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History and Society 1

Rethinking nature in contemporary Japan

Science, economics, politics

edited by
Marcella Mariotti, Toshio Miyake,
Andrea Revelant

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Summary

Preface

The present volume inaugurates the series *Ca' Foscari Japanese Studies*, which aims to provide an open-access venue for peer-reviewed research in this field. The collection will cover Ancient to Contemporary Japan with a multidisciplinary approach and is divided into the following four subseries: Arts and Literature, History and Society, Religion and Thought, Linguistics and Language Education. This organisation mirrors the current diversity of research interests at Ca' Foscari University of Venice, a lagoon city boasting a long tradition as one of the oldest centres for Japanese Studies in Italy as well as home to medieval traveller Marco Polo, the very first to introduce the exotic image of Zipangu (or Japan) to European imagery.

The first direct contacts between Venice and Japan date to 1585, when Jesuit missionary Alessandro Valignano sent a Japanese embassy to Europe, but it was in 1873, when the Iwakura Mission reached the city, that the first Japanese Language course was held at Ca' Foscari, or, as it was known at the time, the Royal School for Advanced Studies on Trade. Teaching and research on Japan became permanent since the 1960s thanks to Rector Italo Siciliano (1895-1980), who introduced a Course in East Asian Languages and Literatures in the academic year 1964-1965 (Boscaro 2004)[1] which was attended by thirteen freshmen. Since then, a wide range of Japan-related courses offered at Ca' Foscari University have gradually attracted more and more students, establishing Venice as the most important centre for Japanese Studies in Italy, with more than 1800 B.A. and M.A. students in Japanese Language and Culture in the A.Y. 2012-2013. Thanks to such records, the Department for Asian and North African Studies of Ca' Foscari has received research funds from the Japan Foundation for international conferences, professor exchanges and staff expansion since the mid-Seventies, and has become one of the Japan Foundation's Centres of Excellence in Europe since 2008.

The present volume owes most of its contributions to the debates in which many of its authors were engaged during and after the international conference *Rethinking nature in contemporary Japan: Science, economics, politics* held in 2013 at Ca' Foscari University of Venice, as part of the three year research project *Rethinking nature: Facing the crisis in contemporary Japan (2012-2014)* funded by the Japan Foundation, to whom the editors are very grateful. It is no secret that the underlying premise of the broader

1 Boscaro, Adriana (2004). «Gli studi giapponesi a Venezia» (Japanese Studies in Venice). In: Tamburello, Adolfo (ed.), *Italia-Giappone: 450 anni* (Italy-Japan: 450 years), vol. 2. Roma; Napoli: Istituto Italiano per l'Africa e l'Oriente; Università degli Studi di Napoli «L'Orientale», pp. 674-678.

research project has been the deeply felt sense of urgency provoked by the tragic events of 3/11 in Japan. In the immediate aftermath of the triple disaster this led to a spontaneous response of solidarity, shared by all teachers and students of Japanese Studies at Ca' Foscari, who jointly organised the first charity event ever held in the courtyard of the university, attended by thousands of Venetian residents (10 April 2011); but it also stimulated many questions from those wishing to understand what happened, how and why it happened, as well as its present and future implications, resulting in two conferences (2011, 2012) which brought together scholars, journalists, students and volunteers.[2]

2 For more detailed information, photos and media coverage about the charity events and conferences 'Ca Foscari per il Giappone' organised in Venice (April 2011 and 2012) to collect funding for the victims of Fukushima prefecture, please refer to the website: http://cafoscariperilgiappone.stud.unive.it/documenti-10-aprile-2011.

Introduction

On 11 March 2011, a 9.0 magnitude earthquake occurred off the Pacific coast of Japan, triggering a tsunami that hit the Northeast of the country with devastating effects. Official reports would later assess the toll at over 18 thousand victims, including dead and missing; damage to buildings and infrastructures was extensive, with the almost complete destruction of several coastal towns. Waves were so high as to roll over the seawalls of Fukushima Daiichi nuclear plant, causing a failure of its cooling systems that led to explosions and the eventual meltdown of three reactors. According to government sources, about 154,000 people were evacuated from the areas surrounding the plant after the release into the atmosphere of radioactive elements as a direct consequence of the accident.[1] The meltdown, however, also caused a radioactive leak underground and into the ocean – a problem that still awaits a definitive solution.

Although both earthquake and tsunami were events far beyond human control, the nuclear accident can hardly be regarded as a 'natural' disaster. Investigations soon brought to light severe deficiencies in the security system of Fukushima Daiichi; these faults, moreover, did not simply depend on a lack of technical preparedness, but rather on prolonged and reiterated negligence. It also emerged that the latter was rooted in collusion between the operating company and regulatory authorities, who purportedly downplayed the standing risks. Furthermore, investigations revealed that these problems, far from being specific to the site affected by the accident, were deeply embedded in the nuclear industry countrywide.[2]

The facts of March 2011 have since spurred an intense debate, both within Japan and internationally, on issues related to emergency prevention and management. Discussion on the former aspect has focused on the accident in Fukushima, which was entirely man-made and avoidable. On the side of disaster response, however, criticism has encompassed all dimensions of the 3/11 aftermath: first, concerning the perceived incompetence of the government in dealing with the crisis in its initial phase; second, with respect to the long-term tasks of post-tsunami reconstruction and nuclear decontamination. Although it is impossible to quantify the relative weight of these problems compared to other national issues, it is generally acknowledged that widespread discontent for disaster management

1 See the website of the Reconstruction Agency https://www.reconstruction.go.jp/english/topics/2013/03/the-status-in-fukushima.html.

2 See The National Diet of Japan (ed. 2012), *The Official Report of The Fukushima Nuclear Accident Independent Investigation Commission* https://www.nirs.org/fukushima/naiic_report.pdf.

contributed to the crushing defeat of the Democratic Party administration at the general election of December 2012. In a broader perspective, 3/11 has had a major impact on public debates on a wide range of national policies; some are immediately related to the three-fold catastrophe, such as nuclear energy policy or economic recovery in the Northeast; others have a less immediate though logical link to those events, such as food security or environmental policy. In all these fields, the Great Eastern Japan Earthquake and its consequences will likely represent an unavoidable frame of reference for a long time to come.

Because of its scale and gravity, the 3/11 disaster has commanded the attention of public opinion worldwide. Although press coverage is not as frequent now as in the early weeks, the issues that tsunami and nuclear accident have raised domestically are also of great significance on the international scene. Over the last few decades, Japan had increasingly gained a reputation as a country attentive to sustainable development, where technological innovation supported economic growth by ensuring an efficient use of natural resources in a way that was respectful of the environment; Japan had also won recognition for its high standards in terms of emergency prevention, as exemplified by anti-seismic technology in civil engineering. The waves that laid waste the shores of the Northeast on 3/11, not only induced a nuclear meltdown, but also shattered the myth of Japan as a safe, responsible country. The loopholes in the security systems of Fukushima Daiichi and other plants, together with evident difficulties in the handling of diverse aspects of the post-disaster crisis, have shown to the world that both the prevention and response capacity of the institutions involved had been dramatically overestimated. It follows that there is a need to reflect upon the causes of this failure, which, as has already been pointed out, cannot be simply reduced to technical matters. A comprehensive analysis of the social, economic and political conditions leading to the present situation is necessary.

Moving from the above premises, an international conference was held in Venice on 25-26 February 2013 on the theme *Rethinking nature in contemporary Japan: Science, economics and politic*s. The aim of the Department of Asian and North African Studies of Ca' Foscari University, which organised this event with the generous support of the Japan Foundation, was to create an opportunity for the discussion of the 3/11 aftermath in a broad, interdisciplinary perspective. The conference explored the background and ongoing effects of the crisis by addressing two main questions: on the one hand, how society and institutions interact in shaping the perception of disaster risk; on the other, how energy policy, particularly with respect to nuclear energy, is influenced by domestic and international factors. Although the overall focus was chiefly on relatively recent developments, several presentations included a historical outline that embraced the entire postwar period. After the conference, selected papers were

further enlarged and edited so as to form the present volume, which is structured as follows.

The first essay, by Ichinose Tomohiro, introduces the theme of emergency management by discussing *Sustainable reconstruction in rural areas of Japan after the disaster on 11 March 2011*. It focuses on *gensai* (the mitigation of damage after a disaster) in the areas along the Sanriku coast affected by the tsunami, underlining the necessity to adopt a backcasting approach, so as to predict future population and aging trends, thus taking the issue of depopulation into account in order to devise a sustainable reconstruction plan.

The next five chapters deal with the production of nuclear energy in terms of its perception by Japanese society. In *Atoms for a dream: Holding the American umbrella in the driving atomic rain*, Yoshimi Shun'ya reviews the changing Japanese attitude towards the peaceful use of nuclear energy throughout the post-war period and up to the fallout of the Fukushima accident; he deals with the issue in connection with the Japan-US bilateral relationship and, particularly, Japan's position under the American 'Nuclear Umbrella'. Utsumi Hirofumi's essay, titled *Rethinking purposive consciousness: An analysis of sceptical fanaticism after Fukushima*, deals with 'the self-fulfilling system' of nuclear development in post-war Japan, stressing how the 'system of irresponsibility', with Japan's infatuation with itself as a cyborg nation, has promoted the establishment of nuclear power plants. The chapter by Hasegawa Kōichi, titled *Rethinking civil society in Japan: Before and after the Fukushima nuclear disaster*, discusses the differences of civil society issues and anti-nuclear activism in Japan before and after the Fukushima nuclear accident, using the author's «triangular model of social movement analysis» of three major factors (political opportunity structure; resources, actors and major support base; and framing based on culture and attitudes). Next, Toshio Miyake's essay, titled *Popularising the nuclear: 'Mangaesque' convergence in post-war Japan*, explores how contested meanings of the nuclear have been domesticated, naturalised, and ultimately reproduced from 'below' within the mangaesque transmedial constellation of popular cultures, addressing some of its most influential representations: from the market-oriented sphere to the state-sponsored educational cute characters and the subcultural parody appropriation. Katarzyna J. Cwiertka, in *From malnutrition to radiation: Reviewing food security and food safety in Japan (1945-2013)*, provides an overview of the role played by food security and food safety in public debate in Japan since the 1940s; the essay underlines how the Tōhoku Earthquake has been a watershed in terms of food security and food safety, reviving, even if temporarily, a long-forgotten experience of food shortage and, more importantly, bringing a completely new dimension to the issue of food safety in Japan – the anxiety about radioactive contamination of food.

