

CHAPTER 1

Renewable Energy-Related Policies and Institutions in Japan: Before and after the Fukushima Nuclear Accident and the Feed-In Tariff Introduction

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§1.01 INTRODUCTION

Exploring how to enhance the use of renewable energy is a key national political agenda in Japan aimed at achieving national energy security and contributing to solving climate change problems as stated in the 1997 Act on the Promotion of New Energy Usage. This chapter focuses on the three major renewable energy-related schemes in Japan: the Renewable Portfolio Standard (RPS) Scheme (the Act on Special Measures Concerning New Energy Use by Operators of Electricity Companies), the Net-metering Scheme for Photovoltaic Power (the Act on the Promotion of the Use of Non-fossil Energy Sources and Effective Use of Fossil Energy Materials by Energy Suppliers or the Excess Electricity Purchasing Scheme for Photovoltaic Power), and the Feed-in Tariff (FIT) Scheme for renewable energy, which began in July 2012.

In Japan, the term 'new energy', which means an energy alternative to petroleum, has been commonly used in writing energy-related laws and policies.¹ However,

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1. New energy is defined as photovoltaic power, wind power, mid- and small-scale hydropower, geothermal power, solar heat utilization, temperature-difference heat utilization, biomass power,

in this chapter, we basically use the term 'renewable energy', the major sources of which overlap with those of new energy, to focus more on the aspects of environmental integrity and climate-change mitigation, and to include energy such as hydropower and geothermal power, which are not covered by new energy.

The Japanese energy self-sufficiency rate was only 4.8% in 2010, including the use of hydro, geothermal, solar, and biomass power.^{2,3} Like other major industrialized countries, Japan is highly dependent on fossil fuels, which account for more than 80% of energy supply. However, because much fossil fuel is imported from the politically unstable Middle East, and because the energy demands of emerging countries such as China and India are increasing, and these countries are trying to secure their energy supply, it is becoming more difficult for Japan to rely on importing most of its energy as fossil fuel. Therefore, Japan needs to develop its own energy sources.

One of the energy sources that Japan has focused on and expanded in order to depart from fossil fuel dependence has been nuclear power. The Act on Promotion of Global Warming Countermeasures was adopted in 1998, and nuclear power has gained attention as one of the important energy sources that reduce greenhouse gas (GHG) emissions. In February 2011, there were 54 commercial nuclear power plants operating in Japan. However, the Great East Japan Earthquake, followed by the Fukushima nuclear accident on 11 March 2011, highlighted the safety issues of using nuclear power. Currently, as of June 2013, most nuclear power plants are offline; only two are currently in operation.⁴

The Democratic Party of Japan has contributed to increasing renewable electricity by providing policy targets on renewable energy, such as the bill of Basic Act on Global Warming Countermeasures which included a target of raising the share of renewable energy out of the total primary energy supply to 10% by 2020, and the decision of the Energy and Environmental Council of the Japanese government made in September 2012 which aim for zero nuclear power generation by the 2030s. However, these were scrapped after the dissolution of the lower house in November, 2012.

As an alternative energy, renewable energy will be one of the most important elements in securing Japan's national energy supply and solving climate change problems. Although multiple national renewable energy-related policies and institutions were introduced to diffuse the generation of renewable energy in Japan after the oil crisis in the 1970s, the current share of renewable energy in Japan in 2011 (excluding hydropower) is only 1.4% of total power generation.⁵

biomass heat utilization, biomass fuel fabrication, and snow and ice heat utilization. Renewable energy includes large-scale hydropower and ocean energy in addition to new energy (Agency for Natural Resources and Energy (ANRE), *What is new energy*, <http://www.enecho.meti.go.jp/energy/newenergy/new/p1.html> [accessed 28 Jun. 2013, in Japanese]).

2. Nuclear power is not considered domestic energy.

3. Ministry of Economy, Trade and Industry (METI) Energy White Paper 2012. Energy Forum: Tokyo (in Japanese) (2012).

4. Japan Nuclear Technology Institute, *Operation of nuclear power plant*, <http://www.gengikyo.jp/db/fm/plantstatus.php?x=d> (accessed 28 Jun. 2013; in Japanese).

5. ANRE, *About renewable energy*, <http://www.enecho.meti.go.jp/saiene/data/kaitori/2012kaitori.pdf> (accessed 28 Jun. 2013; in Japanese).

This chapter outlines previous and current national renewable energy-related policies and institutions in Japan, and describes their effects and challenges. Section §1.02 describes the previous renewable energy-related schemes, with a focus on two major schemes, the RPS Scheme and the Net-metering Scheme for Photovoltaic Power. The section discusses the effects of the schemes, and the reasons why the share of renewable energy has not expanded dramatically. Section §1.03 explains the FIT Scheme for renewable energy, which began in July 2012, and describes the background to the scheme and its expected effects. Section §1.04 summarizes the chapter and discusses effective renewable energy policies.

§1.02 A BRIEF OVERVIEW OF RENEWABLE ENERGY-RELATED POLICIES AND INSTITUTIONS IN JAPAN BEFORE THE INTRODUCTION OF THE FIT SCHEME IN 2012

[A] Renewable Energy-Related Policies and Legal Measures

During the period of rapid economic growth up to the 1970s in Japan, energy consumption there greatly increased. For example, the total final energy consumption more than doubled from fiscal year FY 1965 to FY 1970.⁶ However, in the 1970s, Japan suffered large economic impacts from the oil crises (first in 1973 and then in 1979), and the importance of alternative energy received greater recognition. Japan began to address renewable energy in earnest.

This section gives an overview of renewable energy-related policies and institutions in the period from the oil crisis in the 1970s to 2012. The first major policy for renewable energy was the Sunshine Project⁷ established in 1974. This commenced under the direction of the Agency of Industrial Science and Technology in Japan. The project aims to enhance research and development (R&D) on oil-alternative energy technologies with a focus on solar, geothermal, coal, and hydrogen energy, in order to supply sufficient energy to meet Japanese energy demands in the following decades.⁸ Afterward, the Act on the Rational Use of Energy (1979) and the Act on the Promotion of Development and Introduction of Alternative Energy (1980) were adopted.

In 1997, the Act on the Promotion of New Energy Usage came into force to enhance the use of so-called new energy. This act specifies the role of each actor, including the country, local government, business operators, and citizens, and provides financial support measures for business operators who use new energy.⁹

The RPS Act was promulgated in 2002 and enacted in 2003. It aims to further the use of new energy by requiring certain electricity companies to use a certain amount of electricity generated from new energy annually. Compared with previous policies and

6. Institute of Energy Economics, Japan (IEEJ), Handbook of Energy and Economic Statistics in Japan 2013. The Energy Conservation Center, Tokyo (2013).

7. In 1993, the Moonlight Project (an energy-saving-technology research and development project established in 1978) was integrated into the Sunshine Project, and restarted as the New Sunshine Project.

8. METI, *supra* n. 3, at 189.

9. *Ibid.*

institutions, the RPS scheme is a more direct policy to enhance renewable energy. Types of energy covered in the act are photovoltaic (PV), wind, biomass, medium- and small-scale hydro, and geothermal power. The annual targets for new-energy electricity use by electricity retailers are established by the Ministry of Economy, Trade and Industry (METI). For example, in 2007, the target for 2014 was set as 16.0 TWh.¹⁰

In 2009, the Net-metering Scheme for Photovoltaic Power was launched. Under the scheme, electricity companies are mandated to purchase any surplus electricity that has been generated by customers' PV facilities. The cost of buying back surplus electricity is borne by electricity customers (residential and non-residential) in the form of a PV promotion surcharge.¹¹ This scheme has evolved into the FIT Scheme launched in 2012.

