

[Recommendation]

Making Japan a Nation where Renewable Electricity is Easily Accessed: Three Strategies and Nine Policies Sought by Corporations Engaged in Climate Action

Mitigating climate change requires decarbonization on a global scale. Japan needs to promote increased energy efficiency and continue the transition from fossil fuels to renewable energy. Corporations using large amounts of electricity for their business activities should be able to utilize inexpensive electricity generated with renewable energy. To increase the amount of renewable electricity and lower the cost, we recommend that the government and the electricity business industry implement the following three strategies and nine policies.

Strategies

1. Supply at least 44% of total electricity generated nationwide with renewable energy by 2030.
 2. Reduce the cost of generating electricity with renewables (solar and wind) to less than the cost of generating with fossil fuels (coal and gas) by 2030.
 3. Sell electricity from 100% renewables at prices equivalent to electricity from other power sources by 2030.
- *Electricity from 100% renewables: Electricity free of carbon dioxide (both basic and adjusted emission factor of zero) generated with renewable energy sources that have low environmental impact.

Policies

- Promote the energy transition
 1. Deregulate renewable energy development (with environmental considerations)
 2. Promote deployment of renewable energy not dependent on the feed-in tariff scheme (FiT)
 3. Modify priority dispatch rules (prioritize renewable energy)
- Improve and enhance transmission and distribution networks
 4. Implement a Japanese version of Connect and Manage as soon as possible
 5. Make priority budget allocations to enhancing power grids
 6. Promote power interchange at the distribution level (consider unbundling distribution from transmission)
- Promote renewable electricity use among corporations and local governments
 7. Allow power purchase agreements (PPAs) between developers and consumers
 8. Establish a tracking system of environmental value
 9. Lower the minimum bid for Non-Fossil Certificates from FiT electricity

Renewable Energy Users Network (RE-Users)
Working Group to Discuss Issues

Secretariats

Renewable Energy Institute
CDP Worldwide-Japan
WWF Japan

*This recommendations is an initiative of the Renewable Energy Users Network (RE-Users), a network of corporations working to increase the use of renewable energy through communication and information exchange, and was created by the secretariats based on the opinions of the 20 major companies in the network's Working Group to Discuss Issues, which was formed in April 2019.

Participating companies (in Japanese alphabetical order)

Kao, Konica Minolta, Sony, Daiwa House Industry, Nabtesco, Nomura Research Institute, Fujitsu, Marui Group, Mitsubishi Estate, Unilever Japan, Ricoh, et al. (only disclosable names listed)

Background and Necessity of Proposed Policies

1. Deregulate renewable energy development

When renewable power generation facilities are developed, construction should take place after a site is selected based on environmental considerations. Abandoned farm and forestland are increasing in every region of Japan, and it should be reused. Traditional regulations on farm and forestland remain (such as a prohibition on converting farmland to another use), and there are many cases in which the construction of renewable power facilities is prevented despite the land being appropriate for sites. Regulatory reform would allow abandoned farm and forestland to be effectively utilized upon environmental considerations and would simultaneously promote growth in renewable energy. Moreover, zoning by the government for appropriate land use would be an effective measure for smoothly promoting renewable energy development. The government should also create clear guidelines for problems related to offshore wind power development and the fishing industry.

2. Promote deployment of renewable energy not dependent on the feed-in tariff scheme

Japan's feed-in tariff scheme (FiT) proved effective in dramatically increasing deployment of renewable energy in the country. Going forward, it will continue to be an effective mechanism for the development and deployment of electric power generation facilities utilizing regional resources. At the same time, it will be important to increase renewable electricity that is cost competitive without depending on the FiT scheme in order to increase renewable deployment for the country as a whole. More companies will install renewable power generation facilities on their own premises and consume the electricity without depending on the FiT scheme. To promote deployment of power generation facilities that do not apply FiT, measures are needed to drive cost reductions. Measures are also needed to support the installation of batteries that enable companies and households to fully consume the electricity generated onsite. Conversely, new policies with the potential to increase costs of renewable electricity (such as a wheeling charge on power producers) should be avoided.

3. Modify priority dispatch rules

Other major countries generally have rules that prioritize the electricity with the lowest marginal costs (merit order) to dispatch. Rules that prioritize renewable electricity with lower marginal costs than thermal or nuclear power make it possible to minimize costs when electricity demand increases. Japan does not use the merit order mechanism; it has rules that prioritize non-variable electricity of nuclear, hydro and geothermal power. If Japan switch to the merit order mechanism as other major countries have done, it will reduce electricity costs and enable more extensive use of renewables that emit neither carbon dioxide nor radioactive waste.