The latter section of the volume shifts the focus of discussion on policy making at institutional level. In *Japan at the summit: Energy, climate change and a 'Gaggle of Gs'*, Hugo Dobson analyses the role of the Group of 8 (G8) and Group of 20 (G20), alongside a number of other alphanumeric configurations collectively known as GX summitry or a 'Gaggle of Gs', in shaping and promoting multilateral approaches to the challenges posed by energy issues and climate change, exploring Japan's role and contribution, in particular. Daniel P. Aldrich's essay, titled *Top down versus bottom up: Post-crisis Japanese nuclear policy*, focuses on the role of the Japanese central government in creating and modifying policy instruments designed to alter preferences at the local and regional levels; in this context, it deals with three distinct groups within Japanese civil society (host communities which have nuclear power plants in their immediate back yards, localities which are slightly further away from a nearby nuclear power plant, and civil society in general) and their reactions to the accident at Fukushima and subsequent altered ways of interaction with the central government. The final chapter by Andrew DeWit, titled *Can Japan build resilience in the face of climate change?*, explains how and why the 10.3 trillion yen recession countermeasures of Japanese PM Abe Shinzō's government should centre on ambitious goals for energy efficiency, targeting, in particular, building stock, smart grids and DHC, electric motors, and other very important areas where Japan can be considered to be behind.

As a whole, the aim of this volume is to offer a multi-faceted vision of policy issues relevant to the current debate on 3/11 and its consequences. It is our hope that these essays may stimulate further research and serve as reference for the dissemination of accurate data on problems that represent a major challenge not only for Japan, but also for our globalised society.

Sustainable reconstruction in rural areas of Japan after the disaster on 11 March 2011

Tomohiro Ichinose (Keio University, Tokyo, Japan)

Abstract On 11 March 2011, a great earthquake with a magnitude of 9.0 destroyed most of the rural areas along the Pacific Coast in eastern Japan, which suffered from depopulation and aging problems since before the earthquake. In this paper I will discuss the reconstruction plan of depopulated rural areas from the viewpoints of transportation infrastructures, residential areas, agriculture, forestry, fisheries, consensus building, and nature restoration. We have to take a 'backcasting' approach for a sustainable development, which is the planning strategy that will lead to successful outcomes. An organisation and a platform to support the planning process is necessary to build a consensus within the area.

1 Introduction

On 11 March 2011, a massive, 9.0 magnitude earthquake struck the northwest Pacific off northeastern Japan, triggering tsunami damage in the coastal areas of the Tōhoku and Kantō regions (Mori et al. 2012) and severely damaging the Fukushima Daiichi nuclear power plant. Notably, many small settlements along the Sanriku Coast were totally destroyed by the tsunami. Most local governments in the Sanriku coastal area, ranging from the central-eastern part of Miyagi Prefecture to the southeastern part of Aomori Prefecture, were already suffering from depopulation and aging populations. Ishinomaki City is the biggest in the area, with approximately 150 thousand people. The second biggest city is Kesennuma, which had over 73 thousand people before the earthquake. However, because Kesennuma City had merged with Karakuwa Town in 2006 and Motoyoshi Town in 2009, its population density was approximately 220 people per square kilometre. The population density of all other local governments in the area other than Ishinomaki City was under 200 people per square kilometre.

Most areas in Miyagi and Iwate Prefectures that were damaged by the tsunami also suffered from huge tsunamis in 1896 and 1933 (Yamaguchi 1943). Many people died from these disasters, but the population recovered with the rapid increase of the total population of Japan. The population of Japan is said to have begun decreasing this decade. In 2010, a Long-term Perspective Committee, of which I was a member, was established under the National Land Council of Japan's Ministry of Land, Infrastructure, Transport and Tourism (MLIT). In late February 2011, the committee an-

nounced its midterm report on the outlook of Japan for the year 2050. Based on last year's statistics, we estimate that if trends continue at their current pace about 20 per cent of the currently inhabited land will lose all its population by 2050, and an additional 20 per cent or so of Japan's land will have fewer than 10 residents per square kilometre. In other words, we project that about 40 per cent of the currently inhabited areas will be virtually uninhabited by 2050. The Sanriku coastal area is no exception.

The population of the most damaged local governments decreased 5 per cent or more from 2005 to 2010, and the percentage of the population aged 65 and over was approximately 30 per cent or more in 2010, according to the national censuses in 2005 and 2010. Comparing the population density per square kilometre in Kesennuma City for 2005 and the density estimated for 2050 by the committee (fig. 1), it is clear that the population of the city will decrease. The percentage of the elderly is not included in the figure but will exceed 50 per cent in most areas. The recent earthquake is likely to accelerate the tendency toward depopulation and aging in the Sanriku coastal area.

Japan now faces a serious financial crisis. When a huge earthquake struck central Japan in 2004, the Japanese government responded by investing over 100 billion yen in Yamakoshi Village (population 2,000), which subsequently merged into Nagaoka City. This was possible because the scope of the damaged area was limited. But can the government now support local governments affected by the recent earthquake in the same way? The affected areas span the Kantō and Tōhoku regions, with over 270 thousand buildings and houses destroyed. How can we reconstruct these rural areas?

I review the damage situation in rural areas, especially along the Sanriku Coast. Then I discuss what we must do to reconstruct rural areas given the issues of rapid depopulation and aging. Finally, I focus on consensus building and partnership in local reconstruction planning. This report was modified from Ichinose (2012).

2 Reconstruction of settlements in rural area

Many people took refuge in schools, community centers, or other public facilities just after the earthquake. The local governments of Iwate, Miyagi and Fukushima Prefectures had closed all such facilities by the end of December, because most people had moved into temporary housing. The government had constructed 52,120 temporary houses (according to an MLIT announcement at the beginning of December 2011). 328,903 people had lost their homes and had moved to temporary housing or other locations, such as apartments or relatives' homes (according to a government announcement on 24 November 2011). Many settlements were totally de-

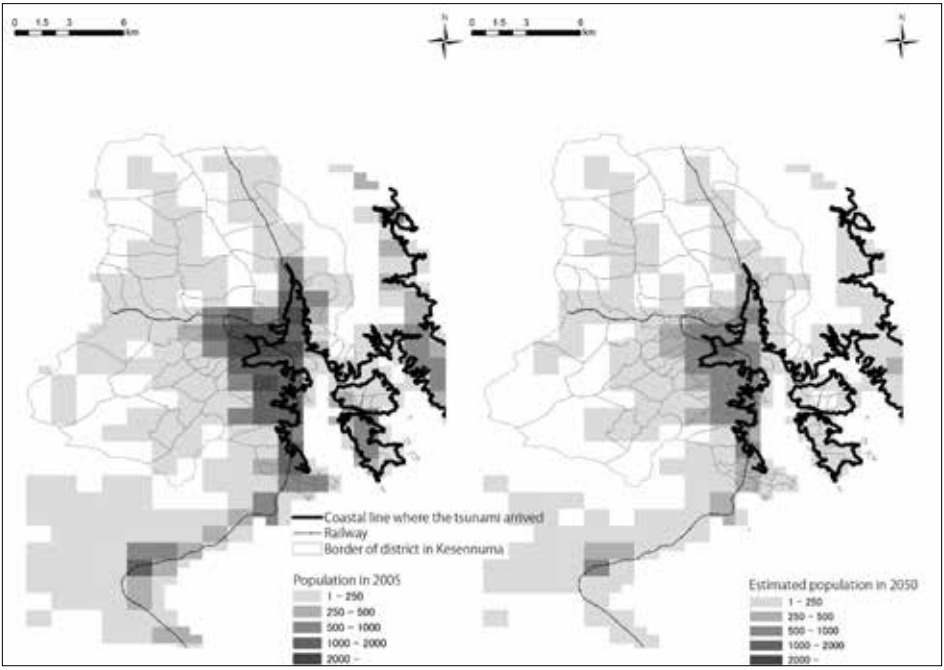

Figure1. Population density in2005 (and estimate for2050) for central Kesennuma City, by A. Ohba (Keio University) using data from MILT

stroyed by the tsunami, while the earthquake caused land subsidence of as much as 0.7 metres that makes it impossible to reconstruct houses and buildings on their original sites. The government has suggested relocating such settlements to higher ground. The third supplementary budget for this fiscal year passed the National Diet on 21 November, 2011, and relocation to higher ground will be totally supported by the government. Relocation plans have been designed at many settlements, especially in small fishing villages. If more than five households want to move together to higher ground, the cost of constructing a residential site is fully supported.

Relocation to higher ground is not a new solution. Some relocations took place after the huge tsunamis in 1896 and 1933. Yamaguchi reports examples of relocation after the tsunami of 1933 (Yamaguchi 1943). Some settlements that relocated after these tsunamis were destroyed again, either because the height of relocation was inadequate or because the settlement had sprawled into the lowland in subsequent decades. The damaged rural areas can be divided into four types (tab. 1). The first concerns areas with little damage to the settlement due to an effective previous relocation, such as the Yoshihama District of Ōfunato City. The second involves areas

where relocated settlements suffered little damage, but sprawl areas were heavily destroyed, such as the Ryōri District of Ōfunato City. The third is areas damaged because their relocations were not high enough, such as the Ōya District of Kesennuma City. The fourth is areas that were totally destroyed, because they were not relocated after previous tsunamis, such as the Tarō District of Miyako City. Tarō was famous for having the highest breakwaters in Japan. In the 1933 tsunami, 911 people perished in Tarō Village, which merged with Miyako City in 2005. Tarō decided to construct ten-metre breakwaters around the central settlement to prepare for the next tsunami. There was a big tsunami in 1960 along the Sanriku Coast caused by a massive earthquake in Chile, but Tarō was unscathed owing to its high breakwaters. The tsunami caused by the recent earthquake, however, destroyed the breakwaters and caused serious damage to the settlement (Miura et al. 2011).

3 Restoration of agriculture, forestry and fisheries

The government announced on 24 June 2011 that the amount of damage caused by the recent earthquake totalled 16.9 trillion yen, excluding damage caused by the Fukushima Daiichi nuclear power plant accident. The amount of damage in primary industries was 1.9 trillion yen, only 11% of total damage. However, there are many small fishing ports along the Pacific Coast that were totally destroyed by the tsunami. There are a total of 253 ports in Miyagi and Iwate prefectures, with small fishing ports especially concentrated along the Sanriku Coast. The Sanriku Coast is famous as one of the best fisheries in the world, but has recently suffered from aging and a shortage of fishery resources. There are many types of fisheries, including pelagic fisheries using large fishing boats, coastal fisheries using small boats, fixed net fisheries, cultured fisheries, etc. Although many people in fishing villages have fishing rights, most work in the city and fish only several days a year. 2,667 people worked primarily at the fishery in Kesennuma City in 2005, only 7.4% of total employees. Many food processing factories concentrated in Ishinomaki, Kesennuma and Ōfunato were totally destroyed. Some have already decided to relocate to other areas of Japan or overseas. A local bank estimated that Kesennuma City lost half of its GRP and one-third of its employment from the earthquake. Even if settlements and fishing ports are reconstructed, therefore, most people cannot live there without a job. Most food processing factories were located on reclaimed land in Kesennuma City. The reconstruction of factories there is now prohibited because of land subsidence. Kesennuma City plans to raise the land a few metres, but this will take years.

