



Recommendations to the government on revising renewable energy policies

Introduction

Under the Act on Special Measures Concerning Procurement of Electricity from Renewable Energy Sources by Electricity Utilities (also known as the Feed-in Tariff Act, hereinafter referred to as the “FiT Act”), renewable energy has achieved a fast-paced diffusion in Japan since 2012. In 2010, the share of all generated output covered by renewable energy sources was 10.2 % , the majority being from hydropower. By 2018, the share of renewables increased to 18.4 %¹, mainly with the ensuing rapid development of solar photovoltaic (PV) generation. Power generated by renewables other than hydropower plants already surpasses that generated by the latter. In particular, the competitiveness of renewables is increasing. The cost of electricity from solar PV is swiftly falling; in fiscal 2012, the tariff for purchasing electricity per kWh (for more than 10 kW) stood at 40 yen, this has decreased to 14 yen in fiscal 2019.

The Subcommittee on Mass Introduction of Renewable Energy and Next-Generation Electricity Networks under the Ministry of Economy, Trade and Industry (METI) has discussed prospective revision of the current FiT Act in accordance with the schedule prescribed in it, and released its interim proposal in mid August. The discussion is presumably focused on the following two items as particularly major changes from the FiT Act in its present form.

- Shift from the feed-in tariff scheme to direct marketing and the feed-in premium (FiP) scheme
- Systematic transmission planning for high integration of renewables into the market

In this document, we, Renewable Energy Institute, set forth our views on the government’s policy to revise the FiT Act and on the renewable energy auction system, and propose the following three recommendations.

<Summary of Recommendations>

Recommendation 1: Prioritize the improvement of the market environment for renewables

It is not appropriate to hastily obligate direct marketing to the RES power producers without improvement of a market environment where producers can sell power they generated. A proper period of transition should be established while monitoring the market environment and the state of preparations among power producers.

Recommendation 2: Promote systematic mid-long term transmission planning

In order to realize a decarbonized society, it is important to introduce systematic transmission planning to maximize renewables deployment at various stages. Since those policies will be implemented to achieve national objectives, the related cost should be borne nationally, but not on a regional basis, and should fundamentally be covered by wheeling charges to encourage cost-effective project management by transmission system operators.

Recommendation 3: Introduce a multi-year plan for auction volumes

Since the current auction scheme is a procedure of determining the quota for the bids every fiscal year, operators have no market prospects, and it is difficult to embark on active development. In order to enhance predictability of the market, it is advisable to establish numerical targets for procurement in a span of 3 - 5 years in each category of renewable energy sources designated for auctions, and to formulate a multi-year plan for the auction volume,

¹ These figures are based on “BP (2019) Statistical Review of World Energy.”

number of auctions, for each year in which auctions will be held. In some categories of power source, the certified business plan amount under the FiT Act is close to or exceeding the targets determined in the energy mix. For setting appropriate procurement target through auctioning, the increment of the energy mix targets is also necessary.

Recommendation 1: Prioritize the improvement of the market environment for renewables

The high integration of renewables in the market is an important agenda. This is because a proper assessment of the value of renewables in the market is necessary and renewable power producers are expected to contribute to maximizing its value. Under the existing FiT Act, renewable power producers are supposed to sell all generated electricity to transmission and distribution companies without scheduling their own power supply. The power generation schedule is basically set by the transmission and distribution companies instead and notified to the retailers (FiT Exception Case 1). In the FiT Exception Case 1, the transmission and distribution companies must notify the generation plan to the retailers at 4:00 p.m. two days before the actual supply, and therefore a highly accurate power generation forecast cannot be made. For this reason, the error rate in solar PV output forecasts by transmission and distribution companies is as high as 18.3 % to 33.2 %².

Moreover, the important purpose in the power market is to achieve an economically rational supply-demand balance by allowing power generators and customers to act corresponding with price signals. Under the FiT scheme, however, RES generators have no incentives to generate electricity according to power demand because the power is purchased at fixed prices regardless of when it is generated.

The impact of the above FiT scheme on the market could be limited when RE electricity supply under FiT accounts for only a small share of the market. In the initial stage of RE deployment, priority is given to promoting investment and cost reduction by mitigating the business risk of renewable power producers. However, as the ratio of FiT electricity increases, the impact on imbalance costs and supply-demand balance will also increase. It is important that renewable power producers can establish a system to manage the supply-demand balance and transit to sell electricity in the market.

