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Asia Policy, Number 17, January 2014, pp. 159-164 (Review)

Published by National Bureau of Asian Research

DOI: <https://doi.org/10.1353/asp.2014.0004>

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that optimism, but would even go further to suggest that since 3.11, Japan's leaders, civil society, and American friends have been planting the seeds of change in the next generation, and that Japan will certainly see the fruits of these investments both domestically and in the context of U.S.-Japan relations. Whether or not that is what Samuels considers a "renaissance" remains to be seen, but there is no doubt in my mind that the novelty of the 3.11 crisis and the adaptive leadership it engendered will, over time, shape a generation.

3.11 and Japan's Shift to Smart, Distributed Power

Andrew DeWit

Richard Samuels's book *3.11: Disaster and Change in Japan* is, to date, the most authoritative English-language study of the impact of history's costliest natural and man-made disasters on Japan's political economy of energy and the implications for intergovernmental relations. The book uses a narrative approach, deftly outlining the institutional terrain prior to 3.11 and presenting the key actors and core arguments for a return to business as usual versus alternatives advanced by reformists. Samuels maps Japan's fights over energy and regional governance, providing a valuable resource for examining those linked conflicts in the larger context of accelerating global paradigm shifts in energy and the character of the city regions that consume the vast majority of it. In Japan, as is true elsewhere, energy is the fundamental economic sector. For decades predictable and taken for granted, energy is suddenly dynamic, with disruptive change being spurred in particular by communities' search for resilience and sustainability in the face of multiple crises.

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NOTE ~ This review essay draws on Andrew DeWit, "Just Gas? Smart Power and Koizumi's Anti-Nuclear Challenge," *Asia-Pacific Journal*, December 16, 2013 ~ <http://japanfocus.org/-Andrew-DeWit/4049>.

Samuels's considerable background in research and writing on Japanese energy and local government left him better prepared than most concerning what to pay attention to in the confusion following 3.11. He neither takes sides nor picks winners, save in betting on expanding opportunities for the local governments who star in his account (p. 197). This detachment allows Samuels to explicate the broad range of interests wanting to rebuild the disrupted *status quo ante* as well as the challengers who swiftly rose to prominence amid the chaos.

His analysis shows us that prior to 3.11 Japanese energy policymaking was dominated by a “nuclear village” centered on the Ministry of Economy, Trade and Industry (METI); the utilities; the nuclear industry; cooperative political, business, media, and academic elites; and advocates in the communities hosting nuclear plants. Japan's power economy—the world's third-largest—featured the most profound monopolization of any developed country, not just in terms of generation and transmission assets, along with the rules governing them, but also via dense and dangerously complacent political and business alliances in the national capital and throughout the country. Compact and powerfully incentivized, the nuclear village had seized control over fiscal, regulatory, and other resources and had driven a nuclear energy paradigm into the core of Japanese policymaking. The dominant discourse, inscribed in energy, environmental, and economic-growth policy, depicted nuclear power as the cheapest, most reliable, and most realistic option, declaring it also to be completely safe as well as the bedrock of energy security. Prior to 3.11, Japan's nuclear program was thus set to expand from under a third of electrical power production to reach over half of the nation's power generation by 2030. In a country with scarce conventional energy resource endowments, oceans away from increasingly precarious and expensive fossil-fuel supplies, the government-backed nuclear paradigm possessed immense resources, credibility, and political momentum, enabling it to obfuscate a startling record of accidents, cover-ups, cost overruns, and other scandals.

Samuels details how the shock of 3.11 shattered this structure of interests and its commanding narrative, delivering a particularly large blow to the Tokyo Electric Power Company (TEPCO), the world's largest private utility. The nuclear village continues to be eroded by public opposition to its vision, the already monumental and still-mounting costs of the Fukushima Daiichi reactor meltdowns, and the spread of renewable and efficiency alternatives among local governments, households, businesses, and other rapidly multiplying “prosumers” (producers and consumers) of energy. Even the subsequent return of the Liberal Democratic Party (LDP), headed by an explicitly pro-nuclear

prime minister, has yet to contain this momentum for an energy shift. Samuels's account is thus invaluable for understanding much of what is at stake in Japan's post-crisis clash between centralized and distributed power (or more generally, distributed energy resources).¹

While Samuels scrupulously avoids taking sides, his work illustrates how the "creative destruction," so to speak, of 3.11 has given Japan a chance to be a leader in the global transition from centralized to distributed power. He sketches the quick defections from the core of the nuclear village as firms such as Toshiba, Hitachi, and Marubeni began "repositioning themselves" (p. 139). Developments have since surged on multiple fronts: in September 2013, just two and a half years after 3.11, Japan's 16 trillion yen power market featured over 100 independent power producers, including such new entrants as Toyota. A year before, in September 2012, that number was 64.² And Japan's feed-in-tariff policy support for diffusing renewables, described at length by Samuels (pp. 141–45) and effective from July 2012, saw over 4 gigawatts (roughly equivalent to four large nuclear reactors) of new renewable capacity deployed in the first year. Moreover, Japanese domestic shipments of solar cells and modules during July–September 2013 leapt to 2.075 gigawatts, over triple the 627-megawatt level of a year earlier.³ These data points are just a few indicators of the speed with which Japan's energy landscape was changing even as Samuels was writing about it.

