



## Japan's Rollout of Smart Cities: What Role for the Citizens? スマートシティが公開されるなか、日本の市民の役割とは

Andrew DeWit

The Asia-Pacific Journal, Vol. 11, Issue 24, No. 2, June 16, 2014.

### Japan's Rollout of Smart Cities: What Role for the Citizens? スマートシティが公開されるなか、日本の市民の役割とは

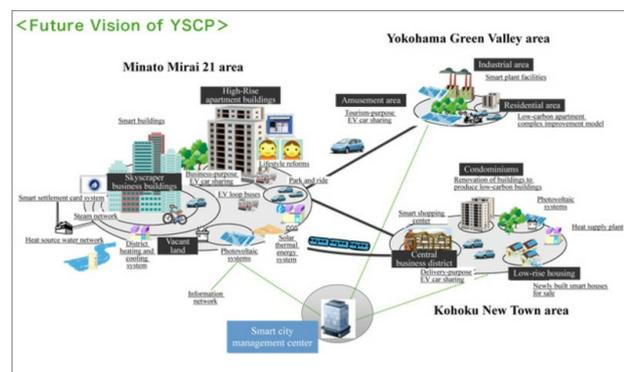
Andrew DeWit

On May 27 Ernst & Young Institute Japan (EY) released a Japanese-language study, summarizing Japan's over 200 smart city projects. EY's work is especially well timed. Among other recent developments, June 2 saw Apple join a long list of firms including Toyota Home<sup>1</sup> by entering the "smart home" market.<sup>2</sup> The global background includes thousands of smart-city projects, collectively worth at least USD 650 billion in 2014.<sup>3</sup> At over USD 40 billion, Korea's Songdo smart city project is the costliest private-sector real-estate development ever undertaken.<sup>4</sup>



Songdo Smart City

And this year Japan's core smart-city projects in Yokohama, Kitakyushu, Keihanna (Kyoto Prefecture) and Toyota City are slated for accelerated deployment domestically and overseas. Based on research by Nikkei BP Cleantech Institute, Japanese experts believe the smart-city market will reach at least a cumulative 5000 trillion YEN in value between 2011 and 2030, when such smart infrastructure as water and housing are included along with smart grids, renewable energy, battery storage and other core elements of the smart market.<sup>5</sup>



Concept of Yokohama Smart City

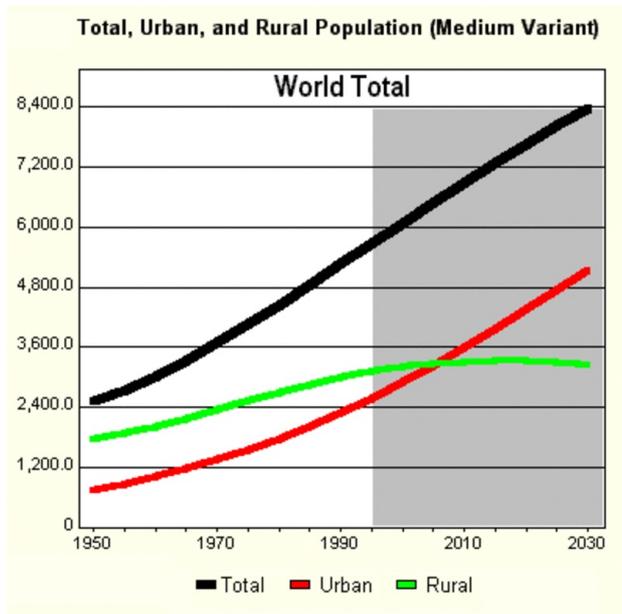
That estimate of a cumulative 5000 trillion YEN smart city market is roughly 10 times the size of the current Japanese economy. It is thus understandable that Japanese policymakers are devoting considerable fiscal, administrative and other resources to the effort. Yet the EY study of Japan's smart-city projects and their context raises many important questions that need to be addressed. Most striking among these issues is the absence of Japanese citizens' input into the design and deployment of advanced urban systems that will profoundly affect their lives. This article reviews the content of the EY study and highlights a number of items the report itself overlooks.