The ministry of Agriculture, Forestry and Fisheries (MAFF) estimated on 16 August 2011 that the total amount of damage to agricultural land and

Figure 2. Ferries carried into the port of Ōshima, Kesennuma City. Photo by the author, 18 May 2011

facilities was 790 billion yen, an amount smaller than for fisheries (1.2 trillion yen). 24,000 ha of arable land were flooded by the tsunami in Miyagi, Fukushima, and Ibaraki Prefectures. The land has been damaged by salt water, and irrigation facilities were destroyed. An irrigation reservoir in Fukushima collapsed from the earthquake. The nuclear power plant accident seems to be having a greater effect on Japanese agriculture than the earthquake. 8,300 ha of arable land must be decontaminated in Fukushima, which is not a large area compared to the total area of Japan. Radiation is still being detected, however, in many foods from areas throughout East Japan, in some cases requiring that their distribution be suspended.

4 Reconstruction of transportation infrastructure and public transportation systems

It has been noted that major national roads and the Tōhoku Shinkansen were quickly restored after the earthquake, unlike after the Great Hanshin Awaji Earthquake in 1995, and that the Sanriku Expressway played a major role as a detour around damaged national roads. However, many rural areas that had limited public transportation services before the earth-

Figure 3. Flooded farmland in rural Kesennuma CIty. Photo by the author, 14 November 2011

quake, remained isolated for a long time, because major roads and local trains and buses were destroyed by the tsunami. Focusing on Kesennuma City, the East Japan Railway Company's Ōfunato Line from Ichinoseki to Kesennuma sustained no damage and resumed operations on 1 April 2011, while the line from Kesennuma to Ōfunato along the Sanriku Coast was heavily damaged with no prospect of restoration. The Kesennuma line leading to the southern part of the Sanriku area was also totally destroyed, and although deliberations have only just begun, it will probably not be restored but instead shifted to alternative transportation modes or routes. Ferries were unable to use Kesennuma port to reach Ōshima (fig. 2), a small island in Kesennuma Bay. Although a small boat began to transport people two days after the earthquake, vehicles and machines for delivery and restoration could not be transported until a month and a half later when Edashima City in Hiroshima Prefecture donated a ferry boat. Initially, therefore, the US Navy landed using amphibious assault ships to assist in restoration. Local bus services connecting rural areas were also struck hard by the tsunami. Miyako Bus Company, which operates local buses in Kesennuma, lost 31 buses and a bus terminal to the tsunami and to fire. According to the reconstruction plan for Kesennuma City, all public transportation services must be restored. Most companies, however, were in the red even before the earthquake due to declining ridership. Rapid depopu-

lation means the number of passengers will not return to pre-earthquake levels. Some routes, therefore, will be abandoned as companies are forced to scale back their operations.

All local governments in Iwate and Miyagi had announced reconstruction plans by the end of December 2011. Few local governments, however, have seriously discussed their public transportation systems. If governments restore public transportation services to pre-earthquake levels, the system will be unsustainable. It is absolutely necessary that each local government consider its future public transportation systems using a 'backcasting' approach to ensure that services remain sustainable decades later. Backcasting has been used to evaluate sustainable development around the world since the end of the last century. Doi (et al. 2011) pointed out that an integrated approach is necessary to promote the dynamic co-evolution of transportation, land use, and infrastructure. They suggested that small, low-speed electric vehicles for one or two persons would be suitable for the super-aged cities of the future. The Reconstruction Design Council in Response to the Great East Japan Earthquake (`http://www.cas.go.jp/jp/fukkou/english/pdf/report20110625.pdf`), in its report, suggested the introduction of cutting-edge, independent, decentralised energy systems in «smart villages» constructed in rural areas. Such systems would comprehensively combine efficient utilisation of energy-saving systems, the use of diverse energy sources including renewable energy, a solution to output instability based on the introduction of storage batteries, and utilisation of cogeneration (combined heat and power) using gas and other fuels. In such smart villages, electric vehicles could be easily charged anywhere, and their batteries could be used as an emergency source of electricity.

We have to develop a transportation system that serves the elderly in all rural areas of Japan, so introducing and testing new transportation systems in disaster areas before they are spread throughout the country is a good idea. A rural area might be suitable for field tests of automatic vehicle operation systems owing to its light volume of traffic. If smart villages and new transportation systems are introduced together, it will contribute to the reduction of greenhouse gases. People will not need to own electric vehicles. There are already some car sharing services at temporary housing complexes. A small electric vehicle sharing service can ensure low-cost mobility for the elderly while creating employment for local people.

5 Nature restoration on damaged land

Many rural settlements were destroyed by the tsunami. The government fully supports the relocation of these settlements. After relocation, the former residential sites can be used for factories, commercial facilities, or agriculture but not for housing. Many local governments have plans to

provide a public park or build a monument to the disaster. The tsunami damaged many natural coasts (Udo et al. 2012), but they have begun to recover on their own, with much of the damaged land transforming into halophytic marsh (Kanaya et al. 2012). Most of Japan's natural coastline has been lost or developed for agricultural and urban land use. Breakwaters have usually been built on the remaining natural coast. The government has considered how high to build breakwaters in disaster areas. Iwate Prefecture has presented Rikuzentakata City with a scheme for 12.5 and 12.8-metres breakwaters. The residents want breakwaters of 15 metres high, because the recent tsunami, which destroyed the central areas of the city, reached 13.8 metres. On the other hand, some people in Kesennuma City strongly oppose a Miyagi Prefecture scheme to erect breakwaters ranging from 5.0 to 11.8 metres high even though their city was ravaged by a 12-metres tsunami. Kesennuma was once a famous sightseeing spot owing to the beauty of its coastal landscape.

One settlement has a plan to restore halophytic marsh on damaged land where all but five houses were swept away or destroyed by the tsunami. The residents are designing a plan to relocate to higher ground. The settlement is located in two small valleys, whose lowlands are always flooded (fig. 3). Some residents intend to keep the water and restore a marsh there even though a high breakwater would be built. The result, of course, will depend on what agreement is reached with other residents, but a group of scientists I belong to has begun to research the environment, flora, and fauna in the marsh.

6 Consensus building for local reconstruction planning

Consensus building between local residents is definitely important for local planning, but the involvement of many kinds of actors in reconstruction plans and action is also necessary, including NGOs and local businesses. For various reasons, some local residents live temporarily outside of their home-towns. They may wish to take part in discussions about reconstruction but face difficulty in attending multiple sessions. In addition, many people who are originally from a disaster area but now live in metropolitan areas also want to do something for their home-towns. Many people went to the disaster areas as volunteers to help those affected during the months following the earthquake. Many would like to continue to help, but cannot visit frequently. Thus, a platform is necessary, one through which many kinds of actors, including local residents, can discuss reconstruction and the future. Social network services (SNS) are well suited to this purpose. Students at Keio University built a Facebook group (`http://www.facebook.com/groups/wakuwaku.kesennuma/`) (fig. 4) in June 2011 that had 1,211 members by the end of February 2014. Ten per cent of members are residents of

Figure 4. Facebook group for discussing the reconstruction and future of Kesennuma City

Kesennuma City, while the rest live outside. Some members, most of them originally from Kesennuma, live in foreign countries. They met through the Facebook group and then set up an English-language Facebook page to appeal to the world for help (`http://www.facebook.com/kesennuma`). The Facebook group has played a major role in real projects. It was decided in June that the summer festival in central Kesennuma would not be held in 2011, because the area was flooded by spring tides and had not been restored. Just after this decision, some citizens started to plan another event in place of the festival. They asked for help through Facebook. Many members helped them to prepare the event, including some students from my campus. The event was held from 11 to 13 August 2011 in several locations in Kesennuma City.

SNS is also a useful platform for providing information to residents outside of their home-towns. However, SNS is not popular among older people and may be difficult for them to use. Still, a broadcast of local meetings using free systems like Skype or Ustream would certainly be useful. The important role played after the earthquake by information volunteers in shelters who helped the affected gather information from the Internet has been noted. Information volunteers can support the dissemination of information within disasters areas and help former residents outside.

7 Conclusion

The earthquake on 11 March 2011 was the greatest in Japanese history, although there have been many other great natural disasters since the dawn of history. We will certainly face great disasters in the future. The tsunami caused by the earthquake totally destroyed the 10-metres breakwaters in Tarō District, which had been described as a walled fortress. Tarō's local residents believed that no tsunami could ever reach their set-

tlement beyond the breakwaters; the main reason why roughly 200 people died there. This teaches us that we cannot completely protect ourselves against natural disasters, and must be prepared for the unexpected. Since the earthquake, many experts have begun to talk about *gensai*, meaning the mitigation of damage from a disaster, also related to ecosystem-based disaster risk reduction (Eco-DRR) (Renaud et al. 2013). However, Iwate and Miyagi Prefecture plan to construct breakwaters over 10 metres high around rural settlements. Many residents oppose the plan, because they will be unable to watch the sea when an earthquake strikes. In addition, if local residents move to higher ground in accordance with the relocation plan and no longer use the lowlands, a breakwater seems unnecessary. In this case, the natural coastline and wetlands must be restored.

The cities and rural areas of the Sanriku Coast were restored and rebuilt after the disasters in 1896 and 1933. Many newcomers came to the affected areas because the population of Japan was increasing at that time. However, Japan faces rapid depopulation during this century. Although we must design reconstruction plans that consider the issues of future depopulation and aging, only a few local governments mention these issues in their reconstruction plans. Minamisanriku Town has predicted a decreasing population for ten years after the disaster in their reconstruction plan. Most of the local governments affected want to restore everything just as it was before the disaster, and as soon as possible. This might lead to many areas that are unsustainable due to depopulation. In order to build cities and regions that are sustainable for decades, we have to design reconstruction plans using a backcasting approach that predicts future population and aging trends.

Most local governments have announced reconstruction plans, with the exception of those in Fukushima Prefecture that remain strongly affected by residual radiation. They have to develop local plans with local residents. Although consensus building among local residents is the most important issue, they suffer from a lack of expertise and an inadequate budget. On the other hand, many NGOs, universities and private companies continue to support local residents. Local governments must form partnerships with such organisations. Organisations acting in the same area rarely share information with each other, so we must build a platform for the sharing of ideas and problems. SNS can be a powerful tool for this purpose, enabling local residents to find not only experts but also co-workers to help them face new challenges. However, we must hold workshops in real spaces because there are some residents, especially the elderly, who cannot access SNS. The government must implement a scheme to support such an organisation.

Table 1. Four types of district as damaged by the tsunami on 11 March 2011, in relation to previous relocations after past tsunamis

District	City	Tsunami damage	Old relocation	Damaged area
Yoshihama	Ōfunato	Slight	Yes	Agricultural land use
Ryōri	Ōfunato	Heavy	Yes	Sprawl area
Ōya	Kesnnuma	Heavy	Yes	Relocated area
Tarō	Miyako	Heavy	No	Surrounded by breakwaters

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Atoms for a dream

Holding the American umbrella in the driving atomic rain

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Abstract In postwar Japan, nuclear energy was transformed from fear into an object of hope, and received as a symbol of dreams and peace. Nuclear power in Fukushima goes back to 1960, the year of the massive protests against the US-Japan Mutual Security Treaty. In that same year, Fukushima Prefecture announced its intention to solicit nuclear facilities. Most nuclear power stations constructed in Japan commenced operation in the 1960s and 1970s. As a result, by the mid-1990s the four initial reactors of 1971 had burgeoned to fifty-four, making Japan the country with the third highest number of nuclear reactors in the world. In the context of the public's everyday life and sense of society, how was this spectacle of a bright future desired and accepted? Taking as its subject postwar Japan's embrace of nuclear energy, this work will investigate the transition from the 'Nuclear-Powered Sunshine' of the Cold War period to the 'Radioactive Rain' of the post Cold War period.