4. Implement a Japanese version of Connect and Manage as soon as possible

Not being able to connect to power grids is a problem that occurs around the country in relation to the development of renewable power generation facilities. Power grid operating rules are not flexible in Japan. Even though there is adequate available capacity on power grids, new power generation facilities cannot connect to them.

To solve this problem, the Japanese Connect and Manage scheme developed by the government should be implemented as soon as possible. Power grid operators need to quickly apply the new scheme. TEPCO Power Grid began a trial project in Chiba Prefecture utilizing available power grid capacity under a Japanese Connect and Manage scheme. This scheme should be expanded to all regions nationwide.

5. Make priority budget allocations to enhance power grids

Even some regions rich in renewable energy resources do not have adequate power grids for supplying the electricity they generate. Enhancing power grids to connect resource-rich regions with regions that have extensive power demand is essential to increasing renewable electricity over the long term. The government should prioritize power grid enhancement when making energy-related budgetary allocations and should quickly build power grids that enable maximum use of renewable power plants dispersed around the country.

6. Promote power interchange at the distribution level

Companies and households that self-consume solar PV and other forms of renewable electricity will continue to increase. In order to efficiently utilize surplus electricity without wasting, it requires power interchange at the distribution network level. There are currently many restrictions on power interchange via distribution network (such as restrictions on reverse flows). Facilitating intra-regional interchange of renewable electricity through measures that allow for more flexible use of distribution network can be expected to reduce the load on the power grids between different regions. Keeping wheeling charges low at the distribution level and implementing other cost related measures would make it possible to increase intra-regional power interchange and transactions. Advanced countries in Europe separate distribution network operators from transmission network operators and have created optimal operating systems for each. Japan plans to unbundle transmission and distribution from generation business in April 2020 (for the neutrality of the transmission and distribution sector) and should further consider separating the transmission and distribution sectors.

7. Allow power purchase agreements (PPAs) between developers and consumers

Under the current Electricity Business Act, the only entity that can sell electricity to consumers is electricity retailers registered with the government. By contrast, many advanced countries and regions in Europe and North America allow electricity consumers to directly make power purchase agreements (PPA) with developers. Consumers will have more options for procuring electricity and it becomes easier for them to purchase renewable power that better meets their requirements. Developers are able to diversify their customers, which creates a healthy competitive environment. It will promote lower generation costs for renewable electricity and reduce the country's overall electricity costs. The Act should be changed to allow PPAs between consumers and developers.

8. Establish a tracking system of environmental value

Major countries in Europe and North America, and in Asia and South America as well, have systems for managing the environmental value (benefits from not emitting carbon dioxide, etc.) generated by renewable electricity at the country level. They are able to track information on power plants including electricity generating periods and the owner of the environmental value. With the tracking system companies are able to confirm the environmental value of renewable electricity they use and certify ownership of it after purchase. In Japan there are Green Electricity Certificate, J-Credit, Non-Fossil Certificate and other renewable electricity in the market, revealing that its management of environmental value is not centralized, and there is no common mechanism that companies can use to select power based on environmental value and certify its usage. Japan is clearly behind other countries. Establishing a tracking system for renewable electricity at the country level is an urgent issue.

