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RENEWABLE ENERGY INSTITUTE

Electricity Certificate for Renewables

Comparison of Japanese and International Systems

English Edition
April 2022

Contents

Renewable Energy Institute published “Electricity Certificate for Renewables.” The full Japanese edition is compiled for Japanese stakeholders to help them recognize the roles and requirements of electricity certificates (or energy attribute certificates) and covers information on major certificates including GO in Europe, REC in North America, I-REC in various nations and the Japanese local certificates.

This English edition focuses on the Japanese certificates mainly on Non-Fossil Certificate (NFC), currently used as the nation’s standard certificate for renewable or CO_2-free electricity.

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We would like to express our sincere gratitude to everyone who cooperated in compiling this document.

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About Renewable Energy Institute

Renewable Energy Institute is a non-profit think tank which aims to build a sustainable, rich society based on renewable energy. It was established in August 2011, in the aftermath of the Fukushima Daiichi Nuclear Power Plant accident, by its founder Mr. Masayoshi Son, Chairman & CEO of SoftBank Group Corp., with his own resources.

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Introduction: Toward Reliable Electricity Certificates

There are a variety of ways to produce electricity. Different energy sources are used to generate electricity, including coal, natural gas, nuclear, solar, wind, hydro, geothermal and biomass. The environmental impact, such as carbon dioxide (CO_2) emissions, is not the same. However, no matter which method is used to generate the electricity, it can be used in the same way.

With differences in the environmental impact of different generation methods, there is a growing demand for supplying and using electricity with a lower environmental impact. Electricity certificates are a concrete expression of the environmental characteristics (environmental values) associated with electricity generated. Electricity certificates are widely used around the world as a means of proving the characteristics of the electricity generated and used.

There are three types of electricity certificates in Japan: "Non-Fossil Certificates," "Green Electricity Certificates," and "J-Credits (renewable energy generation). In Europe "GO (Guarantees of Origin)" promoted by the European Union, and in North America "REC (Renewable Energy Certificate)" are the standard in the regions. "I-REC (International Renewable Energy Certificate)" is available in more than 40 countries and regions. In addition, China, the United Kingdom, and other countries have their own electricity certificates.

For electricity certificates to be officially valid, they must be operated in a reliable manner recognized by the governments of each country. However, the method of operation of electricity certificates is not the same for every country. This is because electricity systems and rules differ from country to country and region to region, and there are also differences in the purposes for which the certificates are used.

It was desirable that electricity certificates meeting certain requirements could be used in each country. Ideally, companies, households, and other consumers of electricity should be able to purchase electricity in any country after confirming its environmental values through certificates. Climate change has become a major social issue, and the use of electricity from renewable energy sources is spreading around the world. Electricity certificates proving the environmental values of electricity have been increasingly important.

While there are differences among electricity certificates in different countries and regions, many of them meet certain criteria in terms of basic requirements and operating methods. In developed countries, except for some countries such as the United Kingdom, only one type of electricity certificate can be used within a country or region. In Japan, however, three types of electricity certificates exist. Each has different requirements for issuing certificates and different conditions of use.

Non-Fossil Certificate (NFC), which plays a standard role among them, does not fully meet the requirements for an internationally reliable electricity certificate. NFCs lack information to confirm the environmental values. It is not possible to select certificates by the generation method or the type of fuel, as is the case with international electricity certificates. They only certify the environmental values of electricity generated from renewable energy sources, and there is no way to identify whether the electricity was generated by solar, hydro, biomass, or others. There are differences in environmental values depending on the generation method and fuel, but regardless of the values, NFCs are traded at the same price.

In international certificates, strict requirements are set for hydro and biomass, allowing consumers to select electricity and certificates with low environmental impact. The lower the environmental impact of the generation method, the higher the price of the certificate should be. However, NFCs do not contain information to determine environmental impact. To mitigate climate change, it is effective to build new (additional) renewable energy facilities (called “additionality”) replacing thermal power generation, but we cannot purchase NFCs based on the additionality. Green Electricity Certificates and J-Credits also lack the necessary information.

These problems with Japanese electricity certificates create barriers for consumers to promote decarbonization by using renewable electricity effectively. A new electricity certificate system must be established as soon as possible to expand renewable electricity with low environmental impact demanded by consumers nationwide.

This report summarizes the status and future direction of international electricity certificates focusing on GO, REC and I-REC. Comparing with these certificates, we will identify issues of Japanese electricity certificates and present a proposal for reform to develop an internationally reliable electricity certificate system.

To reform the current complicated and insufficient system in Japan, it is desirable to unify the three existing electricity certificates. The new certificates should disclose detailed information such as the generation method and the fuel used, so that consumers can select electricity and certificates based on the information. In addition, it is important from the reliability standpoint that the entire process from registration of generation facilities to issuance, trade and use of certificates can be managed through an online system.

