energy projects upon approval by the government agency, and is expected to promote these types of projects.

ii Gas

In terms of gas-related renewable energy, biogas has been generating a lot of interest in recent years. Biogas is a flammable gas produced by the fermentation of organic waste such as raw sewage, food waste and livestock excretions, a feature that allows it to be harvested at sewage treatment plants, food factories and other such locations. Major town gas utilities such as Tokyo Gas and Osaka Gas have in recent years established guidelines and promoted the purchase of biogas. Additionally, several local governments have begun to produce biogas in a sewage facility or refuse disposal facility.

VI THE YEAR IN REVIEW

The electric power industry regulations have witnessed great reforms since the events at Fukushima in 2011. First, the electric system reform started, including full liberalisation of entry into the electricity retail business, and the following phase of the reform, including legal unbundling of the electric power transmission function and sector from the existing dominant power suppliers, has been implemented in 2020. Second, the introduction of FITs has encouraged the emergence of new entrants to the renewable energy industry and the renewable energy market has been expanded, but the FIT system is being revised to address several problems, including a newly adopted bid pricing system for solar power generation of a certain size and for biomass power generation of a certain type and certain size.

As has been explained, the gas system was reformed along the same lines as the electric system reform and, from April 2017, the full liberalisation of entry into the gas retail business was implemented and new regulations for gas transportation businesses (especially general gas transportation businesses) have been imposed to make gas pipelines available to gas retail business operators. Furthermore, from 1 April 2022, the gas transportation (pipeline) business sector of three major companies (Tokyo Gas, Osaka Gas and Toho Gas) will be unbundled.

No remarkable trends in renewable energy have been seen. The number of new solar projects is decreasing as the sales price has fallen. Wind power projects, and offshore wind power projects in particular, are receiving increased attention, although it remains to be seen whether wind power projects will be popular.

VII CONCLUSIONS AND OUTLOOK

The events at Fukushima in 2011 served as the main catalyst for the recent reforms within the electric power industry. The full extent of these reforms and their effects, however, remains to be seen. As of 31 March 2020, all but six of the 48 nuclear power stations in Japan are stopping operations. The Nuclear Regulation Authority issued new nuclear power station safety standards in July 2013 and, as of 23 March 2020, 11 nuclear power stations are in the process of review for restart under the new safety standards (14 stations have already passed this review). However, it is still unclear when and how many nuclear power stations will restart operations.

Under these circumstances, Japan will become increasingly reliant on its remaining sources of energy, namely oil and LNG. These traditional sources of fuel are regarded as more stable and reliable; however, because they are ultimately non-renewable resources, this in and of itself introduces an entirely different set of issues. Ultimately, Japan's energy requirements may push it in the direction of renewable energy sources such as those discussed. However, the output from these energy sources is substantially smaller than that of nuclear energy, not to mention inherently unstable and less reliable. Accordingly, Japan's demand for alternative and reliable sources of energy may even result in renewed interest in the gas industry, which in turn will surely lead to further developments in this field.

With all facets of the energy industry shifting so rapidly at the moment, the only thing that can be said with any certainty is that change is imminent. Exactly how and what form this change will take remains to be seen, and it is certainly worth keeping a close eye on Japan in the years to come.

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