In parallel with the development of energy-related policies and institutions, there has been a growing interest in environmental integrity and climate change problems. As described above, in 1998, a year after the Act on the Promotion of New Energy Usage came into force, the Act on Promotion of Global Warming Countermeasures was adopted; the act calls for the national government to implement the Kyoto Protocol Target Achievement plan (where the target for Japan was a 6% reduction in GHG emissions compared with the base year 1990 over 2008–2012). On 12 March 2010, the bill of the Basic Act on Global Warming Countermeasures was approved by Prime Minister Yukio Hatoyama and his cabinet and submitted to the Diet. The bill included mid- and long-term GHG emission reduction targets, which are a reduction to 25% below the 1990 level by 2020, and a reduction to 80% below the 1990 level by 2050. The bill also included a target, raising the share of renewable energy to 10% of the total primary energy supply by 2020. Although this bill was scrapped after the dissolution of the lower house in 16 November 2012, the discussion on the bill contributed to raising public attention on renewable energy promotion to some degree. Furthermore, before the Fukushima Nuclear accident in 2011, one of the key forms of energy that could be used to address climate change was nuclear power, but since the accident, there has been a call to use renewable energy that has environmental integrity.

In addition to the above major obligations to enhance renewable energy, there are other schemes such as tax reductions (e.g., green investment tax credits), subsidies (e.g., for the cost of implementing measures to support the use of renewable energy heat, and installation of residential PV systems), and loans (e.g., for implementing environmental and energy measures).¹² Additionally, there are several voluntary schemes designed to enhance the use of renewable energy, such as the Green Power Certificate, which is a system that enhances the use of renewable energy by the introduction of trading certificates based on environmental added value from the

10. ANRE, *RPS Act website*, <http://www.rps.go.jp/RPS/new-contents/top/toplink-english.html> (accessed 28 Jun. 2013).

11. METI, *Approval of electricity charges followed by the fixing of FY 2012 Photovoltaic Power Promotion Surcharge Rates*, http://www.meti.go.jp/english/press/2012/0125_02.html (accessed 28 Jun. 2013). As of June 2013, the target for the period after FY 2014 has been changed to zero.

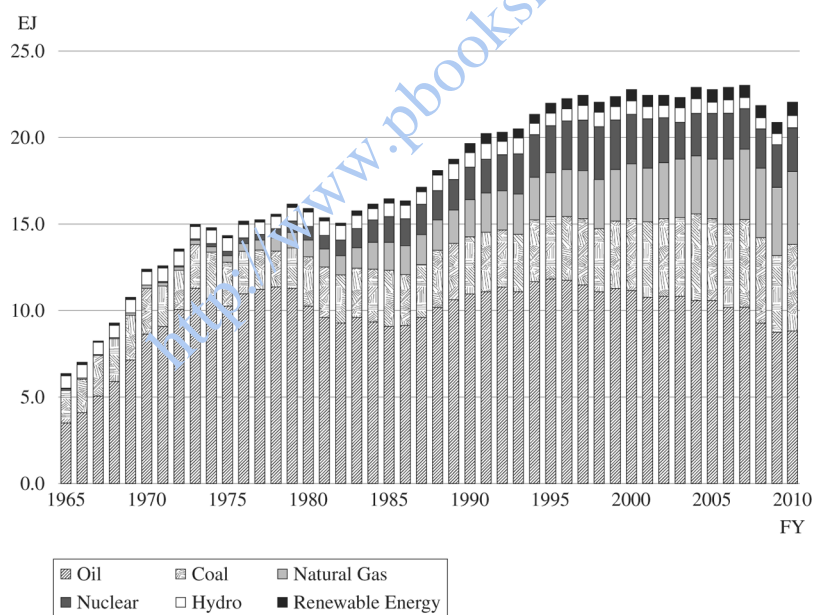
12. ANRE, *Support system for renewable energy introduction*, <http://www.enecho.meti.go.jp/saiene/support/> (accessed 28 Jun. 2013; in Japanese).

electrical power generated using, for example, wind, PV, hydro, biomass, and geothermal power.¹³

[B] Implementation and Effects of Major Renewable Energy-Related Schemes

As described in the previous section, Japan has introduced multiple policies and institutions to enhance the generation of renewable energy, but with only limited effect. Figure 1.1 shows the share of energy sources in the national primary energy supply in Japan. It shows that renewable energy (excluding hydropower) accounted for only 3.7% of the total primary energy supply in 2010.¹⁴ summarized the key barriers to increasing generation of renewable energy in Japan as the geographical restrictions peculiar to Japan (e.g., limited space suitable for large-scale facilities), high costs (the costs of the development and introduction of renewable energy are very high for companies or individuals at present), and instability in its supply (wind and PV power are both subject to natural conditions and the variability of these resources makes the electricity sources unstable).

Figure 1.1 National Primary Energy Supply in Japan¹⁵



13. Ministry of the Environment (MOE), *What is a green electricity certificate?*, <http://www.env.go.jp/earth/ondanka/greenenergy/> (accessed 28 Jun. 2013; in Japanese).

14. Meritas *On the horizon – renewable energy in Asia*. Meritas Report (2012).

15. METI, *supra* n. 3, 97.

The following describes the implementation and effects of the two major renewable energy-related policies in Japan prior to 2012, the RPS Scheme and the Net-metering Scheme for Photovoltaic Power.

In the case of the RPS Scheme, the amount of new energy used by electricity companies was increased by setting an obligatory amount of new-energy use. Annual targets were set for the use of new-energy electricity by electric retailers for eight years. For example, in 2007, the annual targets were 8.7 TWh/year in FY 2007, and 16 TWh/year in FY 2014.¹⁶

In FY 2010, the RPS Scheme required 53 electricity companies (10 major electricity-generating companies, five specified electricity companies, and 38 specified-scale electricity companies) to use a total of 11,015 GWh of renewable energy-sourced electricity (renewable electricity).¹⁷ In FY 2010, the total amount of renewable electricity supplied to electricity companies by renewable electricity facilities was 10,246 GWh (8,873 GWh in FY 2009).¹⁸ There is a banking system such that if an electricity company supplies renewable electricity in excess of the required amount for that fiscal year, it may carry over the excess amount to the next fiscal year.¹⁹ From FY 2009 to FY 2010, 6,406 GWh was carried over.

Among the forms of renewable energy, PV power is one into which Japan has put a great deal of effort. From 1994 to 2005, and from 2008 to the present, there have been installment subsidies for residential PV power generation. In 2009, the Net-metering Scheme for Photovoltaic Power, which sets the purchasing price of PV power that electricity companies are obliged to purchase, was launched. The purchase prices from April to June 2012 were set at JPY 42/kWh (double power generation JPY 34/kWh) for residential facilities less than 10 kW, JPY 40/kWh (double power generation JPY 32/kWh) for non-residential facilities and residential facilities of 10 kW or more, and JPY 24/kWh (double power generation JPY 20/kWh) for facilities installed before FY 2010.²⁰ In July 2012, the scheme became part of the FIT Scheme, which is explained in section §1.03.

The share of residential PV power generation has increased through the introduction of the scheme, although it is difficult to distinguish the effects of separate schemes. The installation of PV systems increased from 2,627 MW in FY 2009 to 4,910 MW in FY 2011.²¹

16. ANRE, *RPS Act website*, <http://www.rps.go.jp/RPS/new-contents/top/toplink-1.html/> (accessed 29 Jun. 2013; in Japanese).

17. METI, *Report on the implementation of the RPS Act in FY2010*, http://www.meti.go.jp/english/press/2011/0714_01.html (accessed 29 Jun. 2013).

