

## Japan: Solar's Real Deal?

### Nation's Large-scale Solar Market is Booming, But is it Sustainable?

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Virginia, USA -- Japan's solar market is soaring. Spurred by a generous incentive, developers are announcing mega-scale projects, investors are closing deals and manufacturers are placing orders. The nation is fast becoming the industry champion of 2013.

But we have seen this kind of rush before, only for it to crash when the incentive disappears. Spain went from euphoria to woe with the economic crisis, and other European nations have made swingeing cuts to incentive schemes.

Will Japan be another boom and bust, a story imposed too often on renewables? Or is its solar industry different? Does it have the right mix of circumstance and know-how to become a stable, top market for large-scale solar? Is Japan, as some predict, the real deal?

#### Breaking Records

Italy now holds the record for the most solar added in a year: 7.9 GW for 2011. Fuelled by a new feed-in tariff (FiT) for large projects, Japan will challenge that record, as it adds 6 GW-9.4 GW of photovoltaics in 2013, much of it from large-scale projects, according to a forecast by Bloomberg New Energy Finance. Japan could even topple China from its spot as top solar market, BNEF says.

This represents a big leap for Japan. Before instituting the FiT, the nation had only 0.8 GW of large PV from about 40 installations, according to Japan's Agency for Natural Resources and Energy.

Domestic and international companies are vying to capture the new bounty. Many are already active; others are positioning for a point of entry. They include Softbank, ORIX, Kyocera, Toshiba, Gestamp Solar, JGC, Mitsui, Sky Solar, SPARX, Panasonic, Sharp, Suntech, First Solar, Yingli Green Energy, Solaria and SunPower, among others.

'The feed-in tariff is driving the large projects. The economics are quite compelling,' said Daniel Shugar, CEO of California-based Solaria.

In July 2012 Japan initiated its new FiT, which required that utilities buy electricity from large solar installations under 20-year contracts at ¥40 (\$0.40)/kWh. The Ministry of Economy, Trade and Industry eased down the rate by 10% in April 2013. Still, the incentive remains 'one of the most attractive in the world right now, even with the recently announced 10 percent cut in tariffs,' said Raj Prabhu, CEO of Mercom Capital Group.

Under the revised tariff, small PV systems (less than 10 kW) receive ¥38 (\$0.38)/kWh and larger systems receive ¥36 (\$0.36)/kWh. Small projects can sell their excess power and large projects all of their power through the tariff.

'The price is still very attractive for independent power producers. The price is set to have a projected IRR of at least 6%. The new FiT price is more than double the FiT price in Germany,' said Shuhei Abe, chairman of SPARX, a Tokyo-based investment group, which recently signed a deal to install an 8 MW PV project in Kumamoto, scheduled to begin operating in December.

The FiT for large projects is new for Japan, which has focused more in the past on residential solar. Japan initiated a renewable portfolio standard in 2003 and six years later began offering a tariff for the purchase of surplus solar from residential installations. But no FiT existed before 2012 for projects 500 kW and above.

### **Fukushima Aftershock**

Like many nations, Japan's push for solar is forward-thinking, driven by a desire to green its energy supply. But Japan also has an eye in the rear-view mirror, at the March 2011 earthquake and tsunami that crashed its economy and its faith in nuclear. Pushed by a wary citizenry, Japanese officials have shut down most of the nation's nuclear plants until they can prove their safety.

Loss of the plants has led to power shortages in Japan, and a growing energy ascetic among the population. 'If you go to Tokyo in the summer you will notice that air conditioning is uncomfortably low. That is partly because people realise that there isn't a lot of capacity,' said Jenny Chase, BNEF's solar insight manager.

What is replacing the nuclear power? For now, fossil fuels, specifically imported liquefied natural gas and oil. Today, fossil fuels produce 90 percent of the nation's electricity. Meanwhile, renewables – largely hydroelectricity – are a relatively small part of the mix.

Aside from renewable energy, Japan has few indigenous energy resources. And the high cost of importing fossil fuel is putting pressure on electricity prices. Four utilities – Kansai Electric Power, Kyushu Electric Power, Tohoku Electric Power and Shikoku Electric Power – have sought rate increases since late 2012. And more are likely to do so, according to the Ministry of Economy, Trade and Industry.

'The major factor behind these recent applications for electricity rate increases is the growing fuel costs for thermal power generation, resulting from the suspended operation of nuclear power plants,' said the ministry in a statement.

Japan is trying to bring down costs through energy efficiency and conservation, importing low-cost natural gas from the US and liberalising its utility industry.

The solar projects, however, aren't viewed as cost-cutting measures – at least not initially. They are actually adding to Japan's electricity rates because of the FiT, although not by much. Utilities cover the cost of the tariff through a surcharge paid by all customers. The FiT is available not only for solar, but other renewables as well: wind, small and medium-scale hydroelectricity, geothermal power and biomass.

So far, the FiT has not had a significant impact on rates, costing about ¥117.3 billion (\$1.3 billion) in 2012, which is about 1.6 percent of Japan's total electricity cost, BNEF said. The tariffs' costs are expected to rise as more solar is built and the FiT is increasingly employed.

Solar is not at grid parity in Japan without incentives. So the nation's push for more solar is viewed not as an economic play, but as a way to bring safer, cleaner and more indigenous resources to the nation. Moreover, Japan needs power now, and solar can be built fast.

When compared with the immediate alternatives, solar becomes an obvious choice for the Japanese, said Solaria's Shugar: 'Japan doesn't have another alternative to importing massive amounts of fossil fuel power - which puts you at geopolitical risk. If you think of nuclear versus solar, solar wins on the economics. And nothing is more hazardous than plutonium and Japan knows that more than anyone. Given that stark contrast, you're going to go solar.'