The book also points out that metropolitan Tokyo became one spearpoint of a growing local movement to reduce reliance on monopolies such as TEPCO and instead contract with new entrants, produce power locally, and press for deregulation of the power sector (pp. 139–40). Deregulation is now official policy, but local governments—such as the 36 prefectures and 17 designated cities (those with populations over 500,000) grouped in their respective Natural Energy Councils—are advocating an accelerated time frame and greater institutional transparency. Most local governments have more or less

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¹ Centralized and distributed power are distinguished by the geographic and economic concentration of electrical generating capacity versus its dispersal. The former is most strongly symbolized by nuclear plants but also includes large-scale fossil-fuel power plants and an extensive one-way grid. By contrast, distributed power sees much smaller-scale generation distributed over a wider area, opening the door to flexibility, falling costs, and increasing equity through renewables, radical efficiency, interactive "smart" grids, and broader participation in the power economy.

² Aaron Sheldrick, "In a Sign of Reforms to Come, Newcomers Snap at Heels of Japanese Utilities," Reuters, September 14, 2013 ~ <http://www.reuters.com/article/2013/09/14/us-japan-utilities-idUSBRE98D0DJ20130914>.

³ Ishida Masaya, "Taiyou denchi no shukkaryou ga zennenh de 3-bai ni, hatsudenjigyoyou wa 10-bai no 75-man kW" [Solar Cell Shipments Thrice Previous Year, Utility-Use Up 10 Times to 750,000 Kilowatts], *Smart Japan*, December 5, 2013 ~ <http://www.itmedia.co.jp/smartjapan/articles/1312/05/news026.html>.

ambitious measures to spur solar, wind, small hydro, geothermal, biomass, and other renewable energy initiatives, together with power cuts through advanced LED lighting and other efficiencies, that expand local employment and business activity.

Another example of this disruption of pre-3.11 centralized power is the new energy plan advanced by the city of Kyoto on November 15, 2013. Following Fukushima Prefecture's targeting of 100% renewables by 2040, Kyoto is the first among Japan's twenty designated cities to draft a roadmap to eliminate its dependence on nuclear power. Stressing the role of information and communications technology (ICT), Kyoto's plan relies on 15% conservation and a tripling of renewable power by 2020.

Kyoto stands out for its explicit anti-nuclear sentiment, but the emphasis of hundreds of other local governments on "local production-local consumption" (*chisan chishou*), backed up by collaboration with central agencies, illustrates how the impact of 3.11 continues to distribute effective authority in energy policymaking by diffusing power generation, conservation, and storage. This is in sharp contrast with the situation prior to 3.11, when few local energy plans set robust targets for distributed power and efficiency.

Another area disrupted by 3.11 is Japan's smart-city program. The smart-city approach integrates the increasingly miniature, versatile, and inexpensive ICT capacity held, for example, in a smartphone with large-scale urban infrastructure such as power and energy, administration, waterworks, transportation, healthcare, and waste treatment. Somewhat akin to sensory organs and a nervous system, ICT sensors measure and monitor an increasing range of phenomena relevant to managing these resource- and energy-intensive infrastructures. The sensors deliver real-time information on the urban ecosystem, allowing for greatly enhanced efficiency, interactive power grids, and other facilities that seemed distant prospects even a few years ago.

Samuels briefly describes Japan's smart cities (p. 145), noting METI's central role in coordinating four large-scale projects in conjunction with some of Japan's biggest industrial concerns. Prior to 3.11, Japan's smart-city initiative centered on building a low-carbon and more efficient model in a few cities, with a focus on export opportunities. METI officials and other policymakers were constrained by the larger context of the monopoly utilities, the centralized and nuclear paradigm in the power economy, and other strictures of the pre-disaster status quo. Samuels shows us how the METI-led effort quickly began to morph after 3.11, with the patent evidence of the vulnerability of centralized power and the sudden imperatives of conservation and local resilience. He notes that the disasters expanded local governments' and central agencies' incentives to

take part in the accelerating fusion of ICT, distributed energy, efficiency, and other aspects of the smart-city model (pp. 138–40, 195–97). Indeed, Japan's government-sponsored smart-city projects have since increased from 22 to well over 100.⁴ As is the case globally, there is no reliable count. The number of projects is growing too rapidly and diversely, with many communities implementing a broad range of smart applications, while others confine theirs to one or a few areas of infrastructure.

