



With the Japanese PV market booming, many predict strong demand will continue in the foreseeable future despite last month's climate change announcement by the government.

Land of the highly prized sun

Japan: Historically strong, the PV market in Japan in 2012 and 2013 has provided huge demand to the PV supply chain. While domestic producers are in pole position to benefit, foreign suppliers are entering the market and developing a track record, both in their own right and through partnerships with local firms.

In September, Japan joined the 10 GW cumulative PV capacity club. By doing so, it became one of an illustrious group with only Germany, Italy, China and the U.S. as peers. The achievement was observed by NPD Solarbuzz, which noted China and the U.S. reached that milestone mere months before Japan.

While Japan's PV installations have been rooted in a history of supportive government policies dating as far back as 1994, the growth of PV in the country has been impressive of late – particularly since the revamped FIT was introduced (see graphic p. 26). In October, figures from the Japanese Agency for Natural Resources and Energy (ANRE) showed the country had installed 1.82 GW of capacity in Q2 2013. Of note is the burgeoning commercial rooftop space, where 1.4 GW were added in the quarter.

Izumi Kaizuka, from RTS Corporation, says Japan is set to install around 5 GW of new grid-connected PV this year. The rooftop segment will account for half that capacity, notes Kaizuka.

Of that half, around 40% is commercial rooftop, with the remaining residential. The strong commercial rooftop figures are due to a sweet spot in the market, where installations between 10 kW and 49 kW can be grid-connected to the low voltage network, with minimal bureaucratic hurdles. "Projects this size are easy to connect and finance," says Kaizuka.

How much the industry as a whole will be affected by last month's government announcement it will row back on greenhouse gas carbon reduction commitments is unclear but the strength of the market remains in the aftermath of the unwelcome news from the COP 19 climate change summit in Warsaw.

Another factor feeding the strong performance of commercial rooftop PV is a tax incentive for firms who install PV. At present, the cost of a PV installation can be fully depreciated against tax within a year. For profitable companies, and with FITs of JPY 37.8/kWh for arrays larger than 10 kW, this makes PV installation very attractive indeed.

Utility-scale connection

Previously non-existent, the ground-mounted, utility-scale segment will account for around half of Japan's grid-connected capacity in 2013, according to RTS. Representing a genuine boom, these projects have been developed by new and established PV players. Utility-scale solar is referred to as mega-solar in Japan.

However, it is not entirely plain sailing for mega-solar. Grid connection issues and Japan's network of monopoly utilities is proving to be a major break on development, reports RTS Corporation. Nowhere is this trend more evident than in the northern island of Hokkaido, which would appear to be the ideal location for utility-scale PV power plants given that it is one of the few places in Japan where open space is available.

However, the majority of electricity consumption is further south, nearer to Japan's population centres, and currently transmission infrastructure between these regions is limited. The Hokkaido Electric Company is the monopoly elec-

Photo: Schletter



Schletter advises that as a foreign company, managing a smoothly operating supply chain in Japan is vital.

KEY POINTS

- Generous tax incentives have boosted Japan's rooftop PV market, which will account for 50% of all installed PV in 2013.
- However, widespread delays on some projects have prompted METI to investigate why just 10% of larger projects have been completed.
- The strong performance of Japan's residential PV market has given a boost to companies right across the supply chain.
- As a result, Japan could be on course to become the world's most important PV market, boosted by developments in storage.

tricity utility for the prefecture, which is Japan's largest, and it has placed a cap on PV installations for the region of 400 MW – for projects larger than 2 MW. "The developers just gave up on many projects in the Hokkaido area," says Kaizuka.

Delayed projects

In September, Japan's Ministry of Economy, Trade and Investment (METI), which administrates the FIT under which the country's PV developers oper-

ate, launched an investigation into why only one in ten PV projects larger than 400 kW have been developed.