Japan is now expected to establish a new certification comparable to the international electricity certificates that have already been realized in many countries and regions.

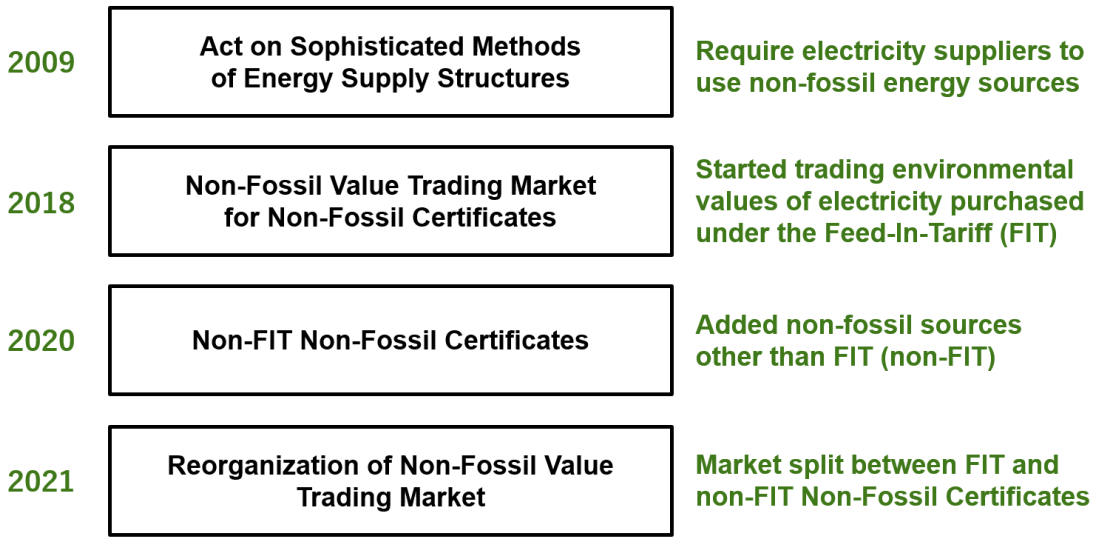
Japanese Electricity Certificates

1. Non-Fossil Certificates

Three types of electricity certificates exist in Japan, but most of the certificates issued are "Non-Fossil Certificates (NFCs)".

In 2020, the Agency for Natural Resources and Energy (ANRE) expanded the scope of NFCs, which had been issued only for electricity from renewable energy sources purchased under the Feed-in Tariff (FIT), to include all electricity from renewable energy sources and electricity from other sources that do not emit carbon dioxide (CO_2) including nuclear (Chart 1).

Chart 1. History of Non-Fossil Certificates



In conjunction with this change, a new guideline is published that electricity from renewable energy sources supplied by retailers to consumers via the transmission and distribution network must be sold in combination with NFCs. Without combining NFCs, retailers cannot sell electricity to consumers as renewable energy or CO_2-free. In corporate PPAs (Power Purchase Agreements), which are expected to expand in Japan, the environmental values provided to customers must also be proven with NFCs except onsite PPAs.

The NFC system is complicated, making it very difficult for businesses and consumers to use. Moreover, the system does not meet the basic requirements for internationally reliable electricity certificates. There is an issue of not being able to properly evaluate electricity from renewable energy sources with low environmental impact and additionality. Fundamental reform of the system is required.

The reason for the complexity of the NFC system lies in the original purpose of its introduction. When the NFCs were launched in 2018, there were two objectives.

First, the environmental values of renewable electricity purchased under the FIT ("FIT electricity") remained buried and could not be exploited. Most of the purchasing cost of FIT electricity is supported by the renewable energy surcharge, which is added to the electricity tariff. The government owns the environmental values of FIT electricity on behalf of consumers. By issuing and selling the environmental values as NFCs, the revenue can be used to reduce the renewable energy surcharge.

As a second objective, the Act on Sophisticated Methods of Energy Supply Structures ("Sophisticated Act"), which was enacted to reduce national CO_2 emissions, requires retailers to set a target for the share of non-fossil sources (44% or higher of electricity sales in FY2030, from April 2030 to March 2031). NFCs are made available as a means of achieving this target. Retailers that have difficulty meeting the target need to purchase NFCs to increase the share of non-fossil sources.

For the above purposes, ANRE issued NFCs for FIT electricity in 2018. Subsequently, non-fossil sources without the support of FIT (Non-FIT) were added to NFCs from FY2020. Non-fossil sources include nuclear power, which does not emit CO_2, but its environmental values are different from those of renewables. For this reason, Non-FIT NFCs were divided into "renewable energy designation" and "no renewable energy designation" (Table 1).