#### Smart Cities

Cities comprise 3% of global land area but produce 50% of global waste and about 70% of global anthropogenic greenhouse gas emissions, while consuming nearly 75% of natural resources. They also generate about 80% of global GDP.<sup>6</sup> Over half the total global population of 7 billion already lives in cities. UN and other projections suggest 2 billion new urban residents will likely be added over the next 15 to 20 years, during which time perhaps as many as 3 billion new "middle class" consumers will swell the ranks of the present 1.8 billion.

Given the above, utterly radical resource efficiency is imperative. The United Nations Environmental Programme's (UNEP) June 5, 2014 report on "Decoupling 2: Technologies, Opportunities and Policy Options" warns that since 2000, metal prices have increased by 176 percent, rubber by 350 percent and energy sources by a rough average of 260 percent.<sup>7</sup> These powerful price signals of unsustainability are evident in an epoch in which some 260 million Chinese alone have migrated to cities. But the true scale of what is driving these price increases boggles the mind. Similar to the UNEP's study, the forthcoming OECD report on "Material Resources Productivity and the Environment" also warns that the sheer amount of material extracted, harvested and consumed globally ballooned 10-fold between 1900 and 1980, reaching roughly 35 billion metric tonnes (Gt). Between 1980 and 1990, it rose again to 43 Gt, and then further expanded to 72 Gt between 1990 and 2010. During the same 1990 to 2010 period, the OECD share of these material flows fell from 43% overall to 27%, while the BRICS share, led by China and India, rose from 34% to 61%. Meanwhile, the non-OECD, non-BRICS "rest of the world" share of this growing mountain actually declined slightly from 22% to 21%. But under business as usual, the non-BRICS, non-OECD share of material flows is likely to increase as the total is

slated to exceed 100 Gt by 2030.<sup>8</sup> Indeed, the UNEP report projects that total material flows could reach 140 Gt by 2050, given business as usual. Keep in mind that this amount of material omits the much larger and increasing “overburden” and other waste<sup>9</sup> removed to get at resources. These materials do not enter the flow of consumable resources, yet they require more and more energy as well as equipment and other inputs to dig up, separate and throw away. And just 2050’s stupendous 140 Gt flow of resources alone would, in itself, be thrice the gargantuan figure for 2000. The UNEP argue that it would probably exceed the limit of all available resources as well as this planet’s capacity to absorb the massive ecosystem damage of extracting it.



World urbanization projection, 1950-2030

ICT is already enabling communities to realize significant gains in efficiency, resilience, responsiveness, and creativity, gains that are poised to increase rapidly if effectively promoted.

Nor are rising resource costs the only driver: The development of smart cities, an inherently decentralized model, is also being accelerated by the patent vulnerability of large-scale centralized power and other systems to increasingly frequent and intense natural and human disasters. As Anthony Townsend, Research Director at the Institute for the Future and Senior Research Fellow at New York University’s Rudin Center for Transportation, illustrates well in his *Smart Cities: Big Data, Civic Hackers, and the Quest for a new Utopia*,<sup>12</sup> these profound trends are already reshaping urbanization. For Townsend and others, the real question is whether the citizens in smart cities will lead, or just be led. So when you use a smart phone, you hold in your hands the technology that might rebuild your democracy as well as help save your own and countless millions of kids from misery.

#### Smart Cities in Japan

The EY report is titled “Smart Cities: A Study of Issues Involved in Going from Testing to the Deployment Stage.” It is also subtitled “Towards Constructing Smart Cities that Produce a Citizen-Centred ‘Precious Circle’.”<sup>13</sup> The “precious circle” refers to achieving a balance of incentives among the three major stakeholders – citizens, corporations, and governments – such that citizen-friendly and sustainable urban development is achieved. Decidedly apolitical, the report ignores the tension between conventional utilities and the producers and consumers (prosumers) of renewable power in the business and household sector.<sup>14</sup> Yet the EY study is still immensely valuable as an overview of the state of Japan’s smart city programmes and debates.

The EY report points out that smart cities have been an object of specialist attention for several years. Most prominent in Japan, for example, the Ministry of Economy, Trade and Industry (METI) started its flagship “next-generation energy and social systems test-bed” smart-city approach in the four centres of Yokohama, Toyota City, Keihanna (in Kyoto Prefecture) and Kitakyushu in 2010.