The problem is whether an environment for power generators to sell power directly to the wholesale power market is in place in Japan. There are two main issues in improving the environment for direct marketing.

First, renewable power producers themselves do not yet possess the know-how and systems enabling direct marketing. Direct marketing requires the ability to make advance forecasts of electricity output, prepare production schedules, bid in the market, trade in the intraday market, and ultimately settle imbalances. It is necessary for the power producers to either make arrangements for this work themselves or consign it to businesses that handle direct sales for them. Direct marketing requires improvement of an environment inclusive of such related systems and education of the vendors.

Second, still in Japan, the market system for selling renewable power and adjusting supply-demand is immature. The power market system reform is still in progress, and the related market systems and competitive environment are still under development. The schedule for unbundling of the generation and the transmission system is planned in 2020, the launch of the supply-demand adjustment market (balancing mechanism or ancillary market in other countries) is planned in 2021. In addition, the importance of creating a futures market is also recognized, a movement towards establishing one has started. In this process of improving the market environment, some trial-and-error activity would be necessary to get each type of market to function. Moreover, the current market is not designed to facilitate easy participation of renewable power producers. For example, in Japan, the gate-closing time in the intraday market is one hour before, but in Europe, adjustments can be made up to 15 or 30 minutes before, in order to reduce error in forecasting output from renewable energy sources.

For such reasons, priority should be placed on preparation of an environment enabling renewables to sell their own power in the market rather than forcing them for direct marketing, and an appropriate transition period should be set while monitoring the market environment and the state of preparations by power producers.

² The rate of forecasting error from April 1, 2018 to January 31, 2019. Prediction error rate = PV output prediction error value / PV output actual value. Based on "Approaches to a Proper Market Mechanism and Supply-Demand Assurance" (tentative translation), Agency for Natural Resources and Energy, 2019.

Recommendation 2: Promote systematic mid-long term transmission planning

Thus far, the power grid in Japan has mainly been formed in a manner to connect large-scale power sources to demand centers. As a result, there is a mismatch between the areas where renewable energy sources are intensively present and those where power lines are introduced. Already in some areas, severe grid constraints have surfaced. A case in point is the northern Tohoku area, where studies are being made on the pros and cons of increasing the capacity of the transmission network and on reinforced capacity, based on requests for grid connection by actual businesses, through an invitational process for power source connection.

In widespread regional grid constraints, however, the very process of study and reinforcement takes a longer time³. By comparison, the construction of renewable power plants can be completed in as little time as one year, and transmission companies therefore cannot cope with the grid access needs of these power sources. Such temporal gap dampens the investment incentives in renewable power producers, delays renewable energy deployment, adversely affects cost reduction, and hinders the country from achieving its policy goal to make renewables the “main power source.”

In response to this situation, the Subcommittee on Electricity Resilience toward Decarbonized Society under the Electricity and Gas Industry Committee of the METI is pursuing studies on the advisable approach to transmission planning so that massive amounts of low-cost renewable power can be sent from the areas suitable for siting of renewable generation to large demand centers. Such activity is already seen in Europe, where the European Network of Transmission System Operators for Electricity (ENTSO-E) has formulated 10-year development plans for a Europe-wide transmission network taking account of different future scenarios, and looking ahead to a massive introduction of renewables. In the United States, authorities in the states of Texas and California have developed “renewable energy zones” grid plans to address this challenge⁴. More specifically, in order to achieve the states’ renewable energy target, transmission lines will be laid directly in the optimal location for renewables. The “renewable energy zone” grid plan establishes a legal and regulatory framework for empowering state government agencies and evaluates renewable energy sources and grid systems for the cost-effective introduction of renewables. The cost required for grid construction is collected through wheeling charges. Texas started this planning process in 2005 and completed grid system development in 2014. As a result, more than 11 GW of wind power generation capacity was newly connected to the grid, which led a great reduction of curtailment rate, despite the increase in wind power generation.

As this indicates, it is effective to improve the grid system in advance with the intention of expanding and introducing renewables at various stages. In particular, the Japanese government should significantly increase the national renewable energy target for the realization of a decarbonized society throughout the country, and examine the realistic geographical arrangements of the national grid system for efficient attainment of the target. Upon performing this task, they should not only strengthen the inter-regional grid lines, but also the top two grid systems.