Table 1. Overview of Non-Fossil Certificates

Certificate Name	FIT Non-Fossil Certificate	Non-FIT Non-Fossil Certificate (renewable/non-renewable)
Standard Setting Body & Issuer	Agency for Natural Resources and Energy (ANRE)	
Eligible Facility	Generation facilities certified by Feed-In-Tariff (FIT)	Generation facilities using non-fossil fuels without FIT
Generation Technology	Solar, Wind, Small & Medium Hydro, Geothermal, Bio	Solar, Wind, Hydro, Geothermal, Bio, Nuclear and others
Purchaser	Electricity retailer, Broker, Electricity user	Electricity retailer, Electricity user (only for PPA)
Transaction Method	Auction in Japan Electric Power Exchange (JEPX)	Auction in JEPX, Bilateral transaction between generator and retailer
Tracking Information (ref. Chart 2)	Facility ID, Facility Type, Facility Name, Generator Name, Generation Output, Certified Date, Commission Date, Facility Location, Allocated Amount	
Validity Period	From April of the generation year to March next year	
Issuance Amount	99.7 TWh (FY2020)	approx. 90 TWh (FY2020)

After a series of revisions, NFCs are now issued and traded in three types: "FIT NFCs," "Non-FIT NFCs (renewable)" and "Non-FIT NFCs (non-renewable)". Furthermore, in August 2021, the trading market for NFCs was divided into two. FIT NFCs are traded in the "Renewable Energy Value Trading Market" and Non-FIT NFCs are in the "Market for Achieving the Obligation under the Sophisticated Act". Along with this change, retailers are not able to use FIT NFCs for meeting the targets of the Sophisticated Act. The system has become increasingly complex.

In addition to the complexity of the system, a fundamental issue remains with NFCs. They are not accompanied by the environmental attribute information indispensable for reliable electricity certificates. International electricity certificates are accompanied by attribute information, such as the location of the generating facility, to enable tracking of the environmental values of the electricity that is the subject of the certificate. Based on this information, consumers and businesses can evaluate the environmental impact and additionality. The ability to track the environmental values of electricity based on attribute information is also important to prove that it is not being used twice.

However, NFCs do not have the attribute information. The only information attached to the certificate is whether the electricity is supplied under FIT or Non-FIT, and whether it is derived from renewable energy or not. This is unusual among the electricity certificates issued in countries around the world. Because the system was originally created to achieve the goals of the Sophisticated Act, it has deviated significantly from the global trend. Electricity certificates that do not track attribute information are not recognized by the international initiative RE100 as a means of procuring renewable electricity (they are recognized when attribute information can be verified by bilateral contract).

As a solution, ANRE launched a demonstration experiment in 2019 to retrofit NFCs with attribute information. When retailers apply for tracking of FIT NFCs purchased on the trading market by designating specific generating facilities or by other means, information such as the location and generation method of the facilities will be attached to the certificates after the purchase. While international certificates are accompanied by attribute information when they are issued, and certificates can be selected and purchased based on the attribute information, such a purchase method is not feasible for NFCs.

In the tracking demonstration experiment, nine items of attribute information are assigned (Chart 2). It includes generation type of the facility (generation method), location of the facility, generation output, and the commission date, which is the minimum information required to determine environmental impact and additionality.

Chart 2. Tracking information of Non-Fossil Certificates

No	Item	Tracking Information	Tracking Information for solar less than 20kW
1	Facility ID	A0123456D01	A0123456D01
2	Type of Facility	Solar	Solar
3	Facility Name	XX	N/A
4	Generator Name	YY	N/A
5	Generation Output	500kW	10kW
6	Certified Date	20XX/1/1	20XX/1/1
7	Commission Date	20XX/3/1	20XX/3/1
8	Location of Facility	1-1-1 Toyosu, Koto, Tokyo	City, Prefecture
9	Allocation Amount	1,000kWh	1,000kWh

Source: Agency for Natural Resources and Energy
（English text by Renewable Energy Institute）

Compared to international electricity certificates, the generation method is only classified into five categories (solar, wind, hydro, geothermal, and biomass), and specific information such as fuel type is not included. For photovoltaic solar facilities of less than 20 kW (kilowatts), the name of the generator is not included to protect personal information, as most of these facilities are for residential use.

Starting with the FY2021 auction, the tracking demonstration was expanded to cover all FIT NFCs, and a part of Non-FIT NFCs (renewable) were also included. Attribute information can be assigned to Non-FIT NFCs (renewable) if the generator applies for tracking.

In the auction conducted in November 2021 by the Japan Electric Power Exchange (JEPX), which operates a trading market for NFCs, approximately 2.8 billion kWh (kilowatt-hours) of Non-FIT NFCs (renewable) were traded. Of this amount, only about 1 billion kWh of certificates were trackable, or about one-third of the traded volume.