The EY study does not examine the political economy background to Japan’s initiatives, so let us take a short detour on that very important aspect with MIT expert on Japanese energy politics, Richard Samuels. Like the EY study, Samuels notes in his 2013 book *3.11: Disaster and Change in Japan* (p. 145) that METI coordinated the four flagship projects with the power, gas, auto, steel and other industrial heavyweights. Samuels adds the important insight that prior to Japan’s natural and nuclear disasters of 3.11, Japanese policymakers aimed at test-bedding low-carbon models in a few cities, eyeing export opportunities. METI officials were aware of innovative developments overseas, and wanted to grow new industries. But they had to work within a centralized and nuclear-focused paradigm in the country’s power economy. Japan’s powerful monopoly utilities were averse to the rise of competitors through deployment of the smart grid and renewable power.

But 3.11 delivered a potent shock to the “nuclear village.” The nuclear meltdowns and the rolling brown-outs starkly demonstrated the vulnerability of centralized power. They also made conservation and local resilience not mere virtues but urgent necessities. The disasters also expanded non-METI central agencies’ and local governments’ incentives to carve themselves a role in the accelerating fusion of ICT, distributed energy, efficiency, and other aspects of the smart-city model.

#### Defining the Smart City

The EY authors argue there are several issues that require attention in rolling out the flagship smart cities, not to mention the myriad other projects underway. First, there is no precise definition of the smart city itself. In addition, the expanding scope of the initiatives as well as the broad range of stakeholders involved cross over multiple jurisdictions. This complexity makes the smart city difficult for administrators, voters and others to grasp let alone plan for and implement. The published documentation (in Japanese) on smart cities indicates that there is still poor understanding of the issues involved in operationalizing the projects. So the EY authors seek to define the elements of the smart city as

So consider again the anticipated 3 billion more middle-class consumers, a near doubling of the present 1.8 billion who collectively account for 80% of current material consumption. Math, physics and other realities indicate that urbanization and middle-class lifestyles simply cannot follow the resource- and energy-intensive pattern common to the developed world and now spreading through the BRICS. Without radical change, resource and energy prices will surely skyrocket and already accelerating climate change will - as the US military recently warned - become an endless horror show of extreme weather, declining crop yields, expanding disease outbreaks, and resource wars.<sup>10</sup>

Done collaboratively, democratically, and with all due haste, the smart-city paradigm may help steer humanity away from—or at least minimize—the fraught outcomes detailed by the UNEP, the OECD, the US military and a host of other agencies. The smart initiatives build on past programmes for resource-efficiency, especially in urbanization, by putting cutting-edge monitoring and management technology into the mix. In Japan, as elsewhere, the smart city essentially blends the information and communication technology (ICT) internal to a smart phone with such large-scale, resource-intensive urban infrastructures as power and energy systems, waterworks, transportation, waste treatment, street lighting, administration and health care. Measuring and monitoring these massive systems, and helping urban citizens and businesses avoid waste, opens the door to radical efficiencies. This is neither the stuff of fantasy nor ICT firms’ PR blather. Thanks to the rapid cheapening and miniaturization of the GPS, thermometers, accelerometers, hygrometers, ambient light monitors, and other sensors “stuffed” in the smart phone,<sup>11</sup> the power of

clearly as possible on the basis of Japanese documentation.

The EY authors search for a concise definition of the smart city, and find none. They lament that there are various definitions even within the rather narrow cluster of administrative agencies grouped around METI. One might add that there is also a bewildering array of terms such as “smart communities,” “smart towns,” “smart villages,” and so forth, which often seem exercises in semantics, assuaging vested interests (especially the incumbent utilities), and seeking either novelty or even some ineffable Japaneseness rather than contributing to the imperative of reducing increasingly expensive and scarce material flows to the minimum.<sup>15</sup>

The EY authors show us that METI itself defines the “smart community” as a next-generation social system wherein households, buildings, transport systems and other elements are linked by IT networks and achieve an effective deployment/use of energy across the region. Similarly, the Natural Resources and Energy Agency in its Energy White Paper describes the smart city as one in which electricity supply and demand is monitored with technology, and energy management is done at a regional level with distributed generation or energy systems.<sup>16</sup> And the lead agency for test-bedding the smart cities, the New Energy Promotion Commission (NEPC)<sup>17</sup> is even more ambiguous. It defines the smart city as one where ICT and other technologies are deployed in new ways and residents’ quality of life is enhanced while the environmental burden is reduced and the city is able to grow sustainably. These rough definitions are not only rather tentative, but also open to multiple interpretations.

