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# analyst view

## The Potential for Fuel Cell Prime Power in Japan

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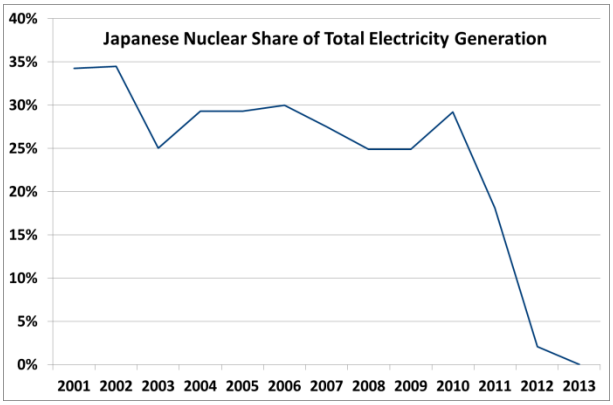
*A Bloom Energy fuel cell installation in the USA (Source: Bloom Energy)*

Bloom Energy was recently quoted by Bloomberg as saying the Japanese market for distributed prime power was primed "to adopt more power supply devices that can withstand disasters and complement services provided by utilities"; the article claimed this was a direct result of the 2011 Tōhoku earthquake and tsunami.

One thing that has occurred in Japan since 2011 is a reassessment of its nuclear generation capacity, and shutdowns have taken place in order to assess the safety of the country's installed capacity. Historically Japan has generated approximately 30% of its electricity using nuclear power, but that all changed in 2011.[1] According to a report by the UK Government,[2] nuclear output in Japan fell by 44% in 2011 in the aftermath of the Fukushima-Daiichi accident and by a further 89% in 2012.




This decline in electricity generation using nuclear power finally decreased to zero percent on the 16th September 2013, when Eurotechnology Japan reported that Kansai Electric Power (KEPCO) had ceased operations at Japan's last remaining active nuclear power reactor (Oi No. 4 reactor).

It believes Japan will be nuclear-free for the foreseeable future, not due to government policy, but a combination of technical issues

1. International Atomic Energy Agency Nuclear Technology Review. http://www.iaea.org/Publications/Reports/
2. House of Commons Library. Nuclear Energy Statistics, Standard Note: SN/SG/3631

and local politics. Operational nuclear reactors in the country have always undergone scheduled maintenance every thirteen months that has required them to be shut down. Approval to restart the reactors in each instance was required from both the country's nuclear safety agency and also from the local community, and this approval tended to be granted as a formality. Since the events that led to the Fukushima disaster however, the nuclear agency has imposed stricter safety measures for restarting reactors. However, these have not proved to be the main barrier; many community authorities have expressed their distrust in the management of nuclear reactors and have refused permission to resume operation. Governor Hirohiko Izumida of Niigata Prefecture has been particularly vociferous in this regard stating that Tokyo Electric Power Company "cannot be trusted".

The void left by this shutdown of roughly 30% of Japan's electricity generation capacity has been filled largely by increased imports of liquefied natural gas (LNG) to fuel gas turbine generators. Japan's Minister of Economy, Trade and Industry, Toshimitsu Motegi, spoke at the Second LNG Producer-Consumer Conference held in Tokyo in September 2013 and stated: "the nation's annual LNG imports have jumped 20 million tons (> 2.5 billion cubic feet a day), or 25%, since 2010". This has come at a significant cost to the country, with fuel prices increasing and energy utilities being forced to pass on these costs to rate payers.

Distributed generation certainly has the ability to provide a more robust supply of electricity in countries that experience natural disasters, such as earthquakes and tsunamis, and fuel cell technology is already enjoying success in Japan on a small scale under the Ene-Farm brand. Sales of residential fuel cell micro-CHP units have increased substantially in recent years as consumers look for ways to diversify their energy supply away from a reliance on centralised generation.

A number of Japanese companies are developing large-scale fuel cell technology capable of generating electricity in the hundreds of kilowatts range and above. Fuji Electric continues to improve its 100 kW phosphoric acid fuel cell system, which it has installed at a broad range of customer sites including factories, museums and wastewater treatment facilities. Its system is also sold under licence by N2telligence as a source of low oxygen content air, which finds application in industrial fire suppression.

Mitsubishi Heavy Industries is developing a large scale fuel cell combined cycle system industrial power plant under its Solidia brand. The company is planning three sizes of the plant: a 0.25–1.35 MW combined SOFC and gas turbine system; a 40 MW upscaled version of the same system; and an 80 MW combined SOFC, gas turbine and steam turbine system. The systems will be fed with natural gas and are expected to be 60–75% efficient.

The comment by Bloom Energy referenced at the beginning of this article came shortly after the launch of its new joint venture, Bloom Energy Japan; Bloom's partner in this JV is Japan's third largest mobile carrier, SoftBank Corporation. Bloom Energy Japan will initially target larger power consumers such as office buildings, factories and data centres. This is the first time Bloom Energy has sold outside of North America and it is hoping to replicate the success found there.

Prospects for growth in the number of large stationary fuel cell installations in Japan therefore appear to be very healthy and, with appropriate support from policy makers and the public, Japan could easily follow in the footsteps of Korea in adopting this technology.

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