

Bloom Energy Japan Versus Abe's Road: What Energy Future for Japan? ルームエナジージャパン対安倍政策 日本のエネルギー未来は

Andrew DeWit

Between 2012 and 2014 we posted a number of articles on contemporary affairs without giving them volume and issue numbers or dates. Often the date can be determined from internal evidence in the article, but sometimes not. We have decided retrospectively to list all of them as Volume 10, Issue 54 with a date of 2012 with the understanding that all were published between 2012 and 2014.

Andrew DeWit

On July 18, Japan's Softbank announced that it has formed a partnership with US Bloom Energy (<http://www.bloomenergy.com>) to enter the Japanese market and proceed from there through Asia. The good news comes at a time when an election victory prompts PM Abe Shinzo to embark on a bold and risky agenda of constitutional revision, military expansion and heightened conflict with China. Back in the early 2000s, Softbank CEO Son Masayoshi blazed a trail that led Japan to having the among the fastest and cheapest internet services in the world. Abe and Son appear to represent polar opposites in their approach to development, independence and power. In this short piece, I argue that while analysts have been dazzled by Abe's electoral triumph, Son's resilient and internationalist road could shape a very different and positive Japanese economic, technological and energy future than that envisaged by the PM.



Bloomenergy CEO KR Sridhar holds up a Bloombox

Abe has won decisively - to no one's surprise - in the July 21 Upper House elections. Abe's LDP took 65 of 121 seats at stake, and gained a comfortable majority of 135 of 242 seats in the House with its coalition partner the Komei Party. The LDP now has majorities in both houses of the national government. The Financial Times, Economist and other observers are counting on the now doubly empowered Abe to pursue the "structural reforms" they tout as key to reviving globalization and recharging the long stagnant economy.

These hopes seem almost certain to be disappointed. Even before the elections, Abe

gave plenty of signs that the economy would be secondary to constitutional and historical revisionism. His provocative July 17 visit to two islets 160 kilometres from the disputed Senkaku (Diaoyu) islands was unprecedented for a Japanese PM, and completely unnecessary in light of his enormous lead in the polls. As for reform, there is already talk that METI Minister Moteji Toshimitsu may be out in a September cabinet shuffle, and that supporters of the monopolized power-market status quo will gain the upper hand.

Indeed, as the June 29th edition of the Japanese business weekly *Toyo Keizai* related in detail, Abe quite strained relations with the peak of the economic elite who recognize the critical role that Chinese and Korean markets will play in Japan's economic future. Yonekura Hiromasu, the Chair of Keidanren, sensibly asked Abe to work harder for improved relations with China and Korea. Yonekura was treated to an explosive rebuttal from Abe, who pounded the table with his fist.

The risk also remains that Abe will visit Yasukuni Shrine in mid-August, intensifying conflict with China and South Korea over historical issues associated with the empire. In a region at the centre of multiple global crises, that act would be the height of irresponsibility. But it is a distinct possibility.

Ties that Bind

One consequence of the Abe threat is that US-China ties are strengthening, not only in light of their massive trade and financial ties, but also in part to minimize the risk of an Abe-driven clash with China. Another force in this increasing cooperation is the role of US Secretary of State John Kerry

(<http://thinkprogress.org/climate/2013/07/19/2328571/sec-kerry-getting-the-us-china-climate-partnership-right/>), a renowned climate change hawk. Kerry went so far as to pen, on July 19, a "Getting the US-China Climate Partnership Right" contribution to Joseph Romm's "Climate Progress" blog. Kerry stressed the benefits from the US and China cooperating "to grow green together" in a "global energy market that's valued at \$6 trillion with four billion users worldwide."

As Kerry surely knows, because the Department of Energy (DOE) published a July 11 (updated July 16) report (<http://energy.gov/downloads/us-energy-sector-vulnerabilities-climate-change-and-extreme-weather>) on the American energy sector's vulnerability to climate change and extreme weather, much of this green growth will have to take the form of distributed generation. Distributed generation is what Softbank has been championing in Japan since the Fukushima disaster. The recent tie-up with Bloom Energy is a critical step along that road, in a country still dominated by centralized power and led by a PM committed to nuclear restarts.

As with relations with China and Korea, Abe is on the wrong side of history in this respect, too. He stresses overseas sales of centralized nuclear power and campaigns for their restart on the home front over widespread domestic opposition, at a time when the country's best opportunity is to get in the lead on distributed green energy.

Centralized Power's Changing Climate

The centralized generation model of the existing utilities, especially Japan's monopolies, offers the economic efficiency of concentrating generating capacity in one place, thereby reducing per-unit costs of generated power. This is because the larger the generating station, whether it be coal or nuclear or other thermal generation, the lower the per-unit cost of output.

Yet concentrated and centralized thermal generation confronts multiple problems. Aside from generally climbing costs of conventional fuel, it is increasingly vulnerable to climate change. This vulnerability is true of the plant itself as well as the power grid that sends the generated power into population centres. Over the past several decades, we have (and "we" means particularly the developed countries) have built power systems whose underlying principle is that the efficiency gains from clustering generating capacity are to be valued above all other considerations. But recent failures of centralized generation, most notably the Fukushima triple disaster, have made business and other customers reluctant to rely on big utilities.