Smart cities were recognized as a growth sector even before 3.11, which is one reason METI and other agencies had the initiatives Samuels mentions. In September 2010, Nikkei BP Cleantech Institute, based on a survey of one hundred selected global projects then underway, projected an energy-related market of about 3,100 yen cumulative between 2011 and 2030; but it also forecast that the market would exceed a cumulative 5,000 trillion yen with inclusion of the broad range of smart infrastructure, including water, housing, and other areas.⁵ Enabled by the rapid diffusion of increasingly inexpensive ICT, distributed energy, and robust public policy, and impelled by the desperation of Hitachi, Toshiba, Toyota, NEC, IBM, GE, Microsoft, Bechtel, Philips, Siemens, AT&T, and myriad others to innovate toward the most competitive business model, there are now thousands of projects worldwide and a market whose scale and growth defy calculation. This accelerating evolution is reshaping urbanization in response to many of the risk factors highlighted by the tragedy of 3.11: the vulnerability to increasingly frequent and intense natural disasters, the systemic weakness of centralized power and other infrastructures, lethargic national governments dominated by vested interests like the nuclear village, and the mounting costs of conventional resources.

One of the key advantages enjoyed by Japan, but overlooked in Samuels's book because it simply was not part of the discourse, is the role of the Ministry of Internal Affairs and Communications (MIC) in shepherding the "smartening" of local governments nationwide. Alarmed at Japan's comparatively low diffusion of and declining competitiveness in ICT, the MIC has elaborated an ICT-centered growth plan since 2004. This initiative received enormous impetus from 3.11, just as the shock of Hurricane Sandy has convinced New York City's officials to emphasize distributed power and other elements of resilience. Thanks in particular to MIC's groundwork, ICT-centered growth

⁴ Kosuke Sato, "Sumaatoshiti jitsugen ni muketa torikumi to kongo no kadai" [Issues and Projects Toward Realizing the Smart City], Japan Research Institute, Paper, no. 2013-03, April 30, 2013 ~ <https://www.jri.co.jp/MediaLibrary/file/report/researchfocus/pdf/6743.pdf>.

⁵ "The Smart City Market Will Be Worth a Cumulative Total of 3,100 Trillion Yen for 2011–2030—Nikkei BP Cleantech Estimates Based on Its Research on 100 Smart Cities Worldwide," Nikkei BP, Press Release, September 27, 2010 ~ <http://www.nikkeibp.com/news/100927.html>.

became official cabinet policy in June 2013 and is being pursued nationwide in Japan rather than only in particular regions endowed with the right mix of incentives and resources. Japan's case thus contrasts sharply with, for example, the lamentable lack of a smart and resilient recovery in New Orleans in the wake of Hurricane Katrina.

Japan's recovery remains a work in progress, one fostered by the proliferation of intergovernmental linkages that Samuels discusses in detail (pp. 151–79). Because much was inchoate while the book was being written, he could not address the role that a mobilized Japanese civil society might play in shaping the smart-city paradigm and the scope of centralized nuclear power within it. The current LDP cabinet seems to want all of the above, as it were, meaning a return to the nuclear paradigm plus maximizing opportunity in the smart and green-energy revolutions.

Yet doing both was problematic prior to 3.11 and likely remains so because of scarce resources, the speed of change, and the trajectory of distributed power. Thus, what Japanese civil society has done and will do seems critical. As Samuels points out, outrage at the nuclear village saw Japanese citizens link up through social media and then vote with their feet in mass demonstrations, disrupting a return to business as usual (pp. 131–34). In conjunction with local government leadership, consumer cooperatives, credit unions, and other networks, the Japanese public is becoming a key player in building distributed energy. What unfolds next in Japan is likely to matter a great deal, as the global smart-city paradigm is teetering between top-down approaches, wherein big business and a technocratic public sector drive the design, and bottom-up approaches that center on input from citizens and responsive local communities. Like citizens everywhere, the Japanese face the choice of either mobilizing even more deliberately to build resilient and democratic communities or becoming even more atomized, passive residents of cities shaped and controlled by technocrats and multinational firms. So whether a further legacy of 3.11 is a Japanese-style sustainable, equitable, and democratic smart-city modernity remains to be seen. But at the very least, the nuclear village's pre-3.11 paradigm appears to be history.