18. *Ibid.*

19. *Ibid.*

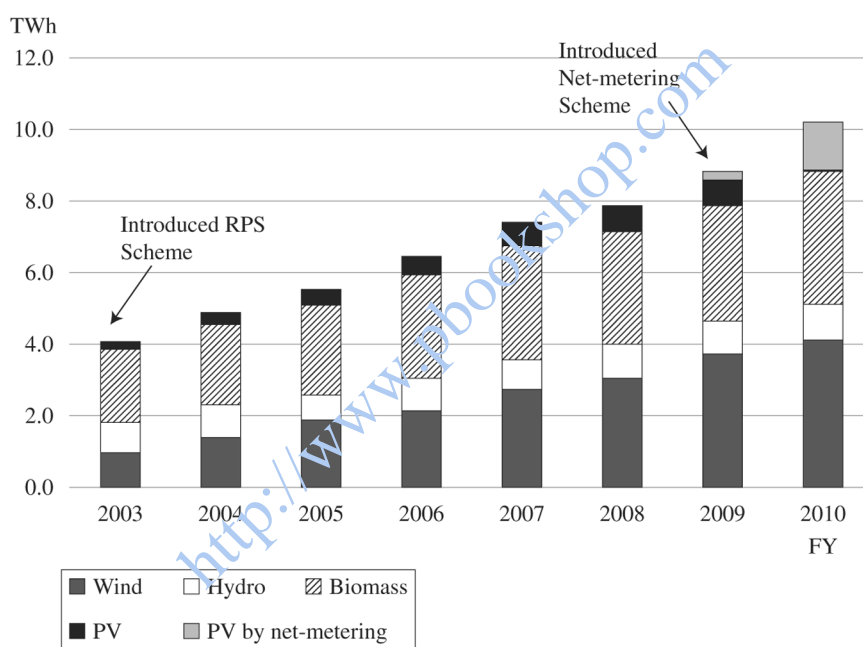
20. METI, *Purchasing prices for April to June 2012 determined; Excess Electricity Purchasing Scheme for Photovoltaic Electricity*, http://www.meti.go.jp/english/press/2012/0301_02.html (accessed 29 Jun. 2013).

21. Institute of Energy Economics, Japan (IEEJ), *Handbook of Energy and Economic Statistics in Japan 2013*. The Energy Conservation Center, Tokyo (2013).

[C] Challenges Facing Major Renewable Energy-Related Schemes

The previous section showed that the RPS Scheme and the Net-metering Scheme for Photovoltaic Power had some effects in increasing the use of renewable electricity. Although it is not clear how much specific schemes directly contributed to the increase in use of renewable electricity since there were multiple renewable energy-related schemes, Figure 1.2 shows that the total generation of renewable electricity has increased gradually since 2003. In particular, there has been a large increase in PV power generation since the Net-metering Scheme for Photovoltaic Power was introduced.

Figure 1.2 Renewable Electricity Production²²



However, as Figure 1.1 illustrated, the share of renewable energy is still small compared with the total primary energy supply in Japan. This indicates that the multiple renewable energy-related schemes including the RPS Scheme and the Net-metering Scheme for Photovoltaic Power were not successful in dramatically increasing the generation of renewable electricity.

The RPS Scheme was established with perceived multiple strengths, such as (1) there being less risk in introducing renewable electricity because the scheme sets an

22. ANRE, *About the FIT Scheme for renewable energy* http://www.hkd.meti.go.jp/hokne/saiene_nintei/seido.pdf (accessed 5 May 2013; in Japanese).

obligatory amount of renewable energy that is equitable among electricity business operators; (2) the scheme being equitable in cost burden and in market competition; and (3) the scheme having cost-effectiveness through market competition among electricity business operators. However, the RPS Scheme also has the limitation that electricity companies are obliged to purchase a certain amount of electricity. Oshima (2012)²³ explains that there are three main problems in employing a quota system in Japan: (1) the low level of the obligatory amount (in FY 2011, the annual targets of use of electricity derived from new energy by electricity retailers only accounted for 1.25% of the total generation of renewable electricity in that year), (2) inclusion of waste power generation as biomass of renewable energy (the cost of which is cheaper than that of renewable energy), and (3) the high likelihood of supporting existing equipment that does not need support, rather than supporting new equipment needed to generate and use renewable electricity. There are also lesser problems such as (4) the exclusion of a large part of geothermal power and small-scale hydropower larger than 1,000 kW, and (5) the setting of only the maximum purchasing price and the short period of purchasing goals and the introduction of the banking system that allows the electricity company to transfer an excess to the next fiscal year, meaning that there is a lack of incentive for electricity retailers to use more than the obligatory amount of renewable energy.²⁴

The Net-metering Scheme for Photovoltaic Power is a new scheme restricting the purchasing price, and has better promoted the use of PV facilities than the RPS Scheme. Although this scheme has contributed to increasing PV power generation, the challenges are that it does not support other forms of renewable electricity such as hydro and wind power, and that excess electricity is purchased only from residential and non-residential PV installments and not from power generators. In 2012, this scheme evolved into the FIT scheme, which is explained in the next section.

§1.03 FIT SCHEME IN JAPAN

The FIT Scheme in Japan (the Act on Special Measures Concerning the Procurement of Renewable Energy by Electricity Utilities) obliges electricity companies to accept applications of electricity supply contracts requested by renewable electricity producers at a fixed purchase price for a long-term period guaranteed by the Japanese government. The scheme regulates the procedures followed by the government in deciding purchase prices and periods, the certification of facilities, the collection and adjustment of surcharges related to purchase costs, and terms by which companies can reject the contracts.

The purpose of the FIT Scheme is to promote the use of renewable electricity, in addition to enhancing international competitiveness, industrial development, local revitalization, and economic development (Article 1 of the FIT Scheme). The scheme is

23. Kenichi Oshima, *Political Economics of Renewable Energy*. Toyo Keizai: Tokyo (in Japanese) (2012).

24. Institute for Sustainable Energy Policies (ISEP), *Renewables Japan Status Report 2013*. Nanatsumori Shokan: Tokyo (in Japanese) (2013).

expected to reduce uncertainty in investment recovery for renewable electricity facilities, and encourage investment to increase the generation of renewable electricity (and renewable energy itself).²⁵

[A] Reasons for Introducing the FIT Scheme

Before the FIT Scheme was enforced, as mentioned above, the RPS Scheme obliging electricity companies to purchase a certain ‘amount’ of electricity rather than to purchase electricity at a certain ‘price’ steadily increased the generation of renewable electricity. At that time, the Japanese government left some options for energy sources to the market since such a pricing policy might distort markets. However, the government did introduce an experimental pricing scheme, the Net-metering Scheme for Photovoltaic Power, in 2009, which was very successful in promoting the use of PV facilities. However, after the Great East Japan Earthquake in March 2011, the situation relating to energy has largely changed. Following the Fukushima nuclear accident, a large part of the Japanese population expressed a wish to abandon nuclear power generation, which lacks security, and to increase the generation of renewable energy. Prime Minister Naoto Kan and his cabinet decided that the share of renewable energy needs to be expanded even if the markets are distorted. Consequently, a more ambitious scheme, the FIT Scheme, was introduced in 2012.

The FIT Scheme in Japan had been under consideration since 2009.²⁶ The Japanese government had already been planning the FIT Scheme before the Fukushima Nuclear accident, but the accident accelerated the implementation of the scheme.

