Renewable Energy

Overview

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Accumulated Generation Capacity Unit: Megawatt

	2011	2012	2013 (estimated)	2014 (estimated)
Total Market Size	10,400	12,210	15,000	20,000
Total Local Production	10,400	12,210	15,000	20,000
Total Exports	0	0	0	0
Total Imports	n/a	n/a	n/a	n/a
Imports from the U.S.	n/a	n/a	n/a	n/a
Exchange Rate: 1 USD	n/a	n/a	n/a	n/a

(NB: Hydraulic power generation is not included in the above chart.)

Renewable energy in Japan is defined here as electricity produced from solar PV (both residential and non-residential), wind, biomass, and geothermal. We expect that Japan's future energy strategy will see a substantial reduction in the use of nuclear power and a massive deployment of renewable energy. In July 2012, the Government of Japan (GOJ) implemented a Feed-in-Tariff (FIT) law for renewable energy sources for the first time in history. Since then, Japanese renewable sectors, especially solar, have been booming. Also in September 2012, the GOJ laid out a growth strategy whereby Japan is committed to increase electricity generation from renewable energy sources by eight times, reaching 190 terawatt hours (tWh), up from 25 tWh in 2010. To achieve this increase, a total of 99 GW of new renewable energy capacity will need to be installed in the next two decades. We anticipate continued high growth in the renewable energy sector in coming years, providing excellent export opportunities for U.S. firms that have cutting-edge, cost-competitive products and services.

Sub-Sector Best Prospects

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Solar PV

Solar PV was the first technology to see a boost from the FIT because solar installations have short lead times and are not subject to long environmental impact assessment studies. Japan is unique in that 80% of current solar generation is in the form of residential rooftop solar panels, in large part due to government subsidies over the past few decades.

In turn, the FIT has also spurred interest in mega-solar projects. Currently, mega-solar costs approximately $2,700 (or 270,000 yen) per kilowatt of installed capacity, which is double the cost in Germany. One reason for the discrepancy is that Japan has higher construction costs due to more stringent seismic and typhoon-resistance building standards. Also, Japan lacks a sufficient pool of unskilled labor for installation work and must utilize pricier skilled labor. That said, we have learned that, in some parts of Japan, mega-solar costs are approaching those of Germany.

Since the introduction of the FIT, Japan has seen over a thousand applications for new mega-solar plants, of which 50 have been constructed. In 2013, land shortages will bring a slowdown in additional projects. In Japan, two types of companies are leading most mega-solar projects:

1) companies with electrical expertise that were suppliers to electrical utilities, and 2) consortiums led by large trading companies that include major construction companies.

As the original 42 yen per kilowatt-hour (kWh) FIT rate for solar sparked a faster than expected increase in solar projects, the GOJ believed a new reduced rate was in order to slow, yet sustain the rate of new solar installations. For this reason, the FIT rate for solar was reduced to 38 yen starting April 1, 2013.

Wind Power Generation

Due to geographical reasons, Japan's wind power generation tends to be concentrated either in the northern part of Japan (Hokkaido and Tohoku) or in the southern part of Kyushu. Although wind power is a major portion of renewable generation in the U.S. and Europe, wind is underrepresented in Japan, with only 0.3% of the energy mix in 2009. As for the size of wind turbines in Japan, most are 2,000 kW and larger, which the Japan Wind Power Association says is the minimum required to sell electricity powered by wind to the power utilities. Compared to the U.S. and Europe, Japan is slow to develop onshore wind turbines. As of 2010, Japan is the 12th largest country in the world in terms of installed capacity of wind power. The reasons include the lack of well-developed transmission grid lines and Japan's restrictions on the new construction of onshore wind power stations.

Geothermal Power Generation

Although Japan ranks as the world's 3rd richest country in geothermal reserves behind Indonesia and the U.S., the country only utilizes 10% of its available resources. Hindered by an administrative ordinance that limits the number of geothermal power stations in natural parks to six, and by regulations such as the Natural Park Law, no new specific development plan has been produced since the Hachijojima Geothermal Power Station started operation in 1999. The GOJ is currently looking at ways to ease regulations governing access to geothermal resources, and partial deregulation has recently been adopted to generate a positive example of new geothermal power station development.