The EY report argues that the various definitions as well as the approaches of the Japanese government and private sector actors offer a rough summary of what makes a smart city “smart.” The authors suggest smart lies in 1) increasing the convenience of urban dwellers, 2) pursuing sustainability through a focus on the environment, security, safety, resilience and other factors, 3) increasing the efficiency of services and other business.

What the EY authors miss, however, is that while Japanese smart city definitions are indeed vague, they are nevertheless clearly focused on energy, specifically the reduction of the carbon footprint. This helps them stand out against the thousands of projects underway or in planning globally. Many smart projects outside of Japan (and a few in Japan as well) have at best a tangential relationship to reducing the core urban material flows of energy and water.<sup>18</sup> While the world’s “smartest smart city” in Santander Spain is sharply focused on energy and water, and deeply engaged with its citizens in managing flows,<sup>19</sup> critics have noted for example that the Glasgow Future Cities project is overly devoted to their surveillance.<sup>20</sup>

#### Japan’s Impressive Numbers

Without mentioning the political economy shock delivered by 3.11 that Richard Samuels describes, the EY authors point out that, in policy terms, Japan’s smart cities were given a significant boost by the 2012 Japan Revival Strategy as well as the 2013 Abe Administration’s Japan Reconstruction Strategy. The money is certainly there, the Abe government having amped up its ICT spending with FY 2013’s roughly YEN 300 billion supplementary budget and over YEN 1 trillion in the current fiscal year.<sup>21</sup> The Abe Cabinet also set up a “Government Chief Information Officer” (CIO) agency within the cabinet secretariat in June of 2013, specifically to coordinate ICT projects and avoid overlap and incoherence due to silos in the bureaucracy and business worlds.<sup>22</sup> The cabinet and its CIO, however, appear to be asleep at the wheel, or preoccupied with other matters. The CIO agency’s most recent posting of information is December 12 of 2013, and there is as yet no itemizing of smart cities and their budgets.<sup>23</sup>

With no apparent cabinet coordination providing a handy list of Japanese taxpayer-financed initiatives in this critical area, the EY study had to search for and add up all the central-government initiatives it could find. The EY authors determined that Japan’s national government agencies alone are promoting over 160 projects. The results would appear to confirm a Japan Research Institute survey of April 2013 that determined Japan’s government-sponsored smart-city projects increased from 22 prior to 3.11 and reached well over 100 as of April 2013.<sup>24</sup> Moreover, the EY count of 160 projects does not include those being led by the prefectural as well as the smaller local government level as well as private-sector-led initiatives.

Among Japan’s many local-government-led smart city projects are the “Smart Town Hikari Kumamoto Project” being undertaken in the newest of Japan’s designated cities.<sup>25</sup> The prefecture of Saitama, just north of Tokyo, is also deploying “eco-towns” centred on smart grids, distributed generation (primarily renewable but also fuel cells) and conservation through home-energy and business-energy management systems as well as smart meters. Indeed, a January 2014 survey by the Kanto-area METI (the regional bureau) determined that among the roughly 500 local governments in the entire region about 10% (44) were undertaking smart community initiatives.<sup>26</sup> Determining whether this fraction is representative of Japan’s 1800 local governments is something the national METI or perhaps the Abe Administration’s CIO ought to be doing.

In addition to subnational-government-led projects, Japan features a significant number of private-sector-led smart cities, towns, and communities. The latter include 16 “smart towns” under development by Sekisui House<sup>27</sup> as well as Panasonic’s FujisawaSST “smart city” initiative.<sup>28</sup> Hitachi also has, not surprisingly, a smart-city development underway in Hitachi City in addition to multiple other project involvements in Japan and overseas.<sup>29</sup> Toshiba, in turn, lists several initiatives – such as the greenfield Ibaraki City Smart Community Project in Osaka Prefecture – among its ventures.<sup>30</sup> Mitsui Fudosan also has several projects underway, particularly within areas of Tokyo.<sup>31</sup> If all of these public and private-sector projects are added up, it would appear that Japan has well over 200 smart communities, and in every part of the country.