Implied in the investigation is that project developers have received FIT approval but are waiting for component prices to fall further, therefore increasing profit margins. Just as pertinent, however, are the difficulties developers face in gaining the required approvals for a PV project bigger than 50 kW. Such an impasse could also be behind the project delays. The METI investigation was expected to

run until October 18, although at the time of writing the results of the department's inquiries had not been published.

METI has up its sleeve the power to fine developers who have been found to have applied for FIT approval but not taken the project further – although the fines are limited to JPY 300,000 (\$3,100). METI can also cancel the FIT certification, essentially killing the project.

"For installations larger than 50 kW, there are various documents required for the regulatory bodies," says Kaizuka.

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FR@vatvalve.com

VAT Germany
Tel (089) 97897876 0
DE@vatvalve.com

VAT U.K.
Tel 01926 452 753
UK@vatvalve.com

VAT USA
Tel (781) 935 1446
US@vatvalve.com

VAT Japan
Tel (045) 333 11 44
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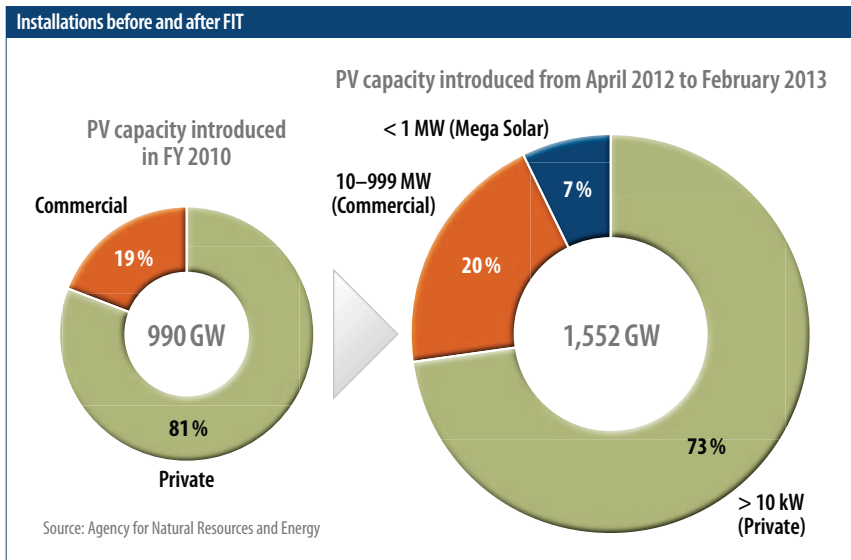
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This regulatory process can be time-intensive and costly, yet paradoxically, before December 10, 2012, project developers were not required to show lease agreements for the land required for the installation.

Residential roofs

For many years the predominant and strongest market segment in Japan, the residential rooftop space continued to deliver strong PV demand in 2013. NPD Solarbuzz says that until the end of 2012, the market accounted for 97% of PV capacity. RTS' Kaizuka describes the sector as performing "very strongly" for 2013.

Renewable energy consultants Apricum agree, yet unlike mega-solar projects, the primary driver of the residen-

tial sector is not purely the feed-in tariff alone. "There is a high ecological understanding and perception within Japanese society," says Apricum principal Matthias Kittler. "And increasingly a wish to have a stable, reliable power supply – given the background that there are sometimes blackouts with the difficult energy situation in the country after Fukushima and the intermittent occurrence of typhoons."

The residential sector of Japan's solar industry is also a top quality and high module efficiency market, which is characterized by a strong preference among consumers for domestic, Japanese brands. "For that reason a foreign supplier of solar components definitely needs to address this demand," says Kittler (see Box on p. 27).

Riding the wave

On the back of strong PV growth, a range of companies across the supply chain have profited. IMS Research, now a part of IHS, published figures in May that showed the Japanese market grew by 120% in Q1 2013, and 270% in Q2. It predicted that, given the higher component prices in the Japanese market, Japan would become the world's largest PV market in terms of revenues.

Japanese producers appear to be in the hot seat to benefit from this strong market growth and the resultant revenues. Reports from the Japanese market appear to confirm that there is a strong preference for domestically produced modules, or at least brands, among residential and commercial consumers.