1 The end of the 'affluent postwar'

With the earthquake of 11 March 2011 and the expanding nuclear disaster that followed, our 'affluent postwar' has finally reached a decisive end. Indeed, this closure had been clearly augured since the 1990s. The collapse of the bubble economy, the close of an era of single-party rule by the Liberal Democratic Party, and the Great Hanshin-Awaji Earthquake and Aum Shinrikyō sarin gas attacks that came in rapid succession in 1995 – these events forced upon us the reality that the 'affluent postwar' was over.

On 17 January, sixteen years ago, a huge earthquake centred in the northern part of Awajishima wrought massive devastation on the Hanshin area and the city of Kōbe. The dead and missing numbered 6,434; the wounded 43,792; those requiring shelter, 30,000; houses destroyed or damaged, 25,000. It was the most severe quake since the Great Kantō Earthquake of 1923. The region's lifelines were severed. The Hanshin Expressway collapsed in over a dozen places, the San'yō Shinkansen rail line was broken, and subway tunnels collapsed. Many buildings in city centres lay in ruins. The relentless footage of fallen highways and burning streets stunned television viewers across the country (Yoshimi 2009, pp. 158-161).

Then on 20 March 1995, while Japan was still reeling from the blow of the Hanshin Earthquake, members of the religious group Aum Shinrikyō

launched sarin gas attacks on subways in the heart of Tokyo. Twelve passengers and station staff died; another 5,510 were wounded. Two days after the incident, the Metropolitan Police Department searched the Aum headquarters in Kamikuishiki Village in Yamanashi Prefecture. They discovered that the building contained facilities for manufacturing sarin and other chemical weapons. From the confessions of arrested Aum members, it became clear that the group had perpetrated several crimes, from a 1994 sarin gas attack in Matsumoto to the Tokyo sarin attack. Until the capture of Aum's leader, Asahara Shōkō, about two months later, Japanese society showed an abnormal fascination with this strange religious group (Yoshimi 2009, pp. 162-165).

It is highly symbolic that the two earthquakes of 1995 and 2011 were accompanied by a chemical-weapon terrorist attack and radiation pollution from nuclear reactor meltdowns, respectively – in short, manmade disasters linked to contemporary science and technology. The days following 11 March 2011, witnessed a constant stream of television footage of representatives from the Tokyo Electric Power Company (TEPCO) and the Nuclear and Industrial Safety Agency in press conferences on the burgeoning nuclear crisis. Their expressionless visages, so disconnected from reality, recalled the Aum Shinrikyō members on television sixteen years before. Moreover, the media images of the reactor buildings of the Fukushima Daiichi nuclear plant bore a disturbing outward resemblance to the 'Satyam', Aum's former headquarters, which we had often seen on television back then. The main difference was that several of the reactor buildings had been so badly damaged by explosions that they retained nothing of their original form. Nonetheless, there are similarities in the way the public reacted to these two incidents. Both revealed the strong distrust people feel towards science, technology, and experts today (Kurihara et al. 2012, pp. 115-158).

Our hearts constricted in helplessness as we watched scenes of the tsunami devastating the Tōhoku coast, leaving a rubble-strewn wasteland in its wake. Over twenty thousand people without time to flee, lives swallowed by the waves and lost; all those countless souls – what on earth could we do for them, we who survived? Such thoughts coursed through the islands of Japan, and are likely to remain etched into the national psyche for a long time to come. The souls taken by this earthquake need repose. Earnest efforts are needed on their behalf and for the revival of the Tōhoku region. Even so, the tsunami and the nuclear crisis are different. The latter is a manmade disaster, the consequence of a situation created by postwar Japan's economic growth. It is a catastrophe that requires thorough investigation more than rites for the repose of lost souls. Yet as we look back in search of the origin of the incident, we find ourselves facing Japan's 'postwar' itself.

2 America's two 'nuclear umbrellas'

Nuclear power in Fukushima goes back to 1960, the year of the massive protests against the US-Japan Mutual Security Treaty. That same year, Fukushima Prefecture announced its intention to solicit nuclear facilities; the next year, in 1961, the town councils of Ōkuma and Futaba passed resolutions that approved building a plant. At the time, Fukushima's attempts to attract industry and kick-start economic growth were failing. With the shift in energy policy from coal to oil, the Jōban coal mine, formerly the largest industrial base in the Prefecture, had begun to decline, and the Prefecture was seeking a third source of electrical power to replace hydropower and thermal power. As luck would have it, the site of a former Imperial Japanese Air Force base was located along the coast facing the bluffs in Ōkuma. After the war, it had become salt fields, and the use rights to this vast piece of land were easily purchased. The acquisition process was completed in 1964, the year of the Tokyo Olympics. Construction of the first reactor began in 1967 and was completed in 1970, the year of the Osaka Exposition; the plant began operating in 1971. The process of soliciting, constructing and operating the Fukushima Daiichi plant thus overlapped exactly with the era of Japan's high economic growth in the 1960s (Kainuma 2011, pp. 188-193).

Most nuclear power stations constructed in Japan commenced operation in the 1960s and 1970s. The first reactor at the Tsuruga plant, constructed slightly earlier than Fukushima Daiichi, as well as the Mihama one, both began operating in 1970. They were followed by the first reactor of the Takahama plant (1974), the Genkai plant in Kyūshū (1975), and the Hamaoka plant in Shizuoka Prefecture (1976). Generally it took about ten years from initial plan to operation in each case. Since many of these plants added second, third and more new reactors, the buildup of nuclear power actually continued into the mid-1990s. As a result, what began as four reactors in 1971, when Fukushima Daiichi commenced operating, had burgeoned to fifty-four by the mid-1990s, giving Japan the third highest number of nuclear reactors in the world, after the United States and France.

But why were so many nuclear reactors planned concomitantly across Japan during the 1960s? A hint may be found almost a decade before local Governments in Japan began soliciting nuclear complexes in two policies that emerged in 1953-54 as part of the US Cold War nuclear strategy: namely, the Eisenhower administration's New Look and Atoms for Peace policies. In spite of the fact that Truman had ordered the atomic bombings of Hiroshima and Nagasaki – or perhaps precisely because of it – once the massive devastation of those cities became clear, his administration declared the atomic bomb to be a last resort, something completely different from conventional weapons. In contrast, the Eisenhower administration's New Look policy equipped American bases all over the world with nuclear

weapons, on the assumption that they had a practical function in warfare. It transferred nuclear weapon regulation from the Atomic Energy Commission to the military to prepare for a strategy of 'massive retaliation' against the communist bloc. As a result, the NATO countries underwent intense nuclearisation, acquiring a total of seven thousand warheads. In Asia, South Korea, Taiwan and the Philippines experienced a similar nuclearisation. Kadena and other bases on Okinawa are said to have held close to eight hundred warheads. By the time Eisenhower stepped down, the US nuclear arsenal had soared to over twenty thousand warheads (Osgood 2006, pp. 46-103).

The other face of Eisenhower's nuclear strategy was Atoms for Peace, which was designed to promote the peaceful use of nuclear energy worldwide. Addressing the UN in 1953, Eisenhower promised that America would cooperate with other countries on research into peaceful uses of nuclear power and the construction of nuclear reactors. By emphasising the atom's 'peaceful uses' and by announcing a willingness to share nuclear power's benefits with other countries, the United States softened its image as a military menace responsible for dropping atomic bombs and promoting the global expansion of nuclear weaponry, with the effect of making the atom palatable for the world's nations.

The Soviet hydrogen bomb tests of 1953 had shaken American primacy in offensive nuclear capabilities. The United States thus eagerly supplied the Third World with nuclear power technology and carried out joint development projects in order to draw them into its camp. The Soviet Union competed by the same means in the countries on its periphery. As a result, countries in the neutral space between the spheres of influence of the two superpowers became the targets of a 'nuclear sales campaign'. The United States itself promoted the introduction of nuclear power to countries like Iran, Iraq, and Pakistan – countries that eventually became large impediments to American world strategy (Osgood 2006, pp. 104-150).

Initially, the direct targets of the Atoms for Peace program were Third World nations of Asia that bordered on the communist sphere and not the former Axis Powers of Japan and Germany, which were already among the ranks of US allies. However, in the eyes of Japanese conservatives, the technology offered by the program was an attractive possibility for Japan too. During the 1950s, future prime minister Nakasone Yasuhirō and the first president of the Atomic Energy Council, Shōriki Matsutarō (who was also the owner of the *Yomiuri* newspaper), in particular, were enthusiastic promoters of Eisenhower's nuclear strategy.

Even after Fukushima, the same Nakasone has continued to proclaim that «the world trend is undeniably toward nuclear power for the purposes of peace and energy provision». He recently recalled that, back in 1953, «when I learned that Eisenhower had switched to a policy of using nuclear energy for peaceful purposes, I thought to myself, "Japan can't fall be-

hind. Nuclear energy is going to define the next era"» (*Asahi Shimbun*, 26 April 2011). Many conservatives had supported him on this point, allowing him to get the first nuclear budget through the diet, to set up a multi-party joint council on nuclear energy, and to play a key role in drafting the Basic Act on Atomic Energy, which became the foundation of Japan's national nuclear policies. Meanwhile, Shōriki played a key role alongside Nakasone by manipulating the mass media. The *Yomiuri* newspaper and Japan Television, both in his media conglomerate, initiated a campaign to promote the peaceful use of nuclear energy. As detailed by Arima Tetsuo, Shōriki was obsessed with the idea of building a microwave telecommunications network in the Far East, and developed close ties to the CIA, as well as to electronics companies like GE and RCA; these companies were also key players in the nuclear power industry. Shōriki invited a group of Americans promoting nuclear energy to Japan, used the *Yomiuri* to campaign for nuclear energy development, organised exhibitions on the theme of the peaceful uses of nuclear energy, and even entered politics under the banner of nuclear power, finally landing the roles of the first president of the Japan Atomic Energy Council and the director of the Agency for Science and Technology (Arima 2008, pp. 31-90).

From the standpoint of the Eisenhower administration, both the New Look and Atoms for Peace were founded on the same economic principle. In the view of the administration, it seemed likely that the Cold War would drag on for an extended period; for American society to sustain a protracted military standoff with the communist bloc, the American Government would need to walk the tightrope of maintaining adequate monetary reserves by controlling military spending while simultaneously beefing up military infrastructure. The Korean War had already left the United States with a ballooning deficit, making it difficult to increase conventional armaments or land forces. In this situation, nuclear weapons were an attractive technology that was cheaper in relative terms, yet possessed far greater destructive capability. This was exactly the same rationale that drew electric power companies to nuclear reactors: compared to hydroelectricity, which required massive investment in dam construction for lower yield, or to thermal power, which was subject to the vicissitudes of the oil market, nuclear power was considered relatively inexpensive for the results it promised.