[B] Architecture of the FIT Scheme

[1] Overview of the Process of the FIT Scheme

Figure 1.3 is an overview of the FIT Scheme in Japan. Renewable electricity producers (including households) need their power-generating facilities to be certified by the METI.²⁷ Each electricity company purchases renewable electricity generated by the certified facilities at a fixed price for a period guaranteed by the government. The purchase costs of renewable electricity are shared by all consumers who purchase electricity from electricity companies in proportion to the volume of electricity they

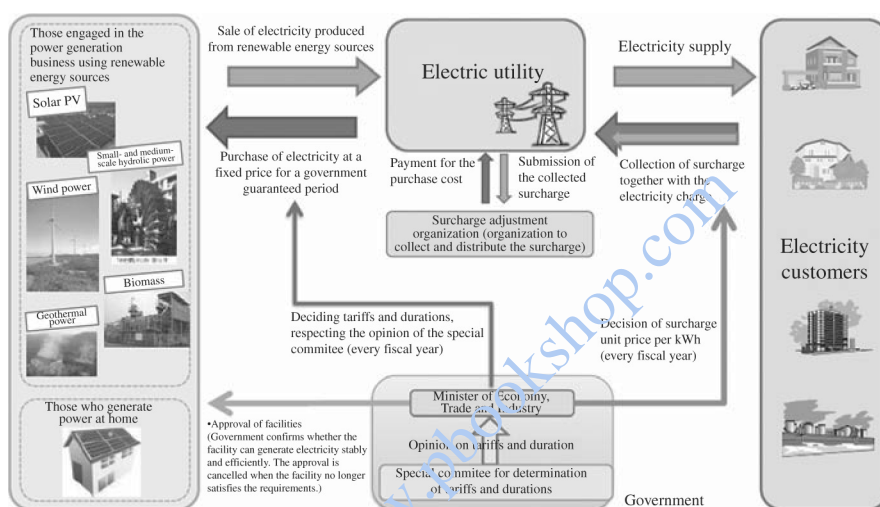
25. Takashi Kitamura, *Situation of the FIT scheme and challenge toward substantial expansion of renewable energy*. *Energy and Resources* 34 (3), 129–133 (in Japanese) (2013).

26. Agency for Natural Resources and Energy (ANRE), *Feed-in tariff scheme for renewable energy*, http://www.meti.go.jp/english/policy/energy_environment/renewable/pdf/summary201209.pdf (accessed 5 May 2013).

27. PV facilities whose capacity is less than 50 kW are certified through the Japan Photovoltaic Energy Association, and others are certified through the Bureau of Economy, Trade, and Industry of each area. Finally, the METI certifies the facilities. When specifications of a certified facility change, the facility needs to be certified again. In the case that the electricity supply by extension or repowering is measurable and can be confirmed, the electricity can be purchased (ANRE, 2012a). ANRE, *About the FIT Scheme for renewable energy* http://www.hkd.meti.go.jp/hokne/saiene_nintei/seido.pdf (accessed 5 May 2013; in Japanese).

have used.²⁸ The Surcharge Adjustment Organization²⁹ collects, calculates, and distributes the surcharge (Articles 8–18 of the FIT Scheme). Renewable electricity producers need to have two contracts with electricity companies, a specific contract and a grid connection contract (Articles 4 and 5 of the FIT Scheme). The former is a contract for the purchase and sale of generated electricity, and the latter is a contract for the connection to grids of electricity companies.

Figure 1.3 Overview of the FIT Scheme in Japan³⁰



[2] Purchase Prices and Periods under the FIT Scheme

The FIT Scheme covers PV, wind, hydro (small- and medium- scale), geothermal, and biomass power (Article 2; Table 1.1).³¹ However, not all facilities for each type of renewable energy are included in this scheme. Table 1.1 summarizes the purchase prices and periods for each form of renewable electricity under the FIT Scheme. The prices and periods are set according to the classification, installation mode, and scale of renewable electricity facilities (Article 3 of the FIT Scheme). The purchase prices and periods of PV power in FY 2012 are more favorable for renewable electricity producers

28. The surcharge is determined in units of JPY/kWh. The surcharge for the promotion of PV power under the Net-metering Scheme for Photovoltaic Power starting in FY 2009 is also imposed on electricity use (until September 2014).

29. The role of the Surcharge Adjustment Organization is described in Arts 19–30 of the FIT Scheme.

30. Agency for Natural Resources and Energy (ANRE), *Feed-in tariff scheme for renewable energy*, http://www.meti.go.jp/english/policy/energy_environment/renewable/pdf/summary201209.pdf (accessed 5 May 2013).

31. Other types of renewable energy that are now in the R&D phase will be included in the scheme in the future, e.g., renewable energy is expected to be diffused to some extent (Art. 2.4.6 of the FIT Scheme).

than those in the previous Net-metering Scheme for Photovoltaic Power. Basically, the full amount of electricity generated is purchased at a fixed price in a fixed period. For residential PV power generation, however, only surplus electricity is purchased (i.e., net-metering³²). This provides an incentive for households to save energy and to stress the continuity of the policy (i.e., the Net-metering Scheme for Photovoltaic Power). The price to be adopted is that when the electricity company receives the application form for a contract of access to the electric power system or when the METI certifies the facility, whichever is later. The period commences at the time of initiation of electricity supply under a specific contract.

Table 1.1 Classifications of Renewable Electricity, and Purchase Prices and Periods under the FIT Scheme in Japan

		Price (Including Tax; JPY/kWh)		Period (year)	Pre-tax IRR (%)
		2012	2013		
PV*	≥10 kW	42	37.8	20	6
	< 10 kW	42	38	10	3.2
	< 10 kW (with private power facilities)	34	31	10	–
Wind	≥20 kW	23.1		20	8
	< 20 kW	57.75			1.8
Hydro	1,000–30,000 kW	25.2		20	7
	200–1,000 kW	30.45			7
	< 200 kW	35.7			7
Geothermal	≥15,000 kW	27.3		15	13
	< 15,000 kW	42			13
Biomass**	Biogas	40.95		20	1
	Wood-fired power plant (timber from forest thinning)	33.6			8
	Wood-fired power plant (other woody materials)	25.2			4
	Waste	17.85			4
	Wood-fired power plant (recycled wood)	13.65			4

* Biomass that does not affect existing applications, such as paper and pulp, are available.

** In the case that systems of multiple types of renewable energy are installed, if the electricity supply from each facility is measurable and confirmed, each facility is certified and an

32. ANRE, *Major terms regulated in the FIT Scheme that should be assumed in the discussions of the Procurement Price Calculation Committee* http://www.meti.go.jp/committee/chotatsu_kakaku/pdf/011_s01_00.pdf (accessed 5 May 2013; in Japanese).

appropriate purchase price is adopted for each. If only the total amount is measurable, the price adopted for the lower-purchase price facility is adopted.

Source: ANRE (2011, 2012a) and ANRE, *Purchase price and periods*, <http://www.enecho.meti.go.jp/saiene/kaitori/kakaku.html> (accessed 5 May 2013; in Japanese).

In the Net-metering Scheme for Photovoltaic Power, the price was set by the METI. However, in the FIT Scheme, the purchase prices, periods, and classifications are discussed and reviewed every fiscal year by the Procurement Price Calculation Committee (Articles 31–37 of the FIT Scheme),³³ and the Minister of the METI makes the final decisions taking into consideration the discussions before the next fiscal year starts (Article 3 of the FIT Scheme). The purchase prices, periods, and classifications are determined so that the surcharge paid by consumers of electricity is not too high. The prices are determined according to costs usually incurred in generating electricity efficiently and the average expected power generation per facility, considering the present situation of the introduction of renewable electricity, a reasonable profit for renewable electricity producers, and actual costs in previous examples (i.e., information such as prices of materials of a power generation system obligatorily reported by the certified renewable electricity producers;³⁴ Article 3 of the FIT Scheme). In the first three years, however, the prices are set to be high enough for the producers to make a profit in order to activate renewable energy markets (Article 7 of Additional Clause of the FIT Scheme). The purchasing periods are determined considering basic periods between the start of electricity supply and the update of important components of the facilities (Article 3 of the FIT Scheme).