Established players such as Sharp, Sanyo and Kyocera have all seen significant demand being delivered in 2013. Other Japanese companies, such as Mitsubishi, are active in supplying the market.

Partnerships deliver

U.S. manufacturer SunPower has seen its supply to the Japanese market increase by 130% from Q2 2013 to Q3 2013. In SunPower's Q3 2013 results, CEO Tom Werner announced that Japan accounted for 26% of the firm's sales and that it had captured "a significant share of the Japanese rooftop market." In its quarterly reporting, SunPower noted that it has module supply deals totaling 90 MW for mega-solar projects.

SunPower has a supply deal with Toshiba Corporation, where the Japanese firm markets SunPower's 20.1% efficiency, 250 W modules in Japan. As of December 2012, the relationship – which dates back to 2010 – has seen SunPower supply 150 MW of modules to Toshiba.

Japan's increasing impact

"2013 has been a strong year for SunPower," said CEO Warner in announcing its Q3 results, thanks largely to Japanese demand. Importantly, SunPower also announced that it is expanding cell capacity at its Philippines manufacturing facility by 25% or 350 MW. The significance of a manufacturing capacity expansion was not lost on PV market observers.

The increasing importance of the Japanese PV market on global module sales is further evidenced in the performance of

i EXPERIENCE OF A FOREIGN COMPANY OPERATING IN JAPAN

Global mounting system market leader Schletter has been active in Japan since 2012. Christian Salzeder is with Schletter's international business development team and he shares some key lessons learnt from successfully entering the Japanese PV market:

- Establishing a company is relatively straightforward, but finding employees can be more difficult.
- Japanese companies prefer to buy from Japanese suppliers.
- It is important to provide technical know-how in Japanese.
- Customers prefer to have face-to-face meetings in order to solve potential problems.
- It is vital that your company has an office in Japan to do business there.

As a European company supplying the Japanese market, there are naturally challenges in establishing a smoothly operating supply chain. Salzeder elucidates:

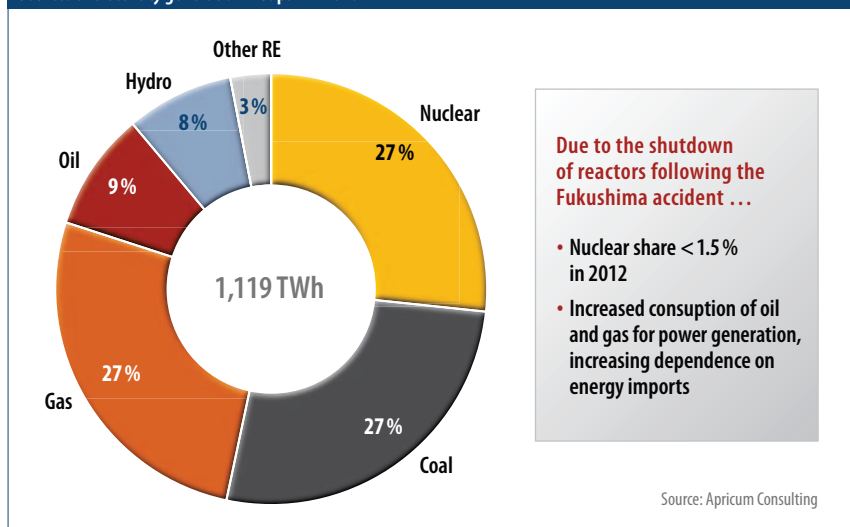
- Customs are low and importing product relatively easy.
- Shipping costs are also low, with shipping times from Europe around 3-4 weeks.
- There are currency risks that need to be managed.
- Japanese customers expect fast and accurate delivery of product.
- A warehouse needs to be established in Japan.
- Products must meet Japanese regulations and building codes.
- References from other Japanese companies are important.