Biomass Power Generation

Japan has been utilizing a variety of biomass fuels as sources of electricity generation: wood waste, raw garbage, livestock waste, sewage sludge, industrial waste, agricultural waste, etc. Traditionally, wood biomass holds the largest share of all the other waste-based fuel sources in Japan. Under the FIT, biomass fuels which are applicable to the FIT tariffs are grouped in four categories: biogas (of which the highest rate of 40.95 yen/kW is applied), timber from forest thinning, other woody materials, waste (excluding wood waste), and recycled wood. Japan distinguishes plants which only burn wood biomass, which fall under the FIT scheme, from thermal plants which use wood biomass as part of a fuel source, and has a total of 56 biomass plants that qualify as renewable. Before the FIT law was implemented, biomass power generation had been the second largest renewable power source in terms of electricity sold to the power utilities. We expect steady growth in the sector.

Opportunities

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Solar PV

We expect that there is still a lot of potential for expansion of rooftop solar installation; currently solar panels are installed on one million of twelve million household structurally capable of supporting the equipment. Weight reductions in next generation panels and structural refurbishments of older buildings will mean that an additional 4.5 million households will be able

to support solar installation by 2030 (GOJ estimates there are approximately 27 million households in Japan). Currently, panel manufacturers market directly to construction companies and consumers. In the near future, more independent system integrators will enter the market. Eighty percent of residential installations still use Japanese panels due to name-recognition, however, there has recently been a significant influx in non-Japanese brands since the implementation of the FIT law.

Wind Power Generation
Since the implementation of FIT law last year, the GOJ has been carrying out measures in order to increase wind power generation. Japan sees a lot of potential for off-shore wind as well as on-shore wind power generation in Hokkaido and Tohoku.

The GOJ allocated $250 million (25 billion yen) in its FY2013 budget for grid expansion, which is not a traditional use of tax monies. Also, in February 2013, the GOJ disclosed ambitious plans to triple wind facilities in 10 years, to approximately 7.5GW. According to the plan, the government and private companies will invest $3.1 billion (or 310 billion yen) in Hokkaido and Tohoku regions in order to strengthen the grid lines by introducing a unique "toll road" system. By using this system, private wind power operators will bear half the cost of strengthening the gridlines (the GOJ will cover the other half) with an aim of expanding wind power under the FIT system. Under the current law, gridline construction is the sole task of regional power utilities.

As for expansion of offshore wind power, Japan launched in 2012 a "floating" type offshore wind turbine demonstration project in Nagasaki, where the GOJ installed a 100 kW turbine. Japan plans to operate a much larger scale offshore wind farm project off the coast of Fukushima Prefecture in the near future. Recognizing that it is more expensive than on-shore wind, the GOJ is discussing the possibility of setting a separate, higher FIT for off-shore wind.

Geothermal Power Generation
As Japan's energy situation has drastically changed since the March 11 earthquake, Japan can no longer afford to overlook its vast geothermal energy potential. The GOJ is now working in order to remove some of the restrictions on geothermal production. As geothermal projects take a long time (10 to 15 years) from planning to actual power generation and require considerable investment, the sector may not give U.S. firms immediate export opportunities. However, it is important to note that Japanese companies and local governments are now looking seriously at launching new geothermal development projects that should lead to a significant increase by 2020.

Biomass Generation
Starting in fiscal year 2013, the GOJ is introducing a new program to subsidize half the cost of constructing new biomass power plants. Also, biomass electricity can currently only be sold to designated power companies; the GOJ will reform this system to allow freer sales of this energy to Japan's Independent Power Producers. The GOJ goal is for 2.8 million households (5% of the country's households) to be supplied by biomass electricity by 2020. Approximately 20 million tons of food waste is produced each year in Japan; most of which goes to landfills. Furthermore, due to the high cost of transporting trees thinned from Japan's forests, approximately 800 tons of these trees per year are left in forests. GOJ plans to utilize all these untreated biomass resources to fuel new power generation, which, under FIT, will produce more new projects in the near future.

Trade Event

World Smart Energy Week 2013
Date: February 27 – March 1, 2013
Venue: Tokyo Big Sight, Tokyo
Organizer: Reed Exhibition Japan Ltd.
URL: http://www.wsew.jp/en/

Web Resources

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CS Japan Contact: Takahiko Suzuki
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Agency for Natural Resources and Energy, GOJ
http://www.enecho.meti.go.jp/english/index.htm

Ministry of Economy, Trade and Industry, Government of Japan
http://www.meti.go.jp/english/index.html