Table 1.1 shows that only the price of PV power has changed from FY 2012 to FY 2013. This is because there are too few newly-operating facilities for other forms of renewable electricity, and thus, there is insufficient evidence with which to update prices.³⁵

[3] *Certification of Producers of Renewable Electricity*

Renewable electricity producers are requested to obtain certification of their power generation facilities if they are to be involved in the FIT Scheme. The basic standards that needs to be met for certification are (1) the facility must be able to stably and efficiently generate electricity during the purchase period; (2) the facility must be able to transparently and fairly measure the amount of renewable electricity that is supplied to the electricity company; and (3) the facility to be used for power generation must be

33. The amount of surcharge (see section §1.03[B][5]) is considered when the Procurement Price Calculation Committee discusses prices, periods, and classifications.

34. For FY 2012, the first year of the FIT Scheme, the prices were determined by interviewing producer associations and each producer on the costs of power generation.

35. Procurement Price Calculation Committee, *Opinions on purchasing prices and periods in FY 2013*, http://www.meti.go.jp/committee/chotatsu_kakaku/pdf/report_002_01_00.pdf (Accessed 6 May 2013; in Japanese).

specified in detail (Article 6 of the FIT Scheme).³⁶ When there is any change to an already certified facility, it is necessary to obtain certification for the facility anew. When the incremental amount of electricity supplied through additional installation or repowering can be clearly measured and this fact can be confirmed by a wiring diagram or the like, the incremental output can be made subject to purchase.

[4] Purchase of Electricity by Electricity Companies

Since the amount of electricity that electricity companies have to purchase is not stipulated, they are basically obliged to purchase the full amount of electricity generated by the certified facilities (Articles 4 and 5 of the FIT Scheme). On the other hand, there are some conditions under which the electricity companies can refuse the purchase and connection of electricity generated (Article 5 of the FIT Scheme and Articles 4–6 of the Ordinance of METI). These are, for example, (1) when renewable electricity producers do not bear the necessary costs for the connection stipulated in the Ordinance of METI;³⁷ (2) when the connection has a significant adverse effect on the securement and supply of electricity by electricity companies; (3) when it is reasonably expected that the connection will exceed the capacity of transmission at the point where the producers wish to connect, and (a) the electricity companies provide reasonable evidence in writing to the producers and (b) they indicate the connecting points that are economically reasonable for the producers in writing to them; and (4) it is expected that electricity companies will receive an electricity supply from renewable electricity producers exceeding their capacity, even if they control the power without any compensation within the limits of 30 days in a year.³⁸ In any case, the electricity companies are requested to provide reasonable evidence in writing to the producers. Each electricity company controls power fluctuation due to fluctuation of renewable electricity by thermal power and hydropower generation. The capacity to control the fluctuation is determined by each company in each area and also on the local scale in the area. The capacity is relatively high in areas with large electricity demand (e.g., Kanto and Kansai areas).

[5] Surcharge Adjustment under the FIT Scheme

Since the amount of renewable electricity produced is different among different areas (e.g., the amount is largest in the Hokkaido area), the Surcharge Adjustment Organization, consigned to the Green Investment Promotion Organization, collects, calculates, and distributes the surcharge. First, each electricity company submits the

36. The details of the standards are determined by the renewable energy source (Art. 6 of the FIT Scheme and ANRE, 2011).

37. Renewable electricity producers bear the cost for power wires, voltage regulators, electricity meters, etc. (Art. 5 of the Ordinance of METI). Therefore, the deep method is basically adopted for them (*see also* Art. 6 of the Ordinance of METI).

38. Details are given in Art. 5 of the FIT Scheme and Arts 4–6 of the FIT Ordinance (the Enforcement Regulations).

surcharge collected from electricity consumers to the Surcharge Adjustment Organization.³⁹ Two groups of consumers are partially or fully exempted from the surcharge: (1) those affected by the Great East Japan Earthquake (exempted from surcharge payment from August 2012 to April 2013; Article 9 of the additional clause of the FIT Scheme) and (2) enterprises that consume a large amount of energy (exempted from payment of 80% or more of the surcharge; Article 17 of the FIT Scheme).⁴⁰ The organization then calculates the payment amount for the purchase costs of each electricity company, and distributes it. The Minister of METI determines the amount of surcharge every fiscal year⁴¹ (Article 12 of the FIT Scheme). In FY 2012, the surcharge was JPY 0.22/kWh and was updated to JPY 0.35/kWh in FY 2013.

[6] Revision of the FIT Scheme

The scheme is revised when necessary by the legislative branch of the government. The procedure followed in revising the scheme is stipulated as (1) when the Basic Energy Plan is revised, the scheme will also be revised if necessary; (2) the scheme shall be examined at least once every three years and necessary measures shall be implemented; and (3) the scheme shall be revised drastically taking into consideration the enforcement of the scheme by 2020 (Article 10 of Additional Clause of the FIT Scheme).

[C] Implementation and Effects of the FIT Scheme in Japan

[1] Production of Renewable Electricity under the FIT Scheme

Table 1.2 lists renewable electricity facilities introduced between April 2012 (the start of the FIT Scheme) and March 2013.⁴² The table shows that the introduction of renewable electricity was greatly promoted after the FIT Scheme was introduced. Renewable electricity producers tended to introduce PV facilities between 10 kW and 50 kW. This is because only surplus electricity is purchased, the purchase period is shorter for facilities less than 10 kW, and legal restrictions are stricter for facilities greater than or equal to 50 kW.⁴³ At the prefectural scale, PV facilities less than 10 kW

39. Electricity companies are permitted to collect a surcharge that exceeds their power generation costs.

40. A reduction in the surcharge of 80% or more is to be provided to business facilities whose annual electricity use exceeds an amount to be set forth in the Implementing Regulations, upon application by a business operator whose ratio of electricity use (in kWh) to sales volume (per thousand yen) (a) exceeds 8 times the average ratio in the manufacturing industry (if a manufacturer) or (b) exceeds the average ratio in the non-manufacturing industry (if a non-manufacturer) by a factor to be determined in the Enforcement Regulations.

41. $\text{surcharge} = (\text{the amount of total purchase} - \text{avoided expenses} + \text{administrative fee of surcharge adjustment organization}) / \text{annual power supply by electricity companies}$.

42. ANRE, *Status of introduction of renewable electricity facilities*, <http://www.enecho.meti.go.jp/saiene/kaitori/dl/setsubi/201305setsubi.pdf> (accessed 2 Sep. 2013; in Japanese). The information is updated almost every month.