Furthermore, the cost of system development for achieving these policy objectives should not be borne solely by the areas consumers where the system is developed. Such system development should be carried out to achieve the national policy objectives, so costs should be borne nationally. The cost burden should basically be defrayed by wheeling charges, as this also encourages a cost-effective operation by transmission operators. It should be noted, however, that the handling of revenue from basic transmission charges on the power plants newly connected by the grid construction is a matter that requires careful and separate study.

³ The invitational process in the northern area of the Tohoku region began in October 2016. The completion of the construction is scheduled for about 11 years after the end of this process. Based on "Guideline for Application to the Invitational Process for Power Source Connection Cases in the Northern Area of the Tohoku Region" (tentative translation), Organization for Cross-regional Coordination of Transmission Operators, 2017.

⁴ USAID & NREL (2017) Renewable Energy Zone (REZ) Transmission Planning Process: A guidebook for practitioners.

Recommendation 3: Introduce a multi-year plan for auction volumes

From fiscal 2017 to fiscal 2018, auctions were held for more than 2 MW of solar power capacity and 10 MW of woody biomass power capacity. The auction for solar power were held three times by the end of fiscal 2018, but the tender offer frame has changed each time. Every year, auction volume for the next year was decided without showing a long-term view. It is therefore unclear how much bid volume will be offered for each succeeding fiscal year. The development of renewables requires a certain period of preparation. Even in the case of solar PV, whose lead time is comparatively short, studies of grid connection and other preparations, including negotiations with landowners, can reportedly take two or three years in Japan if the plants are on a large scale. Under these circumstances, uncertainty about the level of auction volume for which bids are to be offered in each fiscal year makes it impossible for operators to draft a future scenario for development even if they want to participate in the auction. It may reduce the willingness to participate in the bidding system.

In countries that set renewable energy targets, upper limit prices and auction volumes for several years ahead are announced in advance and systematic bidding is conducted, providing predictability to operators (see Table). For example, the German Renewable Energy Act 2017 stipulates in detail the auction capacity and frequency of recruitment every year. In France too, the authorities announce and execute auction plans for several years in accordance with the Energy Transition for Green Growth Act (2015). In the United Kingdom, authorities are taking aim to deliver 1 - 2 GW of new offshore wind power every year during the 2020s, and hold auctions every other year.

This holds two advantages. Firstly, operators can promote business development while monitoring the auction schedule and make plans for participation in auctions. This heightens the possibility of an increase in the volume for the invitation quota, and helps to create a competitive environment as a result. Secondly, for the supply chain as well, it facilitates decisions on long-term investment by making it easier to foresee the market supply volume several years into the future.

Table Renewable Energy Targets and Schedule for Auction Volumes

| | Japan | Germany | France | United Kingdom |
|---------|--|--|--|---|
| Targets | 2030: 22 - 24% | 2025: 40 - 45% | Determination of 2023 numerical targets for each type of source (in 2016) | 2020: 31% Targets to deliver 1-2 GW of new offshore wind power per year in the 2020s |
| Volumes | Determined by the procurement commitment each FY | Notation of the auction volume into the future for each type of source | Determination of the auction volume for each type of source, up to 2019 in 2016 and up to 2023 in 2018 | Auction volumes for a plural number of years, but auctions are held only once every few years |

On the other hand, there are apprehensions about the establishment of a multi-year auction volume, to the effect that it could lead to a succession of rounds with an extremely small number of bids as compared to the auction volume. This possibility could be addressed by taking measures for a certain flexibility as regards the auction volume. As in current Japanese operations, due to concerns of the small bidding amount, narrowing the bidding amount and shrinking the entire market will have a negative effect on long-term cost reduction.

In consideration of the above, it is appropriate to set numerical targets for procurement with spans of 3 - 5 years in each power source category designated for auctions, and to prepare multi-year plans including the auction volumes and number of auctions in each of those years. Because there are some categories of power source in which the certified business plan amount under the FiT Act is close to or exceeding the targets determined in the energy mix, it is necessary to increase the targets of the energy mix in order to set appropriate procurement amounts.