#### Citizen Involvement

The EY report draws attention to the lack of citizen involvement as a serious problem that needs to be resolved in order to develop citizen-friendly, and thus domestically as well as externally marketable, smart city models that will realize their potential. It suggests the need to survey user needs and experiences and deploy other forms of citizen input so that projects will effectively serve citizen needs. Yet given the size of Japan’s ICT spending in the current fiscal year, as well as the country’s high diffusion of mobile devices and excellent broadband services, a more ambitious approach seems possible, even essential. The Swedes, for example, have for at least two years involved citizens in urban planning with 3-D visualization, allowing them to see what is being planned and then to provide their opinions and suggestions about it.<sup>32</sup>

The fact that 3-D and other forms of direct citizen involvement are not even mentioned in the EY report, a report that is critical of the lack of citizen involvement, seems quite telling about the state of the debate in Japan. Japanese planners are not unaware of the global discourse on the need for citizen participation in smart cities. The importance of citizen involvement has in fact been a feature of Japanese policy discussion on smart cities for some years. It is, to take just one example, emphasized in a Ministry of Internal Affairs and Communications (MIC) document from April 20 of 2012. The document is a summary of recommendations by the “ICT Urban Development Promotion Division” based on discussions among the “committee concerning urban development using ICT and the prospects for global expansion.” This very high-level

committee included the top planners on ICT and smart cities. Its chair was Oka Motoyuki, former CEO of Sumitomo Corporation and its co-chair was Komiyama Hiroshi, former president of the University of Tokyo and head of the Mitsubishi Research Institute. It also included the IT section head from the Cabinet Office as well as a slew of other top bureaucrats who were there as observers. Reflecting other reports from Japanese officialdom, as well as studies by the OECD and other agencies, their report stresses the importance of citizen involvement throughout.<sup>33</sup> Yet the fact is that little has been done on this front.

Of course, a cynical perspective might suggest that citizen involvement is everywhere a touchy-feely kind of item to which technocrats pay obeisance and then ignore in order to get real work done. That perspective is likely what animates the nuclear village and other elites who are at the core of any planning related to the electrical system and cities in Japan. But we do know from innumerable cases, including Spain's Santander (the global benchmark), that citizen involvement is not only something doable, especially through smart phones and other devices. Deliberate citizen involvement also greatly aids in the design of citizen-friendly smart cities as well as gives rise to business opportunities related to that.<sup>34</sup> Sweden's 3-D visualization system is just one example. The Swedes innovated a new global business sector for visualizing planning, a profoundly positive and quantifiable externality among the many that come from putting citizens at the heart of smart cities.<sup>35</sup>

One would think that the Japanese, as well as the Koreans with their massive Songdo project, would be doing this far in advance of the Swedes. Both of these countries desperately need competitive and innovative export industries, due to their rapid aging, resource dependence, vested interest dominated political economies, and other challenges. But both the Japanese and the Koreans have much less citizen input-oriented governance systems and political economies. Moreover, their power sectors are highly monopolized. And like power sectors everywhere, these legacy interests are naturally reluctant to undertake initiatives and reforms that threaten their extant business models. Yet in the face of unparalleled resource crises and nimble competitors, deep reforms and revolutionary innovations are essential to building truly competitive and resource-lite smart cities.<sup>36</sup>

Surely one reason both the Abe administration and large segments of Japanese capital remain dubious about citizen involvement is its association with antinuclear social forces that have expanded so dramatically in the wake of the 3.11 Fukushima shock. Yet citizen cooperation is essential, as Japan's own experience attests. One of the critical innovations introduced in the Kitakyushu smart grid was dynamic pricing, wherein the price schedule varies according to time of day and demand. Before the Fukushima shock it was unclear whether the project would be able to conduct a test of dynamic pricing, because many of the residents on the project's smart grid power line were reluctant to take part. Without their cooperation, the test would not have been possible. But in the wake of 3.11, all participants were swayed by the argument that greater energy efficiency was a national priority.<sup>37</sup>

Building smart cities is very different from Japan's postwar model of pouring human and other resources into an export machine whose success is measured in increasing the output of cars, white goods, and other items with incremental gains in efficiency and quality. Because of its demographics combining population reduction and aging, the country now confronts the challenge of rapid decoupling of growth and consumption, far faster than competitors. Getting there requires an active citizenry, deliberately injecting its experience and ideas into design, rather than a passive citizenry that merely puts up with what the technocrats produce in their collusive circles. The Kitakyushu example suggests that the Japanese public sector, including the cabinet, would receive a great deal of cooperation in the event that it called on them to help develop the new industries and business models that are core to the competitive smart city. This is precisely the argument of former Prime Minister Koizumi, who on November 12 of last year encouraged current Prime Minister Abe to withdraw totally from nuclear power given the problems with the technology as well as the degree of public opposition to restarts of existing assets. Koizumi stressed that the Japanese public was extremely cooperative on energy and environmentally related matters.<sup>38</sup> Kitakyushu residents' cooperation on the test of dynamic pricing offers just one example of the accuracy of Koizumi's statement, but the Japanese public are not being asked for their cooperation. Quite the contrary.