9. Lower the minimum bid for Non-Fossil Certificates from FiT electricity

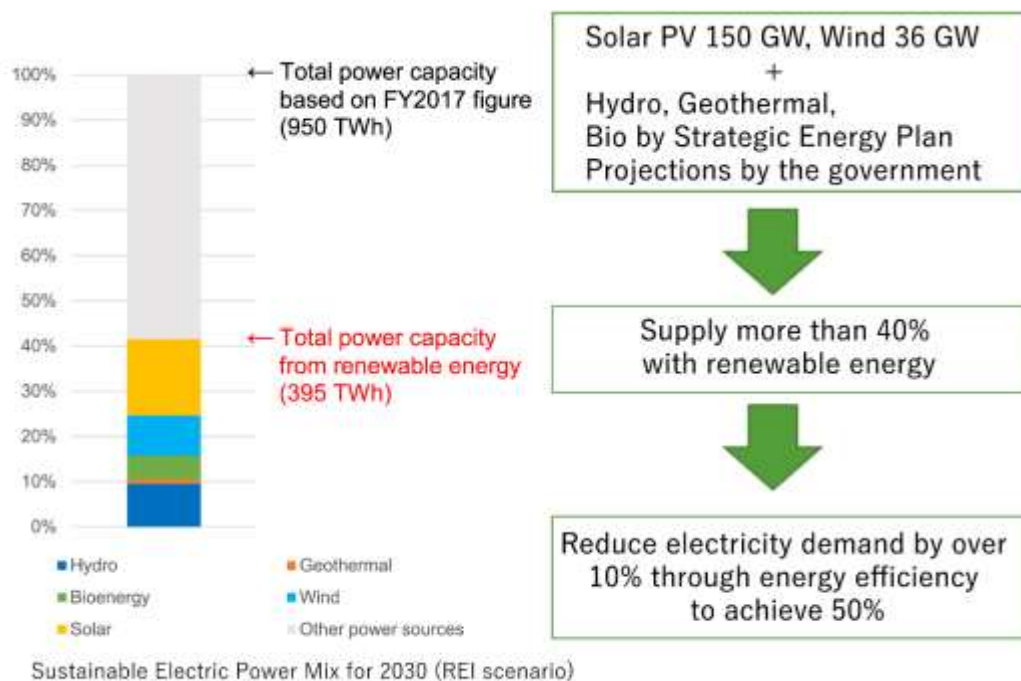
In Japan, approximately half of the electricity generated with renewable energy is purchased under the feed-in tariff scheme (FiT), and the environmental value is sold to electricity retailers in the form of Non-Fossil Certificates or NFCs. At present, NFCs from FiT have a minimum market bid price set at 1.3 yen/kilowatt-hour (kWh), and retailers sell 100% renewable electricity combined with NFCs at higher prices than normal. Overseas, many countries allow certificates from renewable energy to be purchased at around 0.1-0.2 yen/kWh. FiT NFCs are issued in large volume (equivalent to around 80 billion kWh in fiscal 2018), so if the minimum bid price is lowered, it would reduce the cost of 100% renewable electricity and also help reduce FiT surcharges through increased sales volume of NFCs. Electricity retailers, which have the right to set the final sales price, should not sell at prices that exceed the cost of purchasing NFCs.

Realizing Strategies

1. Electricity generation targets (at least 44% from renewable energy by 2030)

The Japanese government has committed internationally to reducing the country's total greenhouse gas emissions by 26% by 2030 (compared to 2013). To fulfill this commitment, it has set the goal of reducing carbon dioxide emissions from electricity use by 32% (compared to 2013) and is requiring electricity retailers to raise their percentage of non-fossil power sources that do not emit carbon dioxide (renewable energy and nuclear power) to 44% or higher. The outlook for nuclear power, however, is unclear, and it is difficult to foresee the amount of electricity generated. Achieving the 44% target with renewable energy alone is the sure way of fulfilling this commitment. If this is realized, it would drive many companies to take climate action through use of renewable electricity and would expand renewable energy and reduce carbon dioxide emissions for the country as a whole for decarbonization toward 2050.

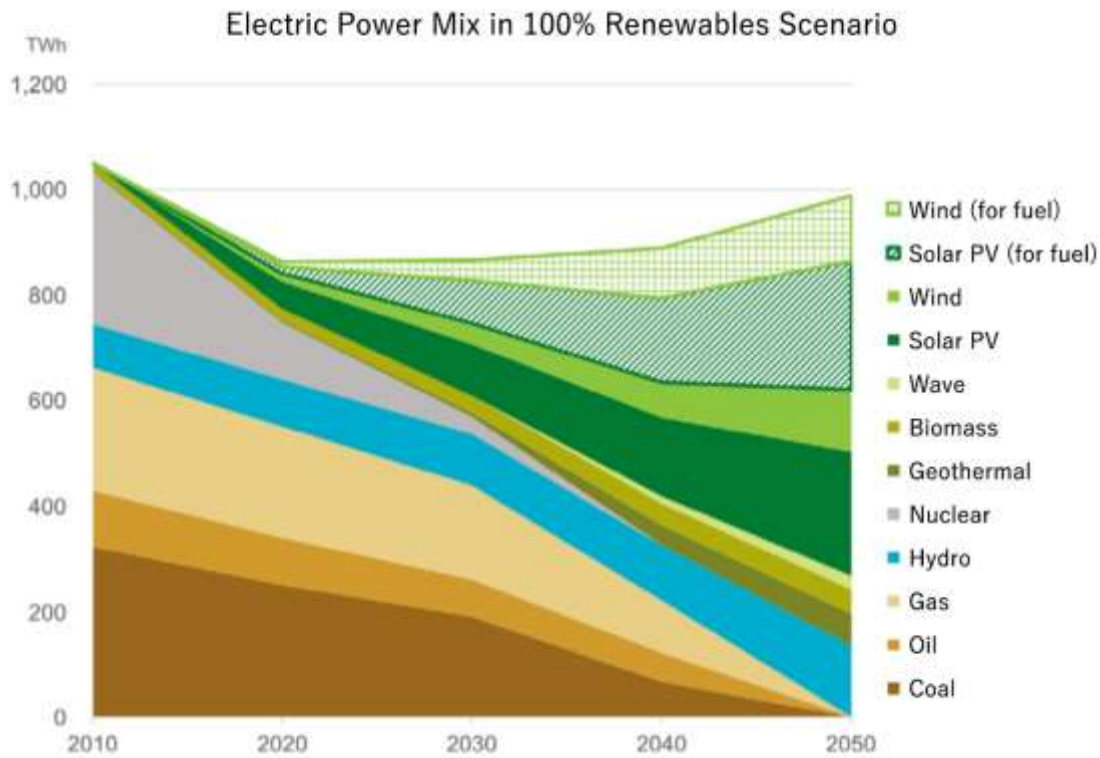
It is certainly possible to raise electricity generated from renewable energy to 44% or higher by 2030. The report released by Renewable Energy Institute in April 2019, *Proposal for Energy Strategy Toward a Decarbonized Society*, indicates that 40-50% of the country's total electricity could be supplied with renewable energy by fiscal 2030 by increasing energy efficiency and expanding solar PV and wind power generation.