In addition to market trading, Non-FIT NFCs are traded directly between generators and retailers under a bilateral contract with electricity. RE100 recognizes Non-FIT NFCs (renewable) traded under bilateral contracts as an option of procuring electricity from renewable energy sources. However, it notes that this is not the best way and recommends the Japanese government that attribute information for all NFCs can be tracked electronically (Chart 3).

Chart 3. RE100 Recommendations for Non-Fossil Certificates

"RE100 defines renewable electricity consumption as the ability to make unique claims on the use of renewable electricity generation and its attributes. As a best practice, company retires or retains energy attribute certificates issued by the energy generation facility from which it wants to claim consumption. In countries where no tracking systems are in place, claims shall be made by transfer of attributes via contracts or any other means that ensure claims are unique and there is no double counting". Therefore, contractual arrangement of renewable energy attributes can be used to substantiate the RE uses claims, but it's not a best practice especially when energy attribute certificates are created and issued to the renewable energy generation. Making credible RE use claims depends largely on effectively tracking RE attributes, verifying exclusive delivery by generators and suppliers, and verifying exclusive ownership of attributes by grid customers buying RE. The most sophisticated mechanism for tracking energy attribute certificates is an electronic attribute "tracking system", in which certificates are electronically serialized and issued to generators with accounts on the system, tracked between account holders in the system where they are traded, and ultimately permanently retired or cancelled electronically by the entity making the claim or on behalf of an end-user making a claim.

Source: Agency for Natural Resources and Energy

ANRE will transfer tracking operations to JEPX starting with NFCs to be issued for FY2022, and JEPX will be responsible for the tracking business along with the NFC trading market. For the time being, however, the existing tracking system is expected to continue.

Another problem remains with NFCs. Among the attributes associated with electricity, the value of the place of origin and the value of the specific generator are not included. The Electricity Business Act stipulates that these two values are attached to the electricity trading contract, not the certificate. Simply attaching information on the location of the generation facility to NFCs does not necessarily appeal to the place of origin and the specific facility. It must be combined with an electricity trading contract.

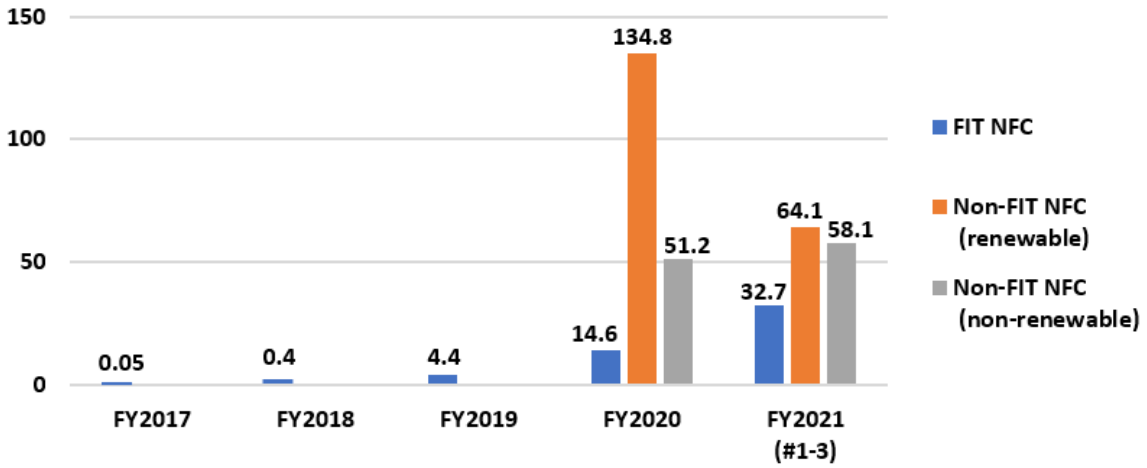
Reliable electricity certificates are required to aggregate all attributes associated with electricity. It is listed in the criteria by RE100 for reliable certificates. In this regard, NFCs do not meet the requirements. ANRE is considering the development of electricity certificates with all attributes, including the values of place and specific facility. It will be an internationally reliable electricity certificate and should be implemented as soon as possible.

The trading volume of NFCs has expanded significantly since FY2020, when trading of Non-FIT NFCs began. Even so, when limited to market transactions, it is still less than 10% of the country's total renewable electricity generation (approx. 200 billion kWh, FY2020). Currently, the volume of both FIT NFCs and Non-FIT NFCs (renewable) issued far exceeds demand. For the time being, it is not expected that there will be a shortage of supply even if demand increases.