#### Komatsu as an Instructive Benchmark

Though the EY study avoids politically contentious items, it does include a diagramme that seeks to visualize the various contexts in which smart cities might develop in Japan as well as overseas. The EY authors emphasize that these contexts depend very much on resource and other constraints as well as the policy and other kinds of influences on the particular smart city. For the Japanese case they note the powerful role of the Fukushima crisis of 2011 as well as the upcoming opportunity to present Japan to the world at the Tokyo Olympics in 2020. They also allude to the cost of energy, climate change, and the competitive challenge from the rapid rise of the emergent economies.

What is missing from the EY study, as well as from Japan's smart city effort as a whole, is benchmarking. The Abe cabinet should be doing this through the CIO office they set up to coordinate initiatives. The mind-numbing scale of our collective threat on resources as well as the scope of the business opportunity in smart cities suggest real leadership lies in taking up Koizumi's approach and – if not getting out of nuclear – at least getting on with the job of governing in the emerging smart cities sector. The vast welter of smart policies and projects in Japan needs a benchmark. One very instructive case might be the firm Komatsu, the world's second-largest producer of mining equipment. Komatsu's Awazu factory in Ishikawa Prefecture boasts a refurbished assembly wing whose power demand has been slashed a remarkable 92%.<sup>39</sup>



Komatsu assembly wing, Awazu

Fully 20% of the cut is from increased productivity, 32% from energy saving, and 40% from solar, biomass and other in-house generation. Komatsu is doing similar projects at other of its facilities. Komatsu's style of radical power-demand cut is core to the smart city, and Japanese projects are focused on energy, so for that reason alone the firm should be made a benchmark.

It is going to be difficult to develop truly smart and sustainable cities, and will require great political discipline and focus. This is perhaps especially true in the developed countries, like Japan, bogged down by the inertia of legacy interests and consumer expectations. Deep Abenomics pockets and broad ranks of engineers are not enough. Japanese smart cities should already be a national project, aimed at being incredibly resource-lite and developed through deeply interactive processes that maximize acceptability to the citizens. Yet the Japanese political, business and bureaucratic elite seem a long way from understanding the need to engage citizens, beyond simply mouthing the slogan of "citizen participation" while - as the EY study cautions - conspicuously doing otherwise. They also seem rather unresponsive to the stark signals from the resource sector, even though Komatsu can see what is going on in

global mining and is the equivalent of a klaxon horn in the midst of Japanese officialdom. Rather than the conventionalism of Keidanren,<sup>40</sup> Japan should be animated by the fast and focused activism of Komatsu. If this does not happen, and soon, there is a significant risk that business opportunities will flow to more nimble, responsive competitors. In spite of all its projects, capacities and incentives, Japan could be marginalized in the smart city business just as it was in feature and smart phones.

**Andrew DeWit** is Professor in Rikkyo University's School of Policy Studies and a coordinator of The Asia-Pacific Journal. His recent publications include "Climate Change and the Military Role in Humanitarian Assistance and Disaster Response," in Paul Bacon and Christopher Hobson (eds) [Human Security and Japan's Triple Disaster](#) (Routledge, 2014), "Japan's renewable power prospects," in Jeff Kingston (ed) [Critical Issues in Contemporary Japan](#) (Routledge 2013), and (with Kaneko Masaru and Iida Tetsunari) "Fukushima and the Political Economy of Power Policy in Japan" in Jeff Kingston (ed) [Natural Disaster and Nuclear Crisis in Japan: Response and Recovery after Japan's 3/11](#) (Routledge, 2012). He is lead researcher for a five-year (2010-2015) Japanese-Government funded project on the political economy of the Feed-in Tariff.

Recommended Citation: Andrew DeWit, "Japan's Rollout of Smart Cities: What Role for the Citizens?", The Asia-Pacific Journal, Vol. 11, Issue 24, No. 2, June 16, 2014.