Japanese market leader Sharp, a company that remains one of only two PV module manufacturers from outside China to feature in the top ten supplier list on NPD Solarbuzz's module tracker ranking for the 12 month period ending June 30, 2013. The only other non-Chinese producer in the ranking is First Solar, which is prohibited from importing its modules into Japan because of the presence of cadmium in its thin film semiconductor stack.

Thin film does have significant market share in Japan, however, in the form of CIGS producer Solar Frontier, which reports that its production is sold out through the first six months of 2014. Solar Frontier executives say that sales discussions are already underway for the second half of 2014.

Solar Frontier says it is focused more-or-less exclusively on serving its domestic market, and the company's VP for Corporate Planning and Operations, Yuichi Kuroda, reports that well over 90% of its production is being shipped to the domestic market. Solar Frontier's 900 MW Kunitomi fab began operating at full capacity in Q3 2013, racking up 75 MW of module production per month. The company also restarted its Miyazaki #2 fab in July of this year to meet strong demand. While currently running full tilt, Solar Frontier is not yet going down the path of SunPower and adding capacity, says Kuroda. "We are taking a conservative approach, but can move quickly when the opportunity arises." Certainly, the strong Japanese market is driving the company along a pathway of continuing profitability. Solar Frontier reports that module prices are stable in Japan at the moment and that the company expects to record its second profitable financial year, which will end in Japan in July 2014.

Sources of electricity generation in Japan in 2010



Outlook

Much of the recent boom in Japan's PV market has been driven by attractive FITs. The FIT has been revised downward by 10% already this year, and while there have been few clear signs from METI as to what level of digression can be expected, Solar Frontier's Kuroda – for one – says that something along the lines of a further 10% is likely.

Looking to the longer term, Apricum's Matthias Kittler says that the economics behind a sustainable PV market in Japan exist. Even in 2010, when nuclear provided 27% of the country's electricity, oil was used for around 9% of generation, Kittler says, adding that this has increased since Fukushima and that there is a strong business case for replacing this oil with PV.

Kittler's calculations have mega-solar installations supplying electricity in Japan at \$0.25/kWh and from oil at \$0.23–0.25/kWh. "Looking at the price trends for PV and for fossil fuels, there will be an increasingly viable case for

solar installations in the future," says Kittler. The Apricum consultant also says that residential grid parity has arrived in parts of Japan, with high electricity prices a feature of the electricity landscape.

Enter storage

There is also a case for storage solutions to become more common in Japan in the near term. Japan has considerable expertise in the field, with manufacturers like Panasonic, and an electric vehicle (EV) industry being driven by firms such as Nissan and Toyota working on battery technology.

"We see companies such as Toyota or Panasonic working closely with municipalities, like the cities of Yokohama or Nagoya, to develop solutions on the ground to combine renewable energy power generation with EVs and storage," says Kittler. With residential FITs only running for 10 years, and PV installations designed to last many more, Kittler also sees a strong business case for integrating storage and smart home solutions with inverters to increase the proportion of self consumption.

"We believe that Japan will remain one of the leading PV markets worldwide," concludes Kittler, "with a market of around 5 GW in installations annually during the next few years." It is a sentiment that is shared by a number of analysts and firms such as Solar Frontier. The mega-solar market looks unlikely to continue its recent growth, given a number of constraining factors, but the economics for a major role for PV in Japan looks set to see a sustainable market of the future. ♦

Jonathan Gifford

STRATEGIES FOR MARKET ENTRY

Matthias Kittler, a principal with renewable energy consultants Apricum, briefly outlines some strategies for suppliers to enter the Japanese market: "Foreign suppliers of solar components need to address the Japanese preference for domestically produced, high quality products. Suppliers can do that by providing test results and certificates that create trust with Japanese clients.

"Apricum also thinks a good solution is the packaging of foreign product with a

Japanese product – for example a foreign inverter bundled with a Japanese module – to sell the package as a Japanese-perceived kit. Another potential strategy is to create a new brand that is perceived as a Japanese brand.

"We really encourage foreign companies to think of opportunities in the market and, ideally, doing so with a Japanese partner company. The market is special and you really have to play the game according to the Japanese rules."