3 The Lucky Dragon (Daigo Fukuryū Maru) and 'Nuclear energy for peaceful purposes'

Atoms for Peace implied more than an affordable new form of energy to sustain affluent lifestyles. It also had a particular political connotation: the forgetting of Hiroshima and Nagasaki. If nuclear energy surged ahead in

various parts of the world, people would gradually become less aware of the connection between nuclear technology and nuclear war. Anti-nuclear sentiments were particularly strong in Japan. Shōriki Matsutarō's confidant, Shibata Hidetoshi, who played a decisive role in the importation of nuclear power to Japan, commented in the early fifties that the «best way to crush the anti-nuclear opposition is by singing the praises of the peaceful use of nuclear power, thereby providing hope for a great industrial revolution» (Shibata 1985, p. 301; Arima, pp. 58-72) Through emphasising «peace», which in turn meant «affluence», 'nuclear power' became a symbolic device to help Japanese people forget their memories of the atomic bombs and compel them to accept the shelter of the American 'nuclear umbrella'.

Yet, as Shōriki, Nakasone, the CIA and their allies were engaged in these machinations, the Daigo Fukuryū Maru (Lucky Dragon N. 5) incident occurred. On 1 March 1954, the United States exploded a hydrogen bomb in the Bikini Atoll that was a thousand times more powerful than the Hiroshima bomb. Radioactive fallout fell over an area of several hundred kilometres. This 'experiment' exposed many residents living on the Marshall Islands to serious radiation, leading to deaths and long-term debilitating after-effects. Several hundred fishing vessels sailing far outside the cordoned-off danger zone of the bomb test were also affected. One hundred fifty kilometres from the epicentre of the explosion, the Japanese trawler Lucky Dragon was especially badly hit: the boat was covered in radioactive ash and, though it hastened back to its home port of Yaizu, its crew was diagnosed with radiation poisoning. One died. The remaining crew members survived only to continue struggling with the effects of radiation exposure. In due course it became clear that not only had the Lucky Dragon's crew been directly exposed, fish already in markets around Japan was also contaminated by radiation. Radiation from the Pacific had been blown close to Japan, releasing a shower of radioactive rain. Strawberries and vegetables, tea and milk were all found to be radioactive, creating a large-scale problem.

Nuclear testing drew strong international criticism, but the United States insisted that the illness of the Japanese sufferers was not due to radiation but rather to the «chemical effect of substances in coral». US officials asserted that the Lucky Dragon had been operating within the US-designated no-fishing zone, although it was eventually determined that the boat had in fact been sailing outside that demarcated zone. Lewis Strauss, chairman of the American Atomic Energy Commission, further asserted that the denizens of the Marshall Islands were healthy and happy, that the crew of the Lucky Dragon might have been communist spies, and that their captain was in the employ of the Russians – and requested a CIA investigation into the matter. Members of the Eisenhower administration reported to the president that Japanese emotions towards nuclear weapons

were abnormally sensitive and that the Japanese mindset was that they had been chosen to be martyrs. Even in joint US-Japan talks held eight months after the hydrogen bomb testing, the American Government consistently stressed that there had been no dangerous radiation exposure and unveiled a set of new standards that set the levels of safe radiation exposure a thousand times higher than before. Yet American import companies banned the shipment of canned Japanese tuna, requesting that they first be subjected to a thorough scanning with Geiger counters.

After the radiation exposure of the Lucky Dragon and the damage to Japan's fishing industries became widely known, opposition to nuclear testing became a national issue in Japan. Started by a group of housewives in Tokyo's Suginami ward, the anti-testing movement rapidly expanded, garnering some 32,000,000 signatures, one-third of the Japanese population at that time. The scale of this movement far exceeded movements based on existing political organisations. Public opinion surveys also showed overwhelming opposition to nuclear weapons. Although the Japanese Government supported the view that the Bikini test had been essential for American security, this official interpretation only resulted in a public backlash, with anti-nuclear sentiments spreading even among conservatives.

Before long, the Bikini Atoll affair spawned a commemorative film: *Godzilla*. The monster's mutated form metaphorically referenced the 'ball of fire' (the H-bomb explosion) that had attacked the Lucky Dragon. *Godzilla* expressed the mass fear of the atom by tying the American H-bomb test, which evoked the war of the future, with Japanese memory of the war of the recent past, represented by the monster's destruction of Tokyo, an image that mirrored the Tokyo firebombing (Takeda 2002; Yoshimi 2012).

4 The nuclear energy for peaceful use exhibition and *Astro Boy*

Given the intense fears of radiation within Japanese society, one might surmise that it would have been difficult for Japan to be brought under the shelter of America's 'nuclear umbrella'. No matter what the US State Department or the Japanese Government claimed, after Japanese society had experienced the trauma of radiation exposure a third time, it was impossible to eliminate nuclear fears simply by touting the grand ideals of the Cold War and anti-communism. On this front, the idea of nuclear energy for 'peaceful use' and the image of the 'affluent lifestyle' it promised came to be seen as a powerful trump card that might reverse the situation. According to Peter Kuznick, members of the US National Security Council recommended that experimental-use nuclear reactors be constructed in Japan to develop a «strong offensive concerning their non-military use». Thomas Murray of the Atomic Energy Commission asserted that the construction of nuclear power facilities in a Japan that had experienced the

atomic bombings would become a «dramatic and Christian gesture» that would decisively «lift all of us far above the recollection of the carnage [of Hiroshima and Nagasaki]». The *Washington Post* even commented Murray's idea as an ideal method to «dispel the impression in Asia that the United States regards Orientals merely as nuclear cannon fodder!» (Kuznick 2011; Kusnick & Tanaka 2011).

In other words, the strategic vision of the National Security Council and the Atomic Energy Commission dovetailed neatly with the vision of conservative forces in Japan (with Shōriki at their core) on this particular point: both factions saw the construction of nuclear power plants as an effective way to bring about 'liberation' from memories of the atomic bombings. The culmination of this series of campaigns was an exhibition on the peaceful use of nuclear energy held in Hibiya Park, with the cooperation of the CIA, from November to December of 1955. The exhibition grounds displayed nuclear-powered trains and passenger planes, all exhibits that heralded the bright future of nuclear power (Sano 1994, pp. 495-536). In fact, the exhibition was an expanded version of a previous event called *Nuclear Power Everyone Understands* held by the *Yomiuri Shimbun* in August 1954 at the Isetan department store in Shinjuku. The biggest draw at the 1954 exhibition had been a display of various components of the Lucky Dragon's irradiated vessel. In this way, even a symbol of the movement against atomic and hydrogen weapons was used to sell the American ideology of nuclear energy for peaceful purposes. It was a trick truly worthy of a showman like Shōriki.

From the late 1940s, various locales in Japan jostled to hold exhibitions on reconstruction, trade and industry, seeing these events as devices to spur postwar recovery (Yoshimi 2005); many were sponsored by newspaper companies, either solely or jointly. For instance, the *Asahi Shimbun* had held an *America Exhibition* in Nishinomiya, a large-scale affair that drew two million visitors. The grounds included an information tower shaped like the Empire State Building, a statue of Lincoln, panoramas of all the states and the American West, the White House, a hall of agriculture and a hall of religion. The *Yomiuri* exhibit on the peaceful use of nuclear power was thus an 'atomic iteration' of these sorts of exhibitions, whose topics ranged from 'holy war' to 'America'.

For Japan before the 1960s, nuclear power was a dream far from reality. When Shōriki and Nakasone created the path to lead the Japanese under America's 'nuclear umbrella', nuclear power was spoken of as an ideal that would be realised some day in the future. For this very reason, an idealised version of usable nuclear power had to be envisioned in a separate dimension, apart from the reality of the damage caused by atomic and hydrogen bombs. From the 1950s to the 1960s, this imagined vision of usable nuclear power was embodied in a figure intensely loved by children: the robot named Astro Boy (lit. «Iron Armed Atom») who carried a reactor in his

body and whose computer brain was powered by energy from nuclear fusion. Atom's younger sister, Uranium, and his older brother, Cobalt, were both named after fissionable elements. Viewers and readers of Astro Boy saw in the robot's 'love for humanity' the potential for the peaceful use of nuclear power for 'justice' (Yoshimi 2012).

5 Closed coal mines and the 'America' of General Electric village

Kainuma Hiroshi's detailed study of the area around the Fukushima power plants examines the process by which local society became dependent on nuclear power infrastructure (Kainuma 2011, pp. 270-291). Futaba District, where the Fukushima plants are located, was formerly the poorest municipality in Fukushima Prefecture. Until the mid-twentieth century, the biggest industrial base in this region had been the Jōban coal mine, which stretched from near the site of the current Fukushima Daini plant all the way to the northern part of Ibaraki Prefecture. It rode the wave of increased coal production during the war and enjoyed continued demand in the immediate postwar reconstruction period.

Starting in the mid-1950s the situation changed drastically. With the mediation of American oil capital, Japan began to import large volumes of cheap, efficient oil from the Middle East, leading to the 'energy revolution' based on a shift from coal to oil. Eventually the demand for coal irreversibly declined, and the economic base of the Futaba District, long supported by the Jōban mine, began to crumble. The decline of its largest industry forced Fukushima Prefecture to find a new industrial lifeline of equal economic capacity.

At this point the Prefecture decided to become an energy provider for the Tokyo metropolitan region, adopting a two-front plan to construct a dam (developed in Okutadami) and a nuclear power facility. Even though the energy shift that had driven the closure of the Jōban mine in the first place was deeply entwined with the profits of American oil capital, to escape the hardship this imposed, Fukushima was compelled to follow the American lead by developing a giant dam in the style of the Tennessee Valley Authority and by constructing nuclear power facilities premised on the American ideology of nuclear energy for peaceful use. The Prefecture even built a resort centre modelled on Hawaii. Ironically, the cure involved implanting 'America' more deeply within the region in every respect.

Kainuma's thesis introduces some intriguing testimony about how technicians from General Electric (GE) were received in the region during construction of the Fukushima Daiichi plant with technology provided by GE. When the construction of the plant first began, a 'GE village' was set up on the grounds of the plant site, with houses newly built for GE employees and their families. This 'village' also acquired facilities like a school,

a church and a tennis court. A former Japanese employee who worked at this GE village reports that «they frequently held American-style parties, which deepened relations with the TEPCO staff and local residents who were invited». Another informant recalled: «I have great memories of home parties held during holidays like Christmas and Halloween. At the time I actually couldn't eat meat, but influenced by the parties held at the GE village I began to» (Kainuma 2011, pp. 284-286). This village was just like the housing complexes built for American troops and their families during the Occupation. As the mine headed towards closure, these facilities for the 'peaceful use of nuclear power' built in a remote, industry-less part of northeastern Japan formed another site of the US-Japan alliance, connected to the military bases in Okinawa, Iwakuni and Yokosuka.