In addition to market trading, bilateral trading of Non-FIT NFCs is also allowed, but the volume of bilateral trading is not disclosed. According to the results of a survey conducted by ANRE for retailers, about two-thirds of Non-FIT NFCs traded in FY2021 (including those not designated as renewable energy) were traded on a bilateral basis, and about one-third were traded on the market.

The floor price is set for market trading of NFCs, both FIT and Non-FIT, and currently traded at the floor price of the market with a few exceptions. The floor price for FIT NFCs was 1.3 yen/kWh until the auction in May 2021 but was reduced to 0.3 yen/kWh from November 2021. The objective was to curb the burden on consumers by lowering the price to a level comparable to that of electricity certificates overseas. As a result, the volume of transactions of FIT NFCs more than doubled in FY2021 (Chart 4).

Chart 4. Transaction Volume of Non-Fossil Certificates
(via JEPX, unit: 100 GWh)



*FY2021 #4 auction is scheduled for May 2022.

Source: Japan Electric Power Exchange (JEPX)

On the other hand, the floor price for Non-FIT NFCs was not set initially but was set at 0.6 yen/kWh from August 2021, to prevent the trading price from falling as the floor price for FIT NFCs was lowered.

The majority of Non-FIT NFCs are from large hydro, residential solar after the end of the FIT purchase period (“Post-FIT”), and nuclear, with the overwhelming majority of the volume owned by the regional utilities. Many of purchasers of the certificates are new retailers that are obligated to meet the targets of the Sophisticated Act, and the revenue from Non-FIT NFCs will be brought to the regional utilities.

This revenue stream will be a factor that hinders competition between regional utilities and new retailers, and its impact will be brought to consumers. There is an urgent need to review the system from the perspective of promoting the liberalization of electricity retail.

As in other countries, electricity certificates in Japan should be traded including information on the generation method and other attributes. Certificates that meet the requirements of consumers will be traded at a higher price, and those that do not meet the requirements at a lower price. The price of certificates should be determined by environmental impact, additionality, and other key values, which will encourage the development of new generation facilities with low environmental impact.

In this regard, the current NFCs must be restructured, and a market should be created where individual certificates can be traded based on the environmental values.

2. Green Electricity Certificates and J-Credits

Green Electricity Certificates and J-Credits (renewable energy generation) have been used as electricity certificates for renewables before the NFC system was introduced. Since NFCs have become the standard for electricity certificates in Japan, Green Electricity Certificates and J-Credits (renewable) are served as a complement to NFCs. Both are used as a means of certifying and trading the environmental values of renewable electricity for self-consumption (Table 2).

Table 2. Overview of Green Electricity Certificates and J-Credits (renewable energy)

Certificate Name	Green Electricity Certificate	J-Credit (renewable energy)
Standard Setting Body & Issuer	Japan Quality Assurance Organization (JQA)	Jointly by Ministry of Economy, Trade and Industry (METI), Ministry of the Environment (MOE) and Ministry of Agriculture, Forestry and Fisheries (MAFF)
Eligible Facility	Onsite generation facilities for self-consumption, Certified facilities before FY2020	Onsite generation facilities for self-consumption
Generation Technology	Solar, Wind, Hydro, Geothermal, Bio	Solar, Wind, Hydro, Geothermal, Bio
Purchaser	Electricity user	Electricity user
Transaction Method	Sales by Green Electricity Certificate supplier	Auction by J-Credit Secretariat, Sales by J-Credit owner or broker
Tracking Information	Owner name, Serial number, Generation amount, Generation period, Generation technology, Date of issuance, Supplier name	Credit ID, Project number, Project operator name, Geographical area, Project overview, Project type, Certified period, Certified amount, Renewable electricity amount
Validity Period	No deadline	No deadline
Issuance Amount	585 GWh (FY2020)	980 GWh (FY2020, certified)