#### Related articles

- Andrew DeWit, [Could a US-Japan "Green Alliance" Transform the Climate-Energy Equation?](#)
- John Mathews and Hao Tian, [China's Continuing Renewable Energy Revolution: Global Implications](#)
- Andrew DeWit, [Distributed Power and Incentives in Post-Fukushima Japan](#)
- John A. Mathews, [The Asian Super Grid](#)
- Andrew DeWit, [Japan's Energy Policy at a Crossroads: A Renewable Energy Future?](#)
- Sun-Jin YUN, Myung-Rae Cho and David von Hippel, [The Current Status of Green Growth in Korea: Energy and Urban Security](#)

#### Notes

- <sup>1</sup> Toyota Home is just one element of Toyota Corporation's [smart city-related initiatives](#).
- <sup>2</sup> See Katherine Tweed, ["Apple Launches Home Kit for the Connected Home,"](#) Green Tech Media, June 2, 2014.
- <sup>3</sup> The figure is from the May 2014 MarketsandMarkets report "Smart Cities Market," which estimates 14% annual growth in the sector but also hints at the potential for "exponential demand." The report also identifies "IBM, Alcatel-Lucent, Accenture, ABB, Cisco, Cubic, Honeywell, Intel, Siemens and Oracle" as the "major players" in the current global smart-city market. See the report's press release [here](#).
- <sup>4</sup> On Songdo, see Rick Huijbregts, ["Songdo Case Study \(v 1\)," Presentation to Harvard Graduate School of Design, Executive Education,](#) January 29, 2014 and Rita Lobo ["Could Songdo be the world's smartest city?"](#) World Finance, January 21, 2014.
- <sup>5</sup> ["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.
- <sup>6</sup> The figures cited are available in the United Nations Environmental Programme's "Global Initiative for Resource Efficient Cities,"
- <sup>7</sup> See p 23 of the report itself as well as summary "Factsheet" at the [website report's UNEP website](#).
- <sup>8</sup> The report's overview and relevant data can be found at OECD ["Material resources, productivity and the environment"](#).
- <sup>9</sup> These are called "extractive wastes," and in the US alone amount to 10 billion tons per year. See Edward Hill, ["Material Wastes,"](#) in Materials, Society and the Environment, May 2, 2014.
- <sup>10</sup> See the US Center For Naval Analysis Military Advisory Board ["National Security and the Accelerating Risks of Climate Change,"](#) CAN, May 2014.
- <sup>11</sup> On the cheapening of sensors, see Jesse Berst ["A 'perfect storm' that's good news. \(Falling prices on comms and sensing\),"](#) SmartGridNews.com, April 25, 2014.
- <sup>12</sup> An excerpt from Townsend's book is available [here](#).
- <sup>13</sup> The "Smart Cities" study is authored by EY researchers Kijou Nanae and Rure Kamiko, and is available [here](#).
- <sup>14</sup> Contrast the willingness of many municipal and cooperative utilities to grow new business models that foster the prosumer. See Paul Hockenos, ["Local, Decentralized, Innovative: Why Germany's Municipal Utilities are Right for the Energiewende,"](#) Energy Transition: The German Energiewende, September 28, 2013.
- <sup>15</sup> Among a welter of examples, in [this \(Japanese\) research report for 2011](#), Waseda University Professor Nagata Katsuya makes the empirically absurd assertion that the "smart city" concept in the West centres on the smart grid because European and North American power grids are unreliable and inefficient compared to Japan's. In fact, Western Europe, Japan, and other major metropolitan centres globally share excellent grid reliability because their urban density makes it economical to deploy expensive underground cable. On this point, see pp. 1-2 of ["Microgrids and distributed energy resource management software,"](#) Saviva Research Review, April 2013.
- <sup>16</sup> The Agency's glossary for the 2011 Natural Energy White Paper (in Japanese) is available [here](#).