Further, while solar prices may be relatively high now in Japan, they are falling there as they are elsewhere in the world. System prices dropped last year by 14% to ¥280 (\$3.11)/W for projects over 1 MW, according to BNEF. Prices will likely continue to fall, as Japan imports more modules. But the FiT could also serve to keep Japan's prices on the higher side globally, BNEF said.

## **A Stable Industry**

The Japanese have yet another ingredient in their favour: technology know-how.

'You have a very strong indigenous manufacturing sector,' Shugar said. 'You have four companies that have dominated – Sharp, Kyocera, Panasonic, and Mitsubishi. The costs are relatively high in Japan compared with China. But they have done research into new materials and some emerging concepts.'

Domestic manufacturers produced 2.2 GW in 2012, and exported only 21 percent or 460 MW. Still, it won't be easy for them, as eager competitors from other countries, especially China, move into the market. Not surprisingly, imports rose 34 percent in the fourth quarter of 2012, according to BNEF.

And Japan's manufacturers have not been exempt from the global troubles facing the sector. Module manufacturer Yocasol went bankrupt, Japan Solar Silicon dissolved, and Sharp posted losses in 2012, BNEF said. But Japan's domestic manufacturing market is expected to strengthen as solar installations accelerate at home. Several of Japan's solar manufacturers are subsidiaries

of large, diversified and familiar companies. Investors may favour the known and stable entities over less certain foreign companies, BNEF said.

### **A Cultural Proclivity**

Japan's solar industry also is nourished by strong public support, emanating from a cultural reverence for nature.

'Social and environmental forces also play a part, as many Japanese people are highly environmentally conscious. The Fukushima incident certainly accelerated the process,' said Roy Li, representative director for Upsolar, a Hong Kong-based module manufacturer that supplied the 1 MW Mitax installation in Kyushu.

Nor surprisingly, Japan has long been a leader in residential PV, with 4 GW already installed before the new FiT. The technology savvy nation also has been quick to adopt smart grids. Both trends create a natural segue for today's mega-solar boom.

Another, less tangible market driver is a cultural proclivity toward acting in the public good. Japanese companies pride themselves in supporting the national interest, in this case restoring the country's energy supply with renewables.

'For a company in Japan to demonstrate how green it is, and that it has understood the national challenge of electricity and the phase out of nuclear and all the terrible things that came with it - and addressing this question on its own production site - I think that is a high incentive for Japanese companies,' said Alexander Ochs, climate and energy director at Worldwatch Institute.

### **Land Limits**

While Japan may have a strong cultural proclivity toward solar, its climate, geography and population density impose limits. It has plenty of sunshine for PV, but not enough to be a good candidate for concentrating solar power, according to BNEF's Chase.

The small nation is also population dense, with 343 people per km<sup>2</sup>, which is high compared with other top solar countries. Germany's density is 231/km<sup>2</sup>; China, 141/km<sup>2</sup>; and the US 32/km<sup>2</sup>. So, open land is precious and expensive in Japan. Much of the new large scale solar in Japan is ground-mounted – and that requires land.

'It's a serious issue,' said Upsolar's Li. 'About 73 percent of Japan is mountainous and/or forested. There is a lack of large parcels of suitable land due to issues like land cost, saturation of the local grid, distance to substations, local climate or terrain, etc. The recent boom will quickly consume suitable land, and has driven up land cost.'

The problem is inspiring some creative solutions, according to Matt Dougherty, an associate at DLA Piper Tokyo Partnership. 'One common theme we are seeing in plant location is in golf courses. There was a glut of golf course construction in Japan during the "Japan Inc" era but now many of those courses are either bankrupt or underperforming.'

Shugar added that unused industrial sites are not difficult to find in a country like Japan. In addition, solar using trackers can increasingly complement agriculture, opening up new possible land resources for projects.

Added Ochs, 'Since land mass is somewhat limited, I think the smartest way to go is to use buildings, rooftops, parking lots. This is a highly industrialised country with many factories, warehouses, commercial buildings. These places should not just use less energy - they should actually produce it.'

### **Financing Available**

While land may be a problem, financing is not, say several industry insiders. Japan enjoys low commercial lending interest rates, about 0.9 percent, which are likely to translate into low interest rates for solar projects, as well, according to BNEF. Both large banks and specialized investment firms have shown interest in solar lending.

'We have utilised limited partnerships for our solar projects. Most investments are either greenfield, which invests from scratch, or brownfield, which is already up and running. Because the mega solar market is still young, most of the investments are greenfield, as are our investments,' said SPARX's Abe. 'Capital is coming from institutional investors who are open to new or non-traditional ventures, wealthy individual investors and pension funds.'

Although financing structures vary from project to project, Mercom's Prabhu says most deals are from bank syndicates financing 15-20 year term loans. Some of the investors include Mizuho CB, Mizuho Bank, Toho Bank, Tohoku Bank, 77 Bank, Bank of Iwate, BTM-UFJ, Chiba Bank, Mitsubishi UFJ Lease & Finance Company, Oita Bank and Shinsei Bank, he said.

### **The Real Deal?**

Shugar, who has done business in Japan in various capacities going back to the late 1980s, has yet to pursue large-scale projects or contracts, but 'we are very interested in the market,' he said. There may not be any need to rush. Japan's solar industry is 'sustainable,' according to Shugar. 'Not a flash market.'

That staying power emanates from an unusual combination of circumstances. The government has created an incentive that appears to work. Japan needs power and has few alternatives except renewable energy. It fears nuclear. At the same time, the country is known for its technology know-how. Its domestic solar manufacturing base is experienced and diversified, and its financial sector is amenable to solar deals. And finally, the Japanese people are predisposed toward green energy and acting for the larger good.

'It is a situation that doesn't exist anywhere else,' Shugar said.

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