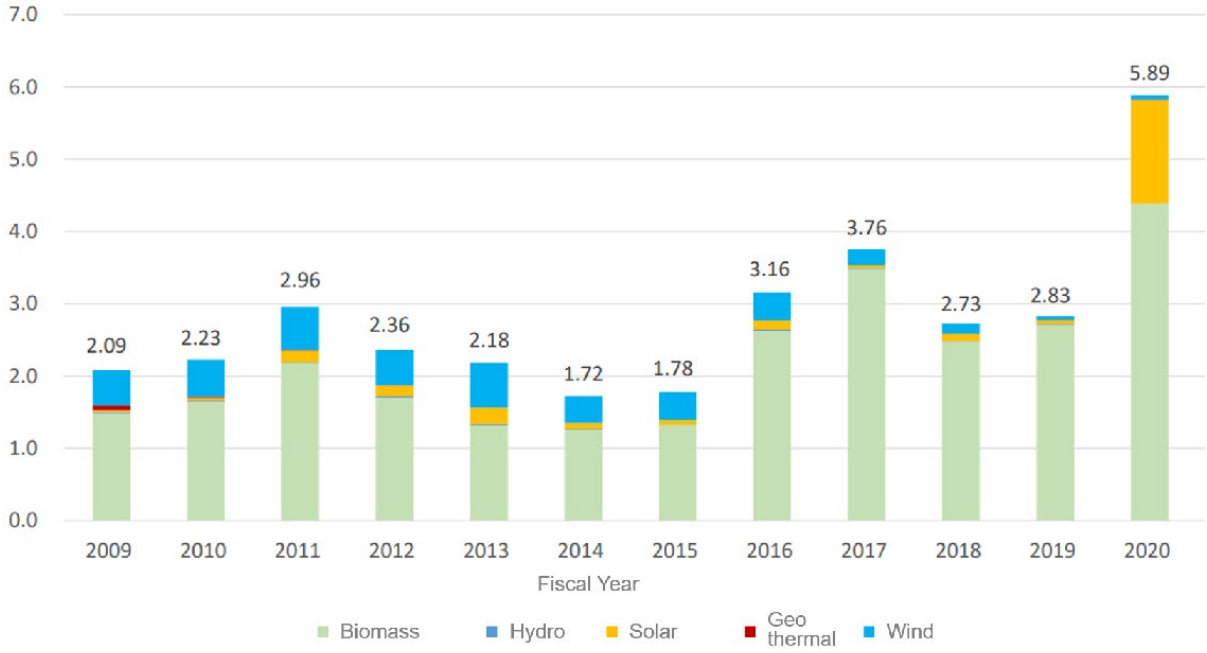
Green Electricity Certificate (GEC) was established in 2000 by Japan Natural Energy, a private company. ANRE subsequently supported the establishment of a third-party certification organization to promote the program. Currently, the Japan Quality Assurance Organization (JQA) is responsible for standardization and is also in charge of certification of generation facilities and certificates. Thirty-nine companies and organizations are certified GEC suppliers as of March 1, 2022.

Like international electricity certificates, GECs can be issued and traded with accompanying attribute information. However, they are not traded through an online system. Attribute information for each certificate is disclosed in a tabular format on JQA's website, including the date of certification, name of the certificate provider, name of the last owner, period of electricity generation and amount of electricity, the name of the generation facility, type of generation method, and date of issuance. But information on the commission date of the generation facility is not included.

The amount of GEC issued in FY2020 was about 600 million kWh, more than double the amount issued in the previous year (Chart 5). Still, this represents only about 0.3% of the country's total renewable electricity generation. As onsite generation facilities using renewable energy sources are expanding nationwide and the amount of electricity consumed onsite increases, GECs are expected to increase as well.

Among five generation methods, biomass accounts for more than 70% of the GECs issued in FY2020. One of the reasons for the large increase in FY2020 is the addition of Post-FIT residential solar facilities for self-consumption.

Chart 5. Issuance Amount of Green Electricity Certificate
(unit: 100 GWh)



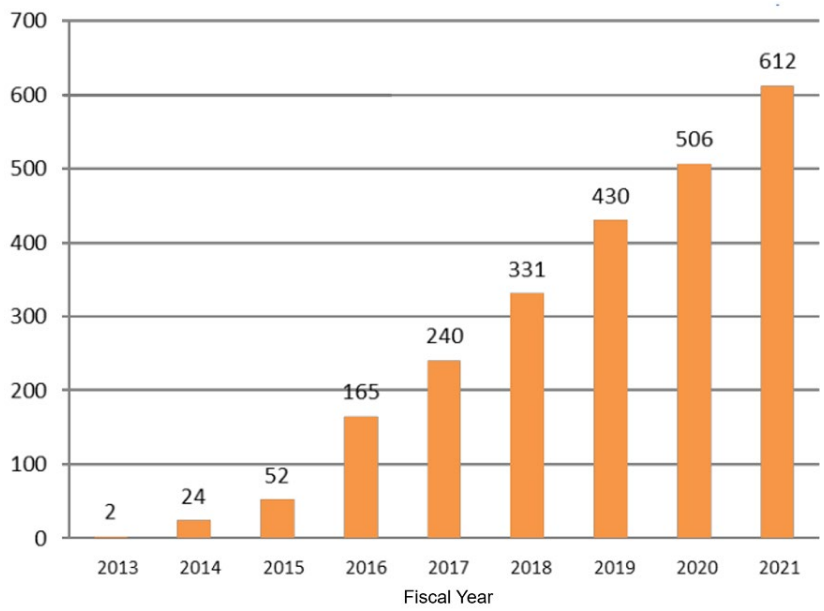
Source: Japan Quality Assurance Organization
（English text by Renewable Energy Institute）

The transaction price of GECs varies depending on the providers. According to Japan Natural Energy, which handles more than 50% of GECs, the standard price is 2-4 yen/kWh for large volume sales. However, as the floor price for FIT NFCs was reduced to 0.3/kWh since November 2021, the price of GECs will decrease from the previous level.