6 Carrying an American umbrella in the radioactive rain

TEPCO's response to the nuclear disaster following 11 March 2011, can only be deemed poor. The prompt response of the American armed forces and the imperial household stand out compared to the confusion of the company and the Japanese Government. Seeing the US military and the imperial house taking the lead in responding to a crisis takes us for an instant back more than sixty years, as if history were repeating itself. Immediately after the quake occurred, president Obama announced that any assistance necessary would be given and swiftly launched Operation Tomodachi. By mid-March, the United States had dispatched nineteen naval vessels, eighteen thousand soldiers and 140 planes for relief activities.

The motivation for the American Government's decision to render such swift, large-scale assistance may well have been linked to the continued intractability of the problem of moving the Futenma base in Okinawa. Matters had deteriorated after the former Japan chief at the State Department, Kevin Maher, had offended Japanese feelings by commenting that Okinawans were «masters of manipulation and extortion». There was likely the hope that generous disaster relief would encourage the Japanese public to view the American military as a necessary presence in Japan after all. Since the United States needs Okinawa as a key component of its strategy to maintain military dominance in East Asia, it is easy to see that it would want to treat the disaster as a 'national emergency' requiring military intervention and make it an opportunity to appeal generally for the utility of the US-Japan alliance. However, the Americans must have been extremely irritated at the unexpectedly fragile nature of the crisis control systems of both the Japanese Government and TEPCO and may have feared that the chaos might lead them to squander this rare opportunity for their alliance. In any case, the US Government must have doubted whether the Japanese Government had the capacity for crisis management.

The citizens of Japan welcomed the rapid response of the American troops, in contrast to the bumbling Japanese Government, and admired American military technology, in contrast to Japan's useless 'technology power'. Seeing the contrast of responses, many Japanese people now have a deep-seated distrust of 'authoritative' experts in the Government and institutions like the University of Tokyo. By comparison the Americans appear far more trustworthy.

How could this have happened? As I mentioned earlier, 'America' was the driving factor in the establishment of Fukushima and other nuclear power plants in over fifty locations across the archipelago. The occupation of Japan did not end with the San Francisco Peace Treaty. It continued throughout Japan's postwar history, becoming ever stronger, and penetrating ever deeper into Japanese society. The high-growth era of the 1960s and the celebration of its pinnacle in the Osaka Expo of 1970 were two instances of this system of power reaching criticality within the container vessel of the postwar Japanese nation-state.

Thus it was no mere coincidence that the electricity used at the Osaka Expo came from reactor number one at the Tsuruga nuclear plant. Japanese nuclear-powered electricity, born from Shōriki Matsutarō's visions, began operating in tandem with the Expo's grand opening. As GE also built the Tsuruga reactor, its construction must also have featured a GE village like the one built in Fukushima. Using the electric power generated by this GE reactor, the grounds of the Expo were lit up by the dazzling glow of countless lights; moving sidewalks and robots sprang into action, embodying the fair's motto, «human progress and harmony». About a year after the Expo's opening, Fukushima Daiichi began operations. Two years after that the OPEC oil shock occurred, and Japan began leaning more than ever on nuclear power in order to free itself from reliance on the unstable supply of oil.

I have already mentioned how this deepening reliance on nuclear power went hand in hand with the implementation of a cunning strategy to alter the Japanese aversion to all things nuclear and to push the triple exposures of Hiroshima, Nagasaki and the Lucky Dragon into the background. At the end of the 1950s, in order to soften anti-American sentiment in Japan, the United States moved several of its bases from the mainland to Okinawa, inaugurating a dual policy of demilitarising the former while fortifying the latter. As a result pro-American consciousness strengthened on the mainland from the 1960s onward while aversion to nuclear power was progressively weakened. A 1956 survey by the United States Information Service found that 60 per cent of Japanese considered nuclear power a curse to humankind; by 1958, that figure had plunged to about 30 per cent (Kuznick 2011). In the throes of high economic growth, people gradually consigned Hiroshima and Nagasaki, as well as the Lucky Dragon, to the realm of memories past.

Nevertheless, the movement calling for the abolition of atomic and hy-

drogen weapons did continue through the 1960s. The struggle reached new heights in 1968 with opposition to the arrival of a nuclear-powered aircraft carrier in Sasebo, Nagasaki. Okinawa, formerly occupied by the US, reverted to Japan in 1972. This simultaneously highlighted the issue of the large nuclear arsenal stationed on the US bases there. On the US side, awareness of the need for a strategy that would further weaken the Japanese 'nuclear allergy' remained acute in this period. From the 1960s to the 1970s, the enthusiastic marketing of American nuclear energy technology to Japan was not solely for the benefit of corporations such as General Electric, but also for American military strategy.

As authors including Mark Gayn, Douglas Lummis, Katō Norihiro and Takeda Tōru have all observed, we began the 'postwar era' basking in the 'sunshine' of nuclear energy. Now that the postwar era has ended, we are walking in a rain of radiation carrying an American umbrella. The source of the 'sunshine' was American nuclear technology, used for the dual purposes of military and peaceful pursuits. This nuclear sunshine shone throughout the Cold War and lit up the 'postwar' – but eventually the sunlight turned to a black rain that poured down onto the earth of our history.[1]

Fukushima, Kashiwazaki and Tsuruga are all remote areas where the survival of local society depends on this radioactive rain. But now that we have experienced a fourth serious radiation incident, we sense that there is something more dangerous than nuclear sunshine contained in the radioactive rain – and in order to avoid that danger, we are once again holding up the American umbrella. On the one hand, the nuclear sunshine produced any number of illusions: television and the suburban single-family home, the Osaka Expo, even Tokyo Disneyland. On the other hand, even the umbrella we are holding up to ward off the radioactive rain is of American manufacture. Its inner mechanisms are the technologies of surveillance and certification and the structures of crisis management, along with the high technology that global capitalism demands.

Just as the electric power generated by the reactor at the Tsuruga plant bolstered the Osaka Expo, so the energy flowing from the reactors at the Fukushima complexes surely powered the consumer culture of Tokyo from the 1970s onward – a culture that culminated in the bubble economy of the late 1980s. Flowing from the blinding lights of the Osaka fairgrounds to the neon glow of Tokyo's consumer capital, the flood of 'nuclear-powered sunshine' washed the memory of three incidents of radiation exposure into the past.

1 Translator's note: «Black rain» refers to rainfall after the bombings in which radioactive soot had dissolved (Dower 1955, p. 288).

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Rethinking purposive consciousness
An analysis of sceptical fanaticism after Fukushima

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Abstract This paper looks into clashes between social forces for and against nuclear technology in Japan after the Tōhoku earthquake. It analyses the social constructs, in which 'pure science' is embedded, and the conditions that enable society's current avoidance of a truly scientific understanding of the situation. Finally, it points out the limitations of purposive consciousness.

1 Sceptical fanaticism after Fukushima

In 2008, I became a member of an international research project on the transnational history of popular images of nuclear power, with the role of looking into the popular images of nuclear power in Japan after the World War II. In my paper, I made the point that what Japan half consciously wanted was to repaint the memory of defeat in the war and the atomic bombings of Hiroshima and Nagasaki with a new sort of self-portrait – a self-portrait of a 'technological super power', symbolised by a 'peaceful use of nuclear energy' developed by the most technologically advanced nations at the time. I concluded my paper by stating that this promotion of a 'peaceful' usage of nuclear power would persist as long as the majority of Japanese people continued holding this dream of Japan as a technological superpower, a dream of being what I called a «cyborg nation».

My chapter was practically finished, when the Tōhoku earthquake and the nuclear disaster in Fukushima happened on 11 March 2011. For a while I wondered whether or not I should change the conclusion of my paper, because I thought that after a nuclear disaster on such an unprecedented scale the popular images of and the policies on nuclear power may well change. In the end, I left my conclusion unaltered, since I decided that the dream of being a technological superpower is so deeply rooted in the minds of the people, and in society at large, that even this catastrophe would not be enough to change how people see and treat nuclear power. The book was published last year (Lente 2012).

The omnipresent chorus of 'scientific thought' that sounded out loud and proud in Japan dealing with the disaster in Fukushima was one of the reasons why I thought that the meaning of nuclear power would not change dramatically. It is true that after the disaster, a movement of unprecedented scale voicing anti-nuclear sentiments surged in Japan. According to the public opinion polls, after the earthquake and the nuclear disaster, the percentage of people in favour of nuclear power dropped dramatically, al-

though since the first poll of 1968, the percentage of people with a positive attitude towards the 'peaceful' use of nuclear power had always been in the seventy to eighty per cent range. But before long a pro-nuclear discourse raises its head again – even in everyday conversations and on the Internet. According to this counter discourse, people who insist that nuclear power has to be abandoned or excessively emphasise the dangers of radiation are 'emotional' and 'unrealistic' because they lack both the correct 'scientific knowledge' and 'realistic world view' that would enable them to take into account the 'inevitability' of the use of nuclear energy in a country plagued with a shortage of energy resources. Conversely, those criticising anti-nuclear movements naturally maintain that their own opinions were 'scientific' and 'realistic'. In fact, the controversy over nuclear power generation in contemporary Japan is often perceived as this binary opposition between 'scientific thinking' and 'emotional arguments'.[1]

The House of Representatives elections held in December 2012 confirmed the existence of this dichotomy towards nuclear power generation. Given that they were the first national elections to be held after the disaster, candidates naturally addressed the issue of nuclear technologies. While almost all of the parties framed policies either decreasing dependence on nuclear power plants or abandoning nuclear power altogether, the Liberal Democratic Party (LDP), which had always stood for development of nuclear energy, criticised the other parties' policies, labelling them 'thoughtless' and expressing the intention of re-evaluating the opportuneness of restarting nuclear power generation in three years' time. In the elections, the LDP scored a landslide. Immediately after the victory, the new prime minister, Shinzō Abe, appeared on a TV show and remarked that the Government intended to establish new nuclear power plants in the near future. He also said that the results of the elections clearly showed that the Japanese people distrust parties wanting to decrease reliance on nuclear power or abandon it altogether because they realise that anti-nuclear advocates are merely playing a shallow 'word game' that ignores reality with its shortage of electricity, rising power rates, and the damage to economic activities that would surely result from any kind of decrease of reliance on nuclear power.

I do not think that the apparent predominance of 'scientific thinking' views on nuclear technology appearing in everyday life, various media and the Internet and criticising the anti-nuclear 'emotional argument' is representative of public opinion in Japan. In fact, almost all of the public opinion polls after the earthquake show that most of the public would prefer to decommission or abandon nuclear power plants. Additionally, many

1 This binary opposition is by no means new. It has characterised the 'peaceful' nuclear development in Japan from its earliest stages right after the war. See Lente 2011, p. 196.

anti-nuclear demonstrations are held in various parts of Japan. Nevertheless, the Japanese Government concluded agreements for cooperation on nuclear technology with the United Arab Emirates and the Republic of Turkey in 2013, and the LDP also pledged to restart nuclear power generation before the next House of Representatives election. The members of the Atomic Energy Society of Japan, who, after the incident, rather regretted their meek attitude in the so-called 'nuclear power village' – a network of politicians, bureaucrats, industries, and academics promoting the development of nuclear power in Japan – have also seemingly somewhat recovered their confidence in nuclear power plants – and in themselves.