43. ANRE, *Basic guidelines for PV field test* http://www.enecho.meti.go.jp/energy/newenergy/basic_2011.pdf (accessed 26 May 2013; in Japanese).

are installed in urban areas while PV facilities greater than or equal to 10 kW are installed throughout the country.⁴⁴ The output in Hokkaido, where multiple solar power mega-plants are planned, is the most distinctive—PV facilities of 2,059 MW are certified.⁴⁵ In addition, PV facilities are popular because environmental assessment is not required and the installation is easier than the installation of facilities for other forms of renewable electricity.⁴⁶

Table 1.2 Introduction of Renewable Energy Facilities in Japan⁴⁷

Facilities for Renewable Electricity (Type of Source)	Cumulative Capacity of Facilities as of the End of FY 2011	Combined Total Capacity of Facilities that Started Operation in FY 2012	Facilities Certified until the End of FY 2012
PV (for households)	4,400 MW	1,269 MW (300 MW from April to June)	1,342 MW
PV (other than households)	900 MW	706 MW (2 MW from April to June)	18,681 MW
Wind	2,600 MW	363 MW (zero from April to June)	798 MW
Small and medium hydro (1,000 kW or more)	9,400 MW	1 MW (1 MW from April to June)	61 MW
Small and medium hydro (less than 1,000 kW)	200 MW	23 MW (1 MW from April to June)	10 MW
Biomass	2,300 MW	36 MW (6 MW from April to June)	194 MW
Geothermal	500 MW	1 MW (zero from April to June)	4 MW
Total	20,000 MW	2,079 MW	21,090 MW

Many facilities operating under the RPS Scheme became part of the FIT Scheme (Article 12 of Additional Clause of the FIT Scheme). Under the RPS Scheme, facilities of 5,287 MW generated 9,360 GWh of electricity. About 70% (3,722 MW or 6,650 GWh) of output moved to the FIT Scheme,⁴⁸ including most wind power facilities (2,522 MW

44. ANRE, *Status of certification of renewable electricity facilities*, <http://www.enecho.meti.go.jp/saiene/kaitori/index.html> (accessed 26 Jun. 2013; in Japanese).

45. ANRE, *Status of introduction of renewable electricity facilities*, <http://www.enecho.meti.go.jp/saiene/kaitori/dl/setsubi/201305setsubi.pdf> (accessed 2 Sep. 2013; in Japanese).

46. Kitamura, *supra* n. 25, at 132.

47. ANRE, *supra* n. 45, at 1.

48. Facilities for which certification is withdrawn under the RPS Scheme can apply for certification under the FIT Scheme. (The application for withdrawal was due by 1 Nov. 2012.) http://www.hkd.meti.go.jp/hokne/saiene_nintei/seido.pdf (Accessed 5 May 2013, in Japanese).

out of 2,586 MW), although only half of the output of biomass power facilities (1,124 MW out of 2,353 MW).⁴⁹

Other outcomes of the FIT Scheme include activation of renewable energy markets due to entry of various industrial sectors irrelevant to energy business, a positive stance of banks (from megabanks to credit unions) to finance renewable energy businesses, and an expectation of energy-related technological innovation, especially the development of batteries.⁵⁰ Various industries such as home appliances, information technology, distribution, construction, and agriculture have been entered. Roofs of stores such as convenience stores and men's apparel chain stores have been used to install PV facilities. In addition, the Japan Agricultural Cooperatives and trading companies work together to install PV facilities on the roofs of livestock barns. This movement has spread throughout the country, including underpopulated areas. Idle land such as industrial parks, golf courses, and agricultural land, roofs of factories, and the tops of landfill sites of industrial waste are utilized. From the investment viewpoint, project finances for a period of 20 years and community-based investment involving local financial agencies and civil funds have been created.

[2] *Current Situation of Renewable Energy Facilities*

The present situation of renewable electricity facilities is described by energy source.⁵¹ As mentioned above, the Japanese government has put a great deal of effort into the promotion of PV power. To date in Japan, most PV power is generated by residential PV systems. Residential PV generation (by facilities less than 10 kW) is rapidly increasing and facilities with total capacity of 1,269 MW had begun operation by the end of FY 2012. Non-residential PV generation (by facilities of 10 kW or more) is also increasing (total capacity of 706 MW by the end of FY 2012); in particular, the construction of solar power mega-plants, which were few in number before the FIT Scheme was enforced, has dramatically expanded with the promoting of plans and construction throughout the country. 137 (189 MW) out of 2,709 (12,487 MW) certified facilities had started generation by the end of FY 2012. In addition, new business such as 'roof lending,' invitations to renewable electricity producers from local government, and public PV facilities are being promoted. These implementations also increase the production of PV-related domestic companies.⁵²

Large-scale wind power facilities take four to seven years to start operation since procedures such as a preliminary study and environmental assessment need to be carried out before facilities can be constructed. Thus, the facilities that started operation in FY 2012 are those planned before the FIT Scheme was enforced. Ten to

49. ANRE, *Terms pointed out in the previous committee*, http://www.meti.go.jp/committee/chotatsu_kakaku/pdf/011_02_00.pdf (Accessed 5 May 2013, in Japanese).

50. Kitamura, *supra* n. 25, at 132.

51. ANRE *Status of renewable energy after the FIT Scheme is enforced*. (Received material from METI; in Japanese).

52. Japan Photovoltaic Energy Association, *Statistics of shipping volume of PV cells*, <http://www.jpea.gr.jp/04doc01.html>; <http://www.jpea.gr.jp/pdf/t130226.pdf> (accessed 5 Jun. 2013; in Japanese).

seventy wind power plants are under construction or the subject of environmental assessment at this moment (as of March 2013). One example of a large-scale wind power plant is that in the Nunobiki highlands of Fukushima Prefecture and the second largest in Japan (65.98 MW with 33 wind turbines). This is an example of converting class-1 agricultural land to a wind farm. This attempt not only realizes compatibility between agriculture and wind power plants but also attracts visitors and increases the sales of local products. Not only on-shore but also off-shore wind power plants have recently begun operation. In Japan, four demonstration projects have now been implemented. Two are fixed wind farms off the coasts of Kitakyushu and Choshi, and the other two are floating wind farms off the coast of Fukushima and Goto Islands in Nagasaki Prefecture. In the case of small-scale wind power, on the other hand, there are few certified facilities, and none have yet begun operation.

Japan has a large amount of geothermal resources (the world's third largest, following the United States and Indonesia), and there is thus a large potential to introduce geothermal power plants. However, because of regulations covering resource-rich areas such as national parks, there have been no newly developed geothermal power plants since 1999. After the relaxation of regulations on geothermal power plants in 2012, new plans for the development of geothermal power plants have been proposed. Consequently, 10 or more projects are being developed. On the other hand, some small-scale geothermal power plants will begin operation in the near future, and hot-spring power generation projects are also planned.

Since it takes three to five years for small- and medium-scale hydropower facilities to begin operation, many hydropower projects are now in the investigation phase for commercialization. In addition, the enforcement of the FIT Scheme encourages the development of hydropower plants by establishing local councils for the development of small- and medium-scale hydropower facilities and the reexamining of projects that were not commercialized previously owing to profitability issues. In addition, there has been an increase in the number of repairs to deteriorated power plants after the enforcement. As a result, it is expected that some small- and medium hydropower plants will begin operation in a few years.

Finally, there are biomass power plants in the planning phase and plants that have been certified although only a few of them have begun operation (as of March 2013).

[D] Challenges Facing the FIT Scheme and Improvements to the Scheme

Because Japan learned from the system implemented by Germany⁵³ before establishing the FIT Scheme and because only one year has passed since the Scheme began, no major problems have been reported so far. In Japan, the share of PV power is much larger than that of any other form of renewable electricity, i.e., the shares of other forms of renewable electricity are still low. After the introduction of the FIT Scheme, as

53. In the FIT Scheme, measures such as the implementation of a unified surcharge, relaxation of the burden of the surcharge for heavy consumers of electricity, and revision of purchase prices were introduced from the beginning.

described in Table 1.2, the introduction of PV facilities, especially PV facilities other than household facilities, has increased rapidly. However, the growth of use of electricity derived from other energy sources including wind power and geothermal power, which have high growth potential in Japan, is still limited.^{54,55} To strongly promote the generation of renewable electricity (especially other than PV-derived electricity), it is necessary to overcome possible challenges and improve the FIT Scheme.

There are four aspects to possible challenges facing the FIT Scheme: the purchase price and long-term goal; grid connections; procedures; and institutions and ministries associated with renewable energy. The following discusses ways to overcome these issues.