Source: Renewable Energy Institute

WWF Japan's *Long-Term Scenarios for Decarbonizing Japan* released in 2017, considered potential energy mixes for 100% renewables by 2050 on the premise of Japan achieving decarbonization under the Paris Agreement

ahead of the rest of the world. Assuming population declines and energy efficiency gains, it projects a renewable power ratio of between 37% and 45% by 2030.

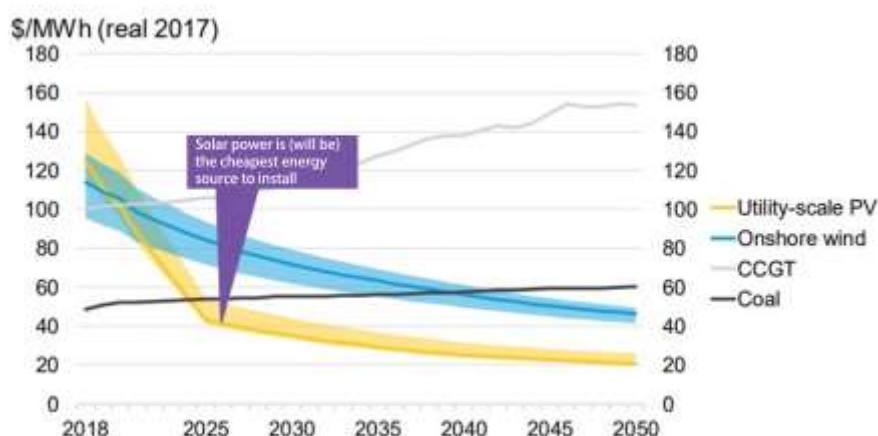


Source: WWF Japan

In *The Power of Transformation*, a report released by the International Energy Agency in 2014, Japan is taken up as a case study. As a result of its analysis, the report expresses the view that achieving a variable renewable energy ratio of 25-40% through solar PV and wind power is technologically possible under the present electric power system. Considering that non-variable renewables—hydro, geothermal and bioenergy (11% in fiscal 2018)—will increase as well, raising the renewable energy ratio to 44% or higher by 2030 will also be possible from a power system standpoint considering transmission and distribution networks.

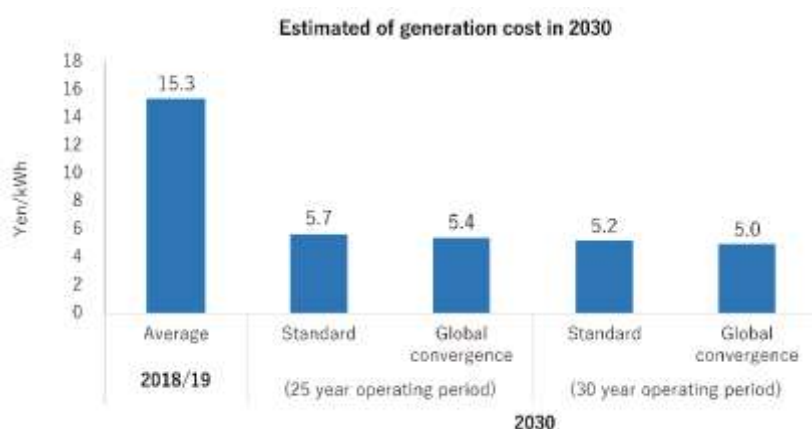
2. Reduction of generation costs (solar PV and wind less expensive than thermal by 2030)

According to forecasts by BloombergNEF, which researches and analyzes power generation costs in countries around the world, solar PV and wind power generation costs will fall in Japan, and around the middle of 2020's solar PV generation costs will drop lower than coal-fired thermal power and become the most inexpensive power source. Similarly, onshore wind power costs will fall below gas-fired power in the early 2020's.