Living in Japan after Fukushima, I became increasingly curious as to what conditions enabled the 'strength' of all things scientific – the strength that was boldly apparent in all of the critique directed at the anti-nuclear movements, the strength that enabled the Japanese Government to conclude agreements with the UAE and Turkey on nuclear cooperation while the country supplying the technology was still suffering the drastic consequences of a devastating nuclear disaster. Is this unruffled composure something science really should have? Shouldn't it wake up to rationality and change its course when faced with a disaster on such a scale? How is it possible that, in the name of science, people can ignore rational criticism and enthusiastically go ahead with what has been empirically proven to be so unreliable? What does it mean if science changes into something else, into something that resembles religion surrounded by unquestioning enthusiasm?

While I was trying to find answers to these and similar questions, I stumbled by chance on the expression «sceptical fanaticism» coined by Michael Polanyi.

Polanyi, a Hungarian polymath, started his masterpiece *The Tacit Dimension* in response to his encounter with Nikolai Bukharin, a Russian revolutionary and politician, in the Soviet Union in 1936. During their meeting, Bukharin said that there is no such thing as 'pure science'. According to him, the assertion of independency of scientific thought, or science for science's sake, was a «morbid symptom of class society», and in socialist societies, science should serve the needs of the society as a whole. In concrete terms, what that meant was that in the USSR, science would, as a matter of course, obey the goals set in the Five-Year Plans, a series of centralised economic plans developed in the Soviet Union at the time.

Bukharin's remark was a shocking revelation to Polanyi because he saw in it a highly instrumental view on science, a perfect fusion of modern scientific scepticism with its pursuit of freedom of thought, on the one hand, and modern utopianism with its desire for a classless society, on the other. Polanyi coined a term for this subordination of science to society's utopianism: «sceptical fanaticism». The paradox he saw in this sceptical fanaticism was that although modernity should ideally be driven by independent sci-

entific thought and freedom of conscience, with both condemning religious dogmas and secular political and traditional authority, in actuality, the modern state turned – without anyone noticing the transformation – to a complete denial of independence of scientific thought, a denial of freedom of ideas. At the time, Polanyi merely wondered what the consequences of this other modernity would be. But a few years later he found out that this denial of freedom of thought would result in millions of people, including Bukharin himself, falling victim to Stalin's Great Purge.

This conversation and the conclusions that Polanyi drew from it eventually led him to abandon physical science to engage in research in the philosophy of science. With this new pursuit, he aimed to rescue independent scientific thought or freedom of thought in general, from the shackles of sceptical fanaticism, from this purely instrumental view of science that denies freedom of thought. What Polanyi called the «tacit dimension» of knowledge was an expression of human freedom that can never be controlled by society as a whole.

Retrospectively speaking, the phenomenon Polanyi called 'sceptical fanaticism', or instrumental view of science, may not be peculiar to socialist societies. A similar convergence of modern scepticism and modern utopianism has been present in many of the 20th century's 'advanced' capitalist societies, one example instantly springing to mind being the Manhattan Project in the United States. Japan may well be one of the most representative examples of a capitalist society operating with 'sceptical fanaticism' at the very core of its existence, fuelled by the fact that the country's self-portrait in the latter part of 20th century was largely based on the phrase «scientific nation». In one sense the USSR of that time and post-war Japan are very different – in the sense of how science is perceived. In the USSR, Bukharin denied the existence of 'pure science'. In Japan and other capitalist societies, on the other hand, science has to be 'pure', at least ideologically, and scientific thought has to be independent from politics, economics and other social constraints, at least ideally. As I will show later, this difference may not have been so decisive. If anything, this diffusion of 'sceptical fanaticism' is exactly why I became interested in the mechanism of the phenomenon, and, after I completed my research on the historical transformation of nuclear images, it made sense to direct my attention to the social dimension of the constructs that 'pure science' is embedded in, to the conditions enabling this often unquestioned 'strength' of scientific thought.

What I am interested in here is not the question of whether or not Japan should restart nuclear power plants. Although natural science and technology coexisted with 'sceptical fanaticism' in the 'advanced' societies in the 20th century, today it would not be enough to merely analyse the pros and cons of nuclear power plants. This is why the main aim of this paper is to clarify the conditions that allow 'sceptical fanaticism' to pass unques-

tioned. Recent developments have provided us with good material to work with, as in the promotion of nuclear technology after Fukushima where these tendencies may appear more clearly than ever.

The following discussion is a rough sketch of my research in this direction. Strictly speaking, it would be better to conduct an empirical study of any one specific science and technology, with nuclear technology as it has evolved in post-war Japan being one choice available to me. However, research on nuclear technology in Japan has only been active, in the true sense of the word, during the short period that has passed since the disaster in Fukushima, which is why it may be too early to draw any conclusions just yet. In addition, as my own knowledge in the realm of institutions of natural science is largely limited to what I have amassed during my research on nuclear energy, in this paper I will merely try to outline a picture of the social institutions surrounding 'pure science', making it general by listing only the phenomena that are not limited to nuclear technology. And, in the long run, an analysis of the general mechanism giving science its strength would provide us with suggestions on how to rethink the place of Nature in contemporary Japan.

2 The connections in which 'pure science' is embedded

One view often voiced in various studies on science is that all existence – including even the laws of nature – is culturally or socially constructed. I would like to start the discussion by suggesting that there are, in fact, universal laws of nature independent from the human beings observing them. However, scientific knowledge and observation are only treated as valuable when the actors and institutions conducting research on the laws of nature and applying their findings in practical endeavours operate as entities that are relatively independent from all others. We can call such actors and institutions the 'scientific world', whose relative independency is enabled not by its separation from all the other worlds but by its particular dependency on them. This dependency means that when the scientific world comes up with questions of whether particular research into laws of nature and the development of technology based on it are good or bad, such questions have to be answered by some other world.

Most commonly, the world responsible for assessing the value of science is the political world. Based on its legitimacy (established either democratically or by force in a tyrannical state), the political world either approves or disapproves the activities, both theoretical and practical, conducted in the scientific world. In addition, the political world establishes the precedence to be given to research on the laws of nature and to the development of different kinds of technology. In this sense, knowledge about universal laws of nature and the practical application of such knowledge do not ex-

ist independently. In both theory and in practice, science stands together with the political world responsible for evaluating all scientific initiatives, approving some and rejecting others. As a result, judgments establishing which kind of scientific research is important are externalised beyond the political world – in addition to the rationality of research and of applications of laws of nature per se – becoming the criteria for decisions regarding actions to be made in the scientific world. People who conform to the judgments made by the political world tend to occupy high social positions in the scientific world.

The scientific world is thus structured on the basis of this specific relationship of dependence on the political world, and it is futile when the scientific world attempts to maintain the neutrality of any particular theoretical inquiry or its application since every such assertion inevitably contains a detour for evaluation to the political world. This is the mechanism that forms and maintains so-called 'pure science' on nature. But even though it is highly dependent on the external political authority that, to a great extent, forms the research in the first place, the social position of the scientific world is perceived to be a direct consequence of the 'pure' value of research on the laws of nature. The legitimacy or authority of scientific research and its applications are based not only on the internal rationality of science but also on the political world external to it.

So what about the political world? The framework underpinning political thought in the 20th century is a concentric circular composition with politicians in the centre, the nation-state as the basic unit of operation, and other nation-states adding up to an international network. The political world based on this concentric circular composition is also interdependent with other worlds, one of the most influential of which is the economic world.

The economic world has a dual-layered structure: the market itself and the academic circles researching it; the market appears as a world of physical exchanges and the academic circles as if they were trying to unravel the law of market just like natural science unraveling the laws of nature.

The market with its exchanges based on the free price system comprising, at least, private companies that supply goods and the households demanding them is perceived as a physical entity following its own universal laws, adding a layer of competition for economic growth to the composition of the states. However, no matter how natural it appears, the market is but a man-made artefact. Therefore, unlike laws of nature, there are no universal laws of market existing independently of the human beings observing it. The market exists by virtue of its dependence on the political world that establishes and maintains the institutions required for it to function, ensuring that actions by companies and households are in conformity with the laws of the market. When the system functions well enough, it results in the illusion that the law of market is, in fact, universal.

The world of the market exists together with the body of knowledge regarding the law of the market. Similarly to the world of natural science, research on the market is treated as valuable only when the actors and institutions conducting the research and applying their findings in practical endeavors are operating in relative independence from all other worlds. Moreover, this relative independence is possible only through dependence on the political world.

Therefore, this dual-layered economic world exists through dependence on the political world, to which it externalises the problem of legitimacy or authority. The universal laws of the market are regarded to exist just like the laws of nature, with bold claims being made regarding the neutrality of knowledge on the market. It is the mechanism, by which 'pure science' regarding the market is established.

The way the political world thinks and acts is based on the state of the market at each particular time and on the scientific knowledge regarding the market available. The way it judges scientific research and technology to be important or not depends on this context, in which political thought operates. That is, one of the pillars sustaining every judgment is the economic growth of the nation-state, and every step taken needs to be based on a judgement regarding whether it will help or hamper the economic growth of the nation-state. Conversely, the economic world that is maintained through dependence on the political world influences the way economic growth is perceived by the political world. In concrete terms, what this means is that scientific knowledge of the market greatly influences the judgments made by the political world in choosing the most effective of the countless possibilities of support for companies in their production and distribution of goods as well as for the stimulation and protection of consumers.

However, it is more difficult for scientific knowledge about the market to disguise itself with neutrality or clothe itself with a scientific aura than for scientific knowledge about nature to do so, because the market world has a greater dependence upon the political world and, therefore, scientific knowledge of the market also depends more on the judgments of the political world than the scientific knowledge of nature. Therefore, the tendency for people and organisations conforming to the judgments made by the political world to have higher social positions than those who do not conform is even stronger in the world of market science than it is in the world of natural sciences. Conformity to the political world becomes an even more important criterion of conduct in the world of market science than in the world of natural sciences. In spite of this conformity, or maybe even because of it, knowledge about the market tends to insist on its neutrality or scientificity. At the same time, in the world of market science there is more room for doubts about the neutrality of scientific knowledge of the market, doubts that are often voiced by the non-conforming. Therefore, the

conflict in the world of market science tends to be more intense than in the world of natural sciences. This highly unstable scientific knowledge of the market serves as the base for the political world to make its decisions regarding economic growth of the nation-state. Here we can find a peculiar interdependency between the political world and the scientific knowledge of the market, interdependency of reciprocal authentication.

All judgments made by the political world as to the importance or otherwise of scientific research on nature are framed by this reciprocal interdependency with the scientific knowledge of the market. That is, the political world thinks about the economic growth of nation-state using scientific knowledge of the market that is regarded as neutral. The scientific knowledge of the market is regarded as being effective for the economic growth of nation-state as long as it conforms to the market established by the political world, on the one hand, and to the judgments that weigh the importance of each particular scientific pursuit in terms of its contribution to economic growth, on the other. And the political world judges what kind of scientific research on nature is important in view of its contribution to the economic growth of the nation-state. This is how the research and application of scientific knowledge on nature was established in the 20th century; it was connected in a two-layered way to at least two more entities: politics and economy. On the one hand, there is interdependency between the scientific and political worlds, and, on the other, interdependency between the political and economic worlds.