[1] *Purchase Price and Long-Term Goal*

The first challenge is the lack of predictability of the purchase price in the next fiscal year, and the lack of a long-term goal in introducing renewable energy.⁵⁶ The lack of predictability in the price acts as a disincentive for business operators to invest in renewable electricity in the future. It is important to consider a predictable purchase price system, set the purchase price according to the latest cost data and knowledge, and publish the cost data frequently to allow business operators to predict the price.^{57,58} Additionally, setting an ambitious long-term goal to increase the introduction of renewable energy is important in providing a clear long-term outlook for renewable energy markets, which would encourage investment. A clear outlook for energy markets would strongly assist the investment decision-making of manufacturers of various instruments related to power plants.⁵⁹

[2] *Grid Connection*

Currently, one of the major barriers preventing producers of renewable electricity from PV from implementing projects is related to grid connection.⁶⁰ Unlike the situation in European countries such as Germany and the United Kingdom, electricity companies in

54. Yusaku Yano, *Potential of geothermal power generation. Research seminar on geothermal power*, <http://www.meti.go.jp/committee/materials2/downloadfiles/g81201a05j.pdf> (accessed 2 Jul. 2013; in Japanese).

55. EX Research Institute, Asia Air Survey, Pacific Consultants, and Itochu Techno-solutions *FY 2010 survey on renewable energy potential*, <http://www.env.go.jp/earth/report/h23-03/> (Accessed 3 Jul. 2013; in Japanese).

56. Japan Renewable Energy Foundation (JREF), *Achievement and challenges of the first year of the FIT Scheme*, http://www.jref.or.jp/images/pdf/20130628/FIT_press%20release_FIT1year_REV.pdf (accessed 4 Jul. 2013; in Japanese).

57. Yushi Inoue and Yumiko Watanabe, *FIT Schemes for renewable electricity in foreign counties*. *Energy and Resources* 34 (3), 134–138 (in Japanese) (2013).

58. Institute for Sustainable Energy Policies (ISEP), *Renewables Japan Status Report 2013*. Nanatsumori Shokan: Tokyo (in Japanese) (2013).

59. JREF, *supra* n. 56, at 3.

60. JREF, *Necessity of priority connection*, http://jref.or.jp/images/pdf/20130225/20130224_final_result.pdf (accessed 4 Jul. 2013; in Japanese).

Japan have no obligation to provide priority access to renewable energy. As mentioned above, they can refuse the purchase and connection of renewable electricity because of lack of capacity of transmission lines or the reserve margin being too small.

For example, since the introduction of PV power has been concentrated in Hokkaido, the region is approaching the limit of its connection capacity of renewable energy because of its small-scale electricity grid. There is a risk that the Hokkaido Electric Power Company will increasingly refuse connections. Furthermore, although the potential of renewable energy is high in the Hokkaido area, Hokkaido needs to manage the generated electricity in the area since the capacity of electric power interchange is small (600 MW) between Hokkaido and Honshu (the main island of Japan). However, its capacity to control power is small owing to the small demand in the area.⁶¹ In April 2013, the METI released methods for responding to the problems faced by Hokkaido, and decided to (1) revise conditions of connections in the specific area to expand the capacity of connection, (2) introduce large-scale batteries to expand the connection of renewable electricity and (3) expand wide-area grid operation according to electricity system reform.⁶²

Grid connection is a major problem not only for PV power but also for other forms of renewable electricity such as wind power. In Japan, areas where the wind speed is sufficient for constructing wind farms are limited to parts of Hokkaido and Tohoku.⁶³ Since the population density is low in these areas, the infrastructure of power grids is limited in these areas. This could result in some of the electricity produced by wind power generation being unable to be fed into the grid. Therefore, the areas suitable for wind power generation in Hokkaido and Tohoku are designated as strategic areas, and it is planned to support private business in developing grids and to demonstrate the business model and technological issues. In particular, a special-purpose company has been established (over half the investment for which is from private businesses and the remaining is from electricity companies) and the investment is recouped through use fees paid by wind power producers. Since this business is unprofitable, half of the project cost is subsidized by the government.

To enhance the generation of renewable electricity, it is important to address grid connection problems, such as by obliging electricity companies to provide priority access,^{64,65} and by expanding the infrastructure of energy transmission and distribution.⁶⁶ In addition, large-scale batteries for the major power grids of renewable

61. METI, *Summary of the press conference by the Minister of METI, Yukio Edano*, http://www.meti.go.jp/speeches/data_ed/ed121207j.html (accessed 9 May 2013).

62. ANRE, *Response to the connection of large-scale PV in Hokkaido*, <http://www.meti.go.jp/press/2013/04/20130417003/20130417003.pdf> (accessed 6 Jul. 2013; in Japanese).

63. ANRE, *Basic information for the Procurement Price Calculation Committee*, http://www.meti.go.jp/committee/chotatsu_kakaku/pdf/008_02_00.pdf (accessed 9 May 2013; in Japanese).

64. Institute for Sustainable Energy Policies (ISEP), *Renewables Japan Status Report 2013*. Nanatsumori Shokan: Tokyo (in Japanese) (2013).

65. Japan Renewable Energy Foundation (JREF), *Achievement and challenges of the first year of the FIT Scheme*, http://www.jref.or.jp/images/pdf/20130628/FIT_press%20release_FIT1year_REV.pdf (accessed 4 Jul. 2013; in Japanese).

66. Minoru Nakamura (Toyo Keizai), *A lot of challenges of renewable energy*, <http://toyokeizai.net/articles/-/13636> (accessed 5 Jul. 2013; in Japanese).

electricity facilities themselves will be needed in preparing for a rapid increase in the generation of renewable electricity. It takes a decade to develop power transmission lines; however, the capacity for the reception of renewable electricity is limited. In FY 2012, JPY 29.59 billion was allocated to demonstration projects of large-scale batteries. In FY 2013, the government's budget contained JPY 2.7 billion of subsidies for battery R&D⁶⁷ to reduce the unit cost of a battery (JPY 40,000/kW) to the level of pumped hydropower generation (JPY 23,000/kW).

[3] Procedures

Unlike the case for PV power generation, one of the most significant problems facing wind and geothermal power generation is that it requires environmental assessment, which takes around three to four years.⁶⁸ Thus, acceleration and simplification of the process need to be considered, and the keys are (1) to shorten reviews by national and local governments, and (2) to shorten environmental investigation of the FIT Scheme. Aiming to halve the proceeding period of environmental assessment for wind and geothermal power plants, the METI and Ministry of the Environment (MOE) decided to implement parallel reviews by national and local governments and to rationalize the reviews through the participation of business operators. In addition, it is considered necessary to collect and manage information used in previous environmental assessments for the benefit of business operators in their assessment.

[4] Institutions and Ministries regarding Renewable Energy

To promote the generation of renewable electricity, it is necessary to link and fill the gaps among institutions and ministries in overcoming renewable energy-related problems. Table 1.3 gives the related Acts and ministries, and the challenges facing the promotion of renewable electricity. The table also gives the options for overcoming the challenges and the current actions being carried out to do so.⁶⁹

67. Kitamura, *supra* n. 25, at 133.

68. ANRE, *Basic information for the Procurement Price Calculation Committee*, http://www.meti.go.jp/committee/chotatsu_kakaku/pdf/008_02_00.pdf (accessed 9 May 2013; in Japanese).