Another electricity certificate, J-Credit (renewable), is a system to trade CO_2 emissions reduced by self-consumption of electricity from renewable energy sources as credits. Companies and other entities purchase them to reduce CO_2 emissions. The trading unit of J-Credits is the amount of CO_2 emissions. The credits are calculated by multiplying the amount of electricity from renewable energy sources generated and consumed onsite by the average CO_2 emissions (per kWh) of electricity for the entire country in the fiscal year in which the electricity was generated and consumed.

In addition to renewable electricity generation, J-Credits also cover CO_2 emissions reduction through energy saving and CO_2 absorption through afforestation. In FY2021, 6.12 million tons (CO_2 equivalent) were certified, a 21% increase from the previous year (Chart 6). This indicates that the entire country is making progress in reducing CO_2 emissions through the deployment of onsite renewable energy and energy saving.

Chart 6. Certified Amount of J-Credits
(unit: 10,000 ton-CO_2)



Source: J-Credit Secretariat

The J-Credit system is operated by the government (jointly by Ministry of Economy, Trade and Industry, Ministry of the Environment, and Ministry of Agriculture, Forestry and Fisheries), which is responsible for certifying facilities and CO_2 emission reductions. J-Credits can be sold by the owners directly or through brokers, or through auctions conducted by the J-Credit Secretariat.

J-Credits to be sold prior to the auction can be purchased on the Secretariat's website. The information on the owner of the credits, the region and location, the outline of the generation facilities and the amount of electricity generated is made public. However, it does not include information on the commission date of the generation facility.

Since January 2018, the auction process has been divided into separate transactions for J-Credits (energy saving) and J-Credits (renewable energy generation). Of these, only J-Credits (renewable energy generation) can be used as electricity certificates. The average bidding price for energy saving has remained flat, while that for renewable energy generation has risen. It has soared since the beginning of 2021, because demand is increasing, especially among companies, as a means of procuring renewable electricity.

The average bidding price for J-Credits (renewable) was about 1.38 yen/kWh in the January 2022 auction, more than four times the floor price of FIT NFCs reduced to 0.3 yen/kWh since November 2021.

Many J-Credits (renewable) are local aggregation of residential solar facilities for self-consumption. However, it is not possible to specify the generation method or generation facility for purchase in the auction process.

It is difficult to foresee whether the average bidding price of J-Credits (renewable) will continue to exceed 1 yen/kWh in the future. It depends on how consumers evaluate the environmental values compared with FIT NFCs.

J-Credits (renewable) certified in FY2020, when converted to electricity, will amount to approximately 1 billion kWh. This is nearly twice the amount of GECs issued, or about 0.5% of the country's total renewable energy generation; the certified amount of J-Credits are disclosed but not the issuance amount (credits are issued when they are ready to be used and sold by providers after the certification process).

Post-FIT solar generation facilities were added to the scope of J-Credits (renewable) from November 2019, for electricity consumed onsite. However, since this overlaps with the eligibility of GECs, certification will be done after confirming that there is no overlap. This is one of the issues with multiple electricity certificates eligible for the same generation facilities.

In order to increase the amount of certificates and transactions of J-Credits, an online system is being developed for all the procedures from registration application to certification and issuance by the end of FY2022, and a new market for real-time transactions is planned to start in FY2023.

3. Major Issues of Japanese Electricity Certificates

As countries around the world expand the use of renewable energy, electricity certificates that verify and trade environmental values will play an important role. From this perspective, there are various issues when comparing Japanese electricity certificates with those of other countries. There are three major issues to be resolved.

First is the coexistence of three types of electricity certificates. In most developed countries in Europe and North America, one type of electricity certificate covers electricity from renewable energy sources. In Japan, there are three types of certificates: Non-Fossil Certificates (NFCs), Green Electricity Certificates (GECs) and J-Credits (renewable energy generation). Each has different requirements for issuing certificates, methods of purchase, and conditions of use. This is complicated not only for consumers but also for businesses that supply renewable electricity.

Second, there is the issue of tracking NFCs. In international electricity certificates, attribute information of the electricity generated is attached to the certificate, and consumers and suppliers can trade and use the certificates based on the information to evaluate the environmental impact and additionality. However, with NFCs, only the information such as FIT or Non-FIT, renewable energy or non-renewable is attached to the certificate.