Source: BloombergNEF

The report *Solar Power Generation Costs in Japan* published by Renewable Energy Institute in July 2019 analyzes current and future costs based on developer survey findings and other sources. The results show costs coming down to the 5 yen/kWh range by 2030.



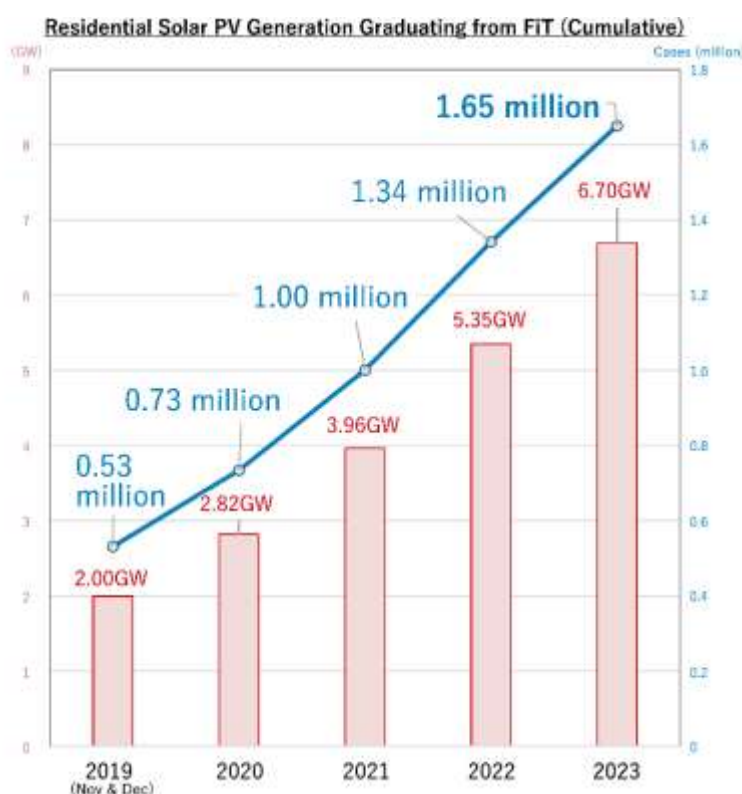
Source: Renewable Energy Institute

When new power plants are built, solar PV and wind power generation facilities will be more economical than coal or gas-fired power plants. In the advanced countries of Europe and North America, and in China where many new plants are being constructed, solar PV and wind generation costs are already lower than coal-fired and gas-fired. Japan also has the potential to create a similar situation by removing the structural factors inhibiting lower costs.

3. Electricity price levels (making 100% renewable power inexpensive)

Solar PV and wind power costs are coming down, and there has been some cost improvement of renewable electricity compared with thermal power. Renewable power plants have no fuel costs (except bioenergy) and once they commence operations, electricity can be generated for only the cost of operation and maintenance, so after capital investment is recovered, electricity can be provided at a lower cost than thermal power. Retailers can reduce their costs long-term by procuring electricity from renewable power plants, and they are able to inexpensively procure and sell renewable electricity from power plants that have already recovered the initial investment.

Moreover, FiT purchase periods began to expire in November 2019 for residential solar installations and solar PV facilities of over 6,000 MW will no longer be subject to FiT over the next five years. Approximately 70% of the generated electricity is expected to be surplus power. Retailers will be able to buy and sell surplus residential power with environmental value (the benefit from not emitting carbon dioxide, etc.), and it is often the case that the purchase price is less than the transaction price on the wholesale power market (averages around 10 yen/kWh). The sale of Solar PV purchased from residential systems will be allowed at prices equivalent to the standard power menu.



Source: Renewable Energy Institute

As renewable electricity without the FiT scheme increases, it will limit the increase in surcharges imposed on all consumers. At the same time, thermal power generation will decrease and fuel costs are reduced so that the country's overall power costs will be lower. Supplying electricity primarily from renewable energy will serve to reduce electricity tariffs over the long term.

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