69. ANRE *Status of renewable energy after the FIT Scheme is enforced*. (Received material from METI; in Japanese).

Table 1.3 Institutional Challenges Facing the Promotion of Renewable Electricity

Type	Act	Main Implementing Ministries	Challenges in Promoting Renewable Electricity	Options to Overcome the Challenges	Current Actions to Overcome Challenges
Location regulations	Factory Location Act	METI	Greening regulation in the act is applied even if PV facilities are installed on the roof of non-factory buildings such as business establishments.	Revision of regulations on area and greening of manufacturing facilities related to PV facilities.	PV facilities are exempted from the notification in the act. In addition, they are classified as environmental facilities.
	Agricultural Land Act /Act on Establishment of Agricultural Promotion Regions	MAFF	Conversion of large-scale agricultural land (e.g., class-1 agricultural land) is not permitted by renewable electricity producers except the nine electricity companies.	Revision of regulations related to agricultural land.	Treatment of installation of renewable electricity facilities when they do not have adverse effects on secure agricultural land and contribute to regional development has been clarified.
	Act on Utilization of National Forest Land/ Public Accounting Act	FA MOF	Lending of national forest by private contract to renewable electricity producers is not permitted except for the nine electricity companies, because their businesses are not for the public.	Lifting the ban on lending national forest land to private power producers and companies of steam production for geothermal power.	Certified facilities in the FIT Scheme are added to the coverage of private contracts.

<i>Type</i>	<i>Act</i>	<i>Main Implementing Ministries</i>	<i>Challenges in Promoting Renewable Electricity</i>	<i>Options to Overcome the Challenges</i>	<i>Current Actions to Overcome Challenges</i>
	Forest Act	FA	Procedures of unspecifying protected forest can be rejected by local governments or national government that strictly require evidence that no other suitable places for development exist.	Unspecifying protection forests and concretization of rules on work permits in protected forests.	Considerations relating to operation of the protected forest regulation are released.
	Natural Parks Act	MOE	Establishment of geothermal power plants is virtually prohibited in special areas.	Lifting the ban on mining investigation and development of geothermal power in the special areas of national parks.	Notification to permit the development of class-2 and 3 special areas with conditions has been released.
	Hot Springs Act	MOE	It is difficult to obtain mining permits, because the criteria for mining permits are unclear.	Mining permits based on scientific evidence.	A guideline allowing scientific reviews has been released.

<i>Type</i>	<i>Act</i>	<i>Main Implementing Ministries</i>	<i>Challenges in Promoting Renewable Electricity</i>	<i>Options to Overcome the Challenges</i>	<i>Current Actions to Overcome Challenges</i>
	River Act	MLIT	Procedures for small-scale hydropower are the same as those for large-scale hydropower.	Simplification of procedures for permitting water rights related to small-scale hydropower.	Procedures for small-scale hydropower have been rationalized and simplified (according to used water flow and the scale of power generation). A license system has been introduced for subordinate power generation in the range of existing water right permits.
Safety regulations	Building Standards Act/ Ship Safety Act	MLIT	Building structural standards required for off-shore wind power are unclear.	Improvement of legal systems related to off-shore wind power (e.g., structural standards).	Technological standards have been established according to the Ship Safety Act. Structural standards for floating wind power facilities have been unified with the Ship Safety Act (and exempted from the Building Standards Act).

<i>Type</i>	<i>Act</i>	<i>Main Implementing Ministries</i>	<i>Challenges in Promoting Renewable Electricity</i>	<i>Options to Overcome the Challenges</i>	<i>Current Actions to Overcome Challenges</i>
	Electricity Business Act	METI	The safety regulations are excessive for PV facilities, because they are safer than other power generation facilities.	Relaxation of safety regulations related to PV.	The ministerial ordinance has been revised to expand the range in which the notification of construction plans is unnecessary. The capacity range for which it is not necessary to appoint a chief electricity engineer has been expanded (from less than 1,000 kW to less than 2,000 kW).
Grid and other regulations	Electricity Business Act	METI	Predictability of possibility and costs of grid connection is not high.	Smoothing grid connection.	Revisions have been implemented, such as disclosure of possible points for grid connection and details of connection costs and work periods, unionization of documents for the procedure, and shortening of the standard processing periods.

<i>Type</i>	<i>Act</i>	<i>Main Implementing Ministries</i>	<i>Challenges in Promoting Renewable Electricity</i>	<i>Options to Overcome the Challenges</i>	<i>Current Actions to Overcome Challenges</i>
	Waste Management and Public Cleansing Act	MOE	If biomass fuel is treated as waste, it will be costly because permissions for waste power facilities/ business and transportation is required.	Clarification of treatment of biomass fuel in the act.	Cases in which local governments do not consider biomass fuel as waste have been collected. It has been clarified that power producers are exempted from regulations of the Waste Management and Public Cleansing Act in the case that the transportation costs of biomass fuel are higher than the sale value.

* MAFF: Ministry of Agriculture, Forestry and Fisheries, FA: Forestry Agency, MOF: Ministry of Finance, MLIT: Ministry of Land, Infrastructure, Transport and Tourism.⁷⁰

So far, institutional arrangements for renewable energy have been mainly designed and discussed by the METI. However, in promoting renewable energy, Acts implemented by other ministries, as described in Table 1.3, will also be related. For example, in introducing geothermal power, there are conflicts with the Act on Utilization of National Forest Land and Public Accounting Act implemented by the Forestry Agency and Ministry of Finance, and the Natural Parks Act implemented by the MOE. Therefore, it is important to identify conflicts and lessen the gaps among the Acts and ministries.

70. ANRE Status of renewable energy after the FIT Scheme is enforced. (Received material from METI; in Japanese).

§1.04 CONCLUDING REMARKS

This chapter presents an overview of the effects and challenges of previous and current renewable energy-related policies and institutions in Japan, with a focus on the newly-introduced FIT Scheme.

The RPS Scheme and Net-metering Scheme for Photovoltaic Power have different scopes and methods, and the latter was more effective in terms of increasing PV power generation. Since the FIT Scheme was launched in 2012, the Japanese government has been trying to unify renewable energy-related institutions under it, including integrating the RPS Scheme and the Net-metering Scheme for Photovoltaic Power. Additionally, subsidies for renewable energy are being reduced. The FIT Scheme has a large potential to increase the use of renewable electricity and renewable energy more generally by allowing renewable energy business operators to develop long-term investment plans and obtain financing from banks. However, as described in the previous section, so far, the FIT Scheme has only really affected PV power introduction. There are possible obstacles preventing the FIT Scheme from enhancing the use of renewable energy dramatically, including the lack of a predictable purchase price and long-term goal for renewable electricity, limited grid connections and connection refusals, ineffective procedures, and gaps among institutions and ministries associated with renewable energy.

Since the Fukushima Nuclear Accident and the resultant shutting down of nuclear power plants across Japan, there has been a growing demand to increase the use of renewable electricity in Japan. Additionally, the Bill of the Basic Act on Global Warming Countermeasures included a target of raising the share of renewable energy to 10% of the total primary energy supply by 2020, and the Energy and Environmental Council of the Japanese government decided in September 2012 to aim for zero nuclear power generation by the 2030s. Although these two measures were scrapped after the dissolution of the lower house, the Democratic Party of Japan has contributed to raising public awareness of the need for renewable electricity to some degree.

To enhance the generation of renewable electricity in Japan, it is important to overcome the challenges of the FIT Scheme including the lack of predictability of the purchase price in the next fiscal year and the lack of a long-term goal in introducing renewable energy, grid connections-related issues, long lead-in period for wind and geothermal power generation, and gaps among institutions and ministries associated with renewable energy. In addition, it is necessary to raise public awareness of the need for renewable electricity. Although the Fukushima Nuclear Accident and the shutting down of nuclear power plants across Japan has raised public awareness, whether we can keep doing so is highly dependent on the policy direction of the current regime of the Liberal Democratic Party Shinzō Abe.