In the NFC tracking experiment conducted by the Agency for Natural Resources and Energy, after retailers and consumers purchase certificates on the market, they can apply for the generation facilities and generation methods they wish to track, and attribute information is simply added if available. It is not possible to purchase certificates based on attribute information, and the system cannot differentiate prices for each certificate by environmental values. What consumers are seeking is renewable electricity with low environmental impact and additionality, but they are unable to fairly evaluate the environmental values of NFCs.

The third issue related to the second is the lack of attribute information items, not only for NFCs but also for GECs and J-Credits. Information on generation methods and fuels, which are important in evaluating environmental impact, is much less than for international electricity certificates. The Japanese certificates only classify generation methods into five types: solar, wind, hydro, geothermal and biomass, but do not provide detailed information on the generation method for hydro or the fuel used for bioenergy.

International electricity certificates provide more details, especially regarding the fuels used. They include information that shows the origin of the fuel, divided into solid, liquid, and gaseous forms. For example, wood waste, crop waste, animal and plant waste, black liquor, sewage gas and so on. Hydrogen, which is expected to be increasingly used as a fuel that does not emit CO_2, is also included. In the European Guarantees of Origin (GO), the amount of carbon dioxide emissions can be included in the case of thermal power generation, and the amount of radioactive waste in the case of nuclear power generation.

In Europe and North America, electricity certificates are positioned as an important tool for expanding renewable energy, and government agencies are working to develop and improve systems and programs based on a long-term vision. In Japan, the government should take the lead in quickly reforming electricity certificates as one of the means to achieve the green-house gas emission reduction target by 2030 and carbon neutrality by 2050. By establishing an advanced certificate system with reference to international electricity certificates, the driving force to dramatically increase renewable energy in Japan will be created.

4. Proposed Reforms

We propose the following five items to reform Japanese electricity certificates into an internationally reliable system.

1. Cover all renewable energy sources with an electricity certificate system and integrate thermal and nuclear power generation as well.

Not only electricity supplied via transmission and distribution networks but also electricity consumed onsite should be included, so that the environmental values of domestic renewable electricity can be comprehensively certified, traded and used under a common system. Furthermore, the certificate system will integrate thermal and nuclear power. To achieve carbon neutrality, the system should be designed including energy sources other than electricity (gas and heat).

2. Provide detailed attribute information, so that environmental impact and additionality can be evaluated.

In addition to aggregating all attributes associated with electricity in the certificate, the attribute information should be provided in as much detail as possible. It will enable consumers and electricity suppliers to make appropriate judgments and selections regarding environmental impact and additionality based on the information. Regarding generation methods and fuels, the level of granularity should be comparable to the international electricity certificates used in other countries.

3. Enable the online system to process from registration of generation facilities and issuance of certificates to redemption.

To enable all consumers and suppliers to utilize electricity certificates regularly, a certificate management system should be developed that executes the process quickly and smoothly online, including registration of generation facilities, application for electricity quantity, and issuance, transfer and redemption of certificates. Functions to efficiently perform verification and validation by the issuing entity of electricity certificates will also be implemented.

4. Disclose attribute information and other data registered in the certificate management system in an appropriate manner.

To promote highly reliable electricity certificates, attribute information and other data registered in the certificate management system should be disclosed in an appropriate manner. With ensuring sufficient security of the system, access to the data can be permitted to authorized users.

5. Develop a transaction system to enable trading of certificates based on attribute information.

In addition to the certificate management system, a highly transparent and fair certificate trading system should be developed so that generators and consumers or suppliers can conduct online transactions at any price by referring to attribute information. It will promote the development and the deployment of renewable electricity based on environmental impact and additionality.

To ensure that electricity certificates that meet the above requirements are fully effective, the government is required to establish a reliable operating organization and implement an action plan as soon as possible, including the arrangement of related legal systems.

Furthermore, the following points should be included in the action plan.

・The government will establish a standardization organization for electricity certificates, and then select and appoint an issuer to take charge of registration and certification. The issuer will operate a database (registry) to store certificate attribute information, and a certificate management system (platform) to perform tasks with referring to the database.

・ The new electricity certificate system should be established by 2025, assuming an implementation effect of about 5 years, so that the system can contribute to the achievement of the green-house gas emission reduction target for 2030. Combined with carbon pricing, which is effective in reducing emissions, this will encourage consumers and businesses to voluntarily use renewable energy.

・ A labelling system based on the attribute information of electricity certificates will be introduced so that consumers can select electricity from renewable energy sources that meet certain requirements in terms of environmental impact, additionality, and other values. By trading labeled electricity and certificates, it is expected to have the effect of increasing the amount of renewable electricity with low environmental impact and additionality nationwide.

Electricity Certificate for Renewables

Comparison of Japanese and International Systems

English Edition

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