This became clear in the wake of Fukushima, when power supply problems wreaked havoc on global supply chains for critical materials in various manufacturing processes such as automobiles and electronic products. And similar power-supply failures have occurred in numerous other cases as well, including the world's largest-ever (roughly 600 million users) last July in India. Moreover, these failures are occurring with increasing frequency, as the DOE report highlights.

There is also growing awareness of the environmental damage from large-scale

generation as well as the challenges that it confronts from the water-energy nexus. The DOE report has lots of company in pinpointing this latter concern, including a long article (<http://www.fortnightly.com/fortnightly/2013/07/growing-footprint-climate-change>) in the July edition of Public Utilities Fortnightly, on "the growing footprint of climate change." As all these studies show, centralized conventional power uses enormous amounts of water at all stages of the cycle, ranging from getting the fuel out the ground to burning it and keeping the equipment from overheating. This dependence on water is one of the many reasons centralized generation is becoming unsustainable.



City Hall

The mounting background of experience and empirical evidence is why a sea change is underway in thinking among corporate, military, urban and other actors concerning where they should get their power and what the acceptable trade-offs are concerning the cheapness of centralized generation (whose costs are going up anyway, even in the US) versus the still relatively more costly

distributed generation (whose costs are declining).

It is thus no surprise that a prominent new customer for decentralized power is New York City, as City Hall is being removed from the conventional power grid in favor of running base load power operations from a Bloom Box. This is part of Mayor Bloomberg's strategy of increasing the city's resilience to natural disasters - such as Hurricane Sandy - and other challenges. New York's turn to distributed generation, via a Bloom Box, follows similar moves by Apple, Microsoft, Google and a host of other corporate actors.

The ICT Connection

Another attractive feature of the Bloom Boxes is the fact that they are very Information and Communication Technology (ICT)-centered. The output of each individual stack is monitored constantly, with interactive operations that serve to identify emergent problems as well as maximize efficiency. Moreover, being modular, the component stacks of cells in the box mean that any individual failure does not result in failure of the total system. In other words, a portion of the Bloom Box can be down due to the failure of a particular stack or set of stacks, but the overall power plant itself will continue producing power. The attractiveness of this feature perhaps cannot be overstated. It means that not only is resilience increased by deploying distributed power, but distributed power generation itself has a built-in resilience feature so that failure of a portion of the system does not jeopardize or shut down the overall system.

In addition, the ICT aspect may greatly enhance the attractiveness of the generation to Japan's local communities and other actors (especially the Ministry of Internal Affairs and Communications) that already seek to be part of the rapidly accelerating paradigm shift in power generation sources as well as power generation and consumption management. Another item that seems likely to make this fuel cell option very attractive to local actors in Japan is the fact that it runs on biogas. There is already a significant policy initiative in Japan for recovering biogas from landfills as well as wastewater and other sources. Consuming natural gas in a fuel-cell is of course more efficient than burning it in a generator, but at the same time still requires the use of a fossil fuel. But the use of biogas (<http://biomassmagazine.com/articles/9154/equipment-profile-biogas-powered-fuel-cells/>) is a different matter, and thus makes the technology truly a potential "bridge to the future."

Moreover, the Bloom Box can also be used as back-up generation to support solar, wind and other intermittent generation. These latter are also a major focus of Softbank's initiatives through its S&B Energy subsidiary (<http://www.sbenergy.co.jp>). The potential threat to Japan's monopoly utilities and their centralized generation is thus multifaceted.

And even though the cost of the power from the Bloom Boxes is more expensive than what is offered by centralized thermal generation, the fact is that Japanese utilities are levying increasing charges on their large-lot power users, in many cases double digit increases. The next increase for all of them is in fact slated for August. The power-cost increases have led to massive defections by customers. For example, after Kyushu Electric raised its rates in April by an average of 11.94%, it lost

199 large-lot (over 500 kw) customers, raising the total number of large-lot customers lost since 2000 to 2194 for Kyushu Electric alone. These large-lot users have moved instead to in-house power generation, independent producers and more efficient systems. Many public sector schools, libraries and other facilities are also dumping the utilities wherever possible. The fuel-cell alternative, via long-term power-purchase agreements, offers a stable option in the face of increasingly uncertain conventional power supply and cost.

Another factor to consider is that the Bloom Boxes' per-unit cost is not likely to increase (quite the contrary) because they are only five years old and just entering mass production. With mass production, particularly in the midst of strong competition as well as ICT-enabled production paradigms (e.g. 3D printing), the per-unit cost of output may see rapid declines. This is especially the case because the Bloom Box (http://www.cbsnews.com/8301-18560_162-6221135.html) is largely made of sand, and because it is located right in the nexus of Silicon Valley big money and advanced ideas.

To be sure, at this point, we do not know if Bloom Energy Japan will be a success. Neither do we know whether Abe will visit Yasukuni nor how hard he will push to get centralized nuclear power back up and running. All we do know is that the forces driving Japan and others towards distributed generation and cooperation are multiple and increasingly powerful. We also know where Abe and Son stand. Son beat the odds a decade ago, and one can only hope that he does again and that his approach becomes the rebound direction from Abe's risky road.

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