- <sup>17</sup> The NEPC's material on the smart community is [here](#).
- <sup>18</sup> On the characteristics of smart cities in the EU, see in particular chapter 2 of the "[Mapping Smart Cities in the EU](#)" study by Urenio, March 7, 2014.
- <sup>19</sup> See Tod Newcombe's fascinating and very readable account of how Santander, which has 180,000 residents and 12,5000 sensors, is using this unrivalled density of ICT to cut resource flows as well as engage its citizens, "[Santander: The Smartest Smart City.](#)" *Governing*, May 2014.
- <sup>20</sup> See Sally Davies, "[Glasgow aims to be the first 'smart city.'](#)" *Financial Times*, June 3, 2014.
- <sup>21</sup> On this spending increase, see (in Japanese) Okui Noriaki, "[Details: The Big Picture on the 2014 ICT-Related Budget.](#)" in *Nikkei BP ITPro*, June 2, 2014.
- <sup>22</sup> On this promised role of the cabinet in coordinating the ICT projects, see (in Japanese) p. 6 "This Time It's Different: Cabinet Leadership" in LDP Dietmember and ICT Strategy Special Commission Chief Hashimoto Gaku's June 14, 2013 presentation "[The Abe Regime's ICT Strategy](#)".
- <sup>23</sup> The CIO's portal is [here](#).
- <sup>24</sup> Sato Kosuke, (in Japanese) [[Issues and Projects Toward Realizing the Smart City](#)], Japan Research Institute, Paper, no. 2013-03, April 30, 2013.
- <sup>25</sup> Kumamoto City became Japan's 20<sup>th</sup> designated city on April 1 of 2013. The smart city project, which is a joint effort of Kumamoto City and Kumamoto Prefecture, is described (in Japanese) [here](#).
- <sup>26</sup> On the survey and its results, see (in Japanese) p 6 of Kanto METI Natural Resources and Energy Division, "[Towards the Establishment of a Kanto-Area Smart Community Collaborative Association \(Tentative Name\).](#)" February, 2014.
- <sup>27</sup> The Sekisui House "[smart community](#)" promotional literature includes a convenient map of their projects.
- <sup>28</sup> The project's [promotional website](#) was opened on April 26, 2014.
- <sup>29</sup> Hitachi provides an English-language overview of several of the projects as "case studies" [here](#).
- <sup>30</sup> Toshiba's Ibaraki City project appears to have been in planning since 2008, according to (in Japanese) "[Redevelopment of North Region's Demolished Factory Area Accelerates, with Universities, Hospitals, Residences and Other Elements Planned Between Hitachi and Panasonic.](#)" *Construction News*, March 18, 2014. Hitachi lists its domestic and global smart city projects (as of May 2013) at (in Japanese) "[Toshiba Smart Communities](#)".
- <sup>31</sup> Mitsui Fudosan Group's smart city strategy began in 2012, and is detailed (in English) [here](#).
- <sup>32</sup> On this, see "[Sweden reinvents urban planning with citizen participation using 3D and Facebook.](#)" *Geospatial*, June 25, 2012.
- <sup>33</sup> The report is part of the long list of documents produced by the "ICT Urban Development Promotion Committee" chaired by Oka. The Committee's website is [here](#).
- <sup>34</sup> On Santander and other smart cities' benefits from including citizens as much as possible, see "[Citizen participation, at the heart of new Smart cities.](#)" *IDEAS4ALLBlog*, April 28, 2014.
- <sup>35</sup> See "[Agency9 brings 3D gaming effects to web-based GIS and planning.](#)" *AGENCY*, August 15, 2013.
- <sup>36</sup> Indeed, Boston Consulting Group senior partner Dieter Hueskel also argues that the business model of conventional utilities has been destroyed by the spread of renewable power. See Anmar Frangoul, "[Renewables: The end for nuclear power?](#)" *CNBC*, May 30, 2014.
- <sup>37</sup> The present author conducted interviews in Kitakyushu on this point in February of 2012.
- <sup>38</sup> On this, see Andrew DeWit, "[Just Gas? Smart Power and Koizumi's Anti-Nuclear Challenge.](#)" *The Asia-Pacific Journal*, Volume 11, Issue 50, No.3, December 16, 2013.
- <sup>39</sup> Tsunashima Yuta, "[Komatsu shows off progress in 'energy independence' at plants.](#)" *Nikkei Asian Review*, May 31, 2014.
- <sup>40</sup> Keidanren is not averse to smart cities, but rather wants to have a little bit of them and a lot of the conventional economy, as can be seen in its (in Japanese) [January 20, 2014 list of demands](#) for tax cuts, TPP, ICT, compact and smart cities, and a host of other items. Like the Abe regime itself, the Keidanren has trouble getting a focus on essentials.