3 Strength of science in a system of irresponsibility

The scientific world is embedded among a series of connections to other entities, but it is the connection to the political world that most directly affects the problem of establishing which kind of research on nature is more important. The political world maintains its own independency through its reciprocal interdependency with the scientific and economic worlds. However, there is one more important agency that strongly affects the political world – that of public opinion. And this is especially true for a political world that adopts a democratic system.

Public opinion either consents to or rejects policies proposed by the political world. And it does the same regarding judgments on scientific knowledge. Needless to say, if a piece of scientific knowledge is supported by the political world, and if public opinion is in favour of the political world, such knowledge becomes stronger. However, even if there are a lot of objections to a certain piece of scientific knowledge, each objection has to fight its way on its own. Based on the analysis made in the previous section, we can further elaborate on the discussion to forge the following understanding of the strength of scientific knowledge on nature.

One of the core concepts of this strength of scientific knowledge on nature is its neutrality. First of all, the neutrality stems from the universality of the laws of nature. Of course, the universal law of nature is not the only aspect that guarantees the strength of scientific thought in modern society. And what adds to this strength is the connection linking scientific knowledge of nature and embedding it in other entities. Through this support supplied by the political world, the interdependency of the political and economic worlds orienting the economic growth of the nation-state, and the approval of the public given to the political world, scientific knowledge on nature can proudly assert its unselfish neutrality, displaying its greatest strength.

When a specific piece of scientific knowledge becomes the target of criticism by the public, the scientific world retorts with this neutrality of scientific knowledge. That is why such a critique is often regarded as an 'emotional argument'. First of all, in many cases such a critique does not meet the criteria for scientificity laid down by the scientific world, because it is not backed by professional scientists and lacks the status of science established with laboratories, journals, scientific associations, budget, educational background and position within the hierarchy of the scientific world. But even if a scientifical critique of science by the public is on the same level as the discourse on the particular subject carried out in the scientific world, it is still often regarded as an 'emotional argument' because it problematises issues deviating from the conventional range of objects of research in the scientific world, which is conventionally determined by judgments made by the political world.

There is one more reason why a critique of any specific piece of scientific knowledge by the public is regarded as 'emotional arguments'. As I have mentioned above, this critique can pose a threat to the political world, to the economic growth of the nation-state, and to the consent of the public so far. In this sense, the critique is often labelled troublesome if it is perceived as a critique of the economic growth of the nation-state, or of the market economy itself. It does not matter whether the critique is made with an intention to criticise economic growth or the market. Even if it is not made for this purpose, it often is regarded as having critical ends. As a result, criticism will be regarded as an 'emotional argument' since not only is it beyond the bounds of scientific knowledge, but it also forgets the many benefits that the critics themselves are getting from the economic growth of the nation-state.

Scientific research and the development of technology are, therefore, protected by at least a double firewall. One part of it is the neutrality of scientific knowledge, and the other is the principle of economic growth, based on the unit of nation-state. As long as this double firewall protects scientific research and development of technology, it will be extremely difficult for a critique of any specific piece of scientific knowledge to get

through. Most commonly, being unable to pass through the firewall, the critique ends up being cast aside by the dubious but rock-hard dualism of 'scientific thinking' and 'emotional argument'.

The firewall (at least in the case of Japan) is further strengthened by yet another wall of defence that might be the most sound protection for scientific knowledge to exist – a 'system of irresponsibility'. This term was coined by a Japanese political scientist Maruyama Masao to describe the 'ultra-nationalist' mechanism of promotion of war by Japan during the World War II. Describing what he meant by 'system of irresponsibility', Maruyama wrote that it is a «remarkable state of affairs in which a country slithered into war, pushed into the vortex by men who were themselves driven by some force that they did not really understand» (Maruyama 1963, p. 16). And although today Japan is not in a state of war, the connections surrounding the scientific world constitute a state of affairs that is quite similar to the object of Maruyama's research.

Based on the development of science and technology, the entire country is unhesitatingly moving towards economic growth. However, each of the agencies promoting this growth is driven by forces that it does not really understand. Although in its pursuit of scientific research and its practical applications the scientific world tends to insist that scientific progress is an autonomous process, 'pure science' cannot exist without the justifications supplied by the political world. The political world promotes science for heteronomous, not autonomous reasons, since it is the economic world that supplies reasons causing the political world to promote some sciences rather than others. Equally, the economic world does not have any autonomous foundations justifying the economic growth. Whatever foundations it has, are created by the political world that backs up the market, enabling market scientists to insist on the universality of the law of market and to believe in axioms that authorise the promotion of the economic growth of the nation-state.

In this way, economic growth based on the development of science and technology is promoted by each of the agencies involved in a form of cross-referential outsourcing of authority. None of them has its own language enabling an ultimate justification of the actions taken, which is why each entity simply borrows the language of the other worlds to bolster its justifications. This borrowed language is of the sort that C.W. Mills called the «vocabularies of motive», that is, «accepted justifications for present, future, or past programs of acts» (Mills 1967, p. 443). Of course, if the interdependency between the academic, political, economic worlds and public opinion operated as a decentralised decision-making system mutually preventing abuse of power, such a system would indeed be useful for the control of economic growth based on the development of science and technology. In reality, though, the system does not operate like this at all. The system of 'vocabularies of motive' is set so that each of the worlds has

a hierarchically higher one above it similarly to the 'rock, paper, scissors' game, resulting in a 'system of irresponsibility' without any ultimate authority. If we demand the reasons why the scientific world proceeds with specific researches, why the political world supports them and supports specific policies maintaining the market, why the economic world concentrates on competition and on certain scientific research, and why public opinion approves specific scientific research and specific policies maintaining the market, all of the answers we will ultimately be given would be external to each of the separate entities.

If this rough understanding is right, this slightly changes the meaning of our previous discussion. As I have mentioned above, scientific research and development of technology backed up by the political world are protected by a double firewall. One part of it is the neutrality of scientific knowledge, and the other is the principle of economic growth based on the unit of nation-state. However, if scientific research and development of technology are in fact also protected by a 'system of irresponsibility', there is no need for those involved to take the neutrality of scientific knowledge and the principle of economic growth seriously. And the less seriously people consider such issues as the neutrality of scientific knowledge or the principle of economic growth, the stronger scientific thought becomes. Conversely, if people start to question the problem of the neutrality of science and the importance of economic growth, they will be compelled to reflect on the connection between the scientific, political, and economic worlds as well as public opinion, and reconsider their carefree convictions regarding the strength of scientific thought, just as the contemporary studies of Science, Technology and Society have been doing. But as long as people just pretend to have a great interest in the neutrality of science and economic growth based on the unit of nation-state using 'vocabularies of motive', without actually considering them, this will give unreasonable strength to scientific thought backed up by a fully-functional 'system of irresponsibility'.

The conditions for strength of scientific thought that appear in the critique of anti-nuclear movements after Fukushima in Japan may well be just this kind of escapist scientificity. Neither public opinion nor a sincere critique of nuclear power stations by scientists can easily break the firewall. And this is only to be expected, because many people positioning themselves as 'scientific', when the debate is about science, and as 'realistic', when it is about economic growth, are not genuinely interested in the problem of the neutrality of either, so the attack on this front is in most cases futile, because the 'scientific' or 'realistic' parties avoid any sincere discussion regarding neutrality. The more sincere the anti-nuclear movements are about the problem of security of nuclear power generation, the more irresponsible the 'scientific' and 'realistic' critique of anti-nuclear movements becomes as regards the problem of security of nuclear power generation. This is the situation I would like to call 'sceptical

fanaticism' – to use Polanyi's expression. And although Polanyi himself described 'sceptical fanaticism' as being produced by the fusion of 'scientific scepticism' and 'fanatic utopianism', the above analysis makes it possible to say that 'sceptical fanaticism' is produced by 'groundless enthusiasm' for scientific thought in a 'system of irresponsibility'.

4 Contingency, conscious purpose and the social

The interdependency between the scientific, political, economic worlds and public opinion, or the 'system of irresponsibility' encompassing science and technology is, of course, not peculiar to contemporary Japan. It has been more or less present in at least many, if not all, 'advanced' capitalist societies, although the concrete ways in which the phenomena manifest themselves may differ. It is this system that has made it possible to achieve a truly unprecedented development of science and technology in the 20th century.

What is peculiar to contemporary Japan, especially after Fukushima, may be the 'extremity' of the situation. Since the mid-1980s, in Japan, forms of interdependency have become more and more simplified, and have increasingly become a blatant cover-up, quickly losing whatever actual regulatory functions they ever had. As in a loud chorus of 'globalisation', competition is intensified artificially; not only this relative independency, but many other protective mechanisms of society also start to be deregulated, and a rapid increase of irregular employment is a manifestation of the selfsame change. The Tōhoku earthquake and the nuclear disaster in Fukushima, which happened right in the middle of the artificially promoted 'globalising trend', strengthened this direct interdependency more than anything else had ever done before. It has shown us that the 'system of irresponsibility' that has sustained the development of science and technology so far become so strongly rooted in society that even a nuclear disaster is not enough to upset it.

Of course, this is only one aspect of contemporary Japan. As a result of the fact that interdependency between social entities, which ideally should protect all aspects of society through mutual control, has now transformed, merely authenticating every established power, there is an increasing number of people and actions that drop out of the framework simply because the framework no longer supports them. And one aspect of contemporary Japan that just cannot be overlooked concerns the various actions and experiences that are thus left out. It includes the various complex experiences of the sufferers of the earthquake and the nuclear disaster – which may involve having to stay in the quake-hit areas, or being evacuated against one's will – experiences of people with handicaps, the aged, parents with small children, and so on. Although all of these people are left out of

the framework of economic growth promoted on the basis of science and technology, and although they do live in very severe conditions, they are still managing to survive – largely by their own efforts. They are sustaining their lives through various barely noticeable arts – little ways of doing little things – and through small collectives, conducting meetings, having chance encounters, creating their own narratives, their own humour, their own shared memories, or learning how to forget their painful experiences instead, establishing their own ways of surviving, always operating in their own dialects, one step away from the mainstream official Japan. Compared to the flashy political and economic topics, and the great chorus of *kizuna* (ties) and *fukkō* (reconstruction) appearing in the mass media, these little ways and little collectivities sustaining the lives of those outside the Japanese success-story are barely noticeable to the majority. However, their unimposing quietness and modesty do not mean a lack of importance. These little ways and collectivities are absorbing all those people and experiences that are dropping out of the deregulated framework of interdependence between the political, economic, scientific, and cultural entities. I would like to call these little ways and collectivities the grass-root 'thick social', an increasing thickness of society that is one aspect of contemporary Japan appearing not only in the quake-hit areas but also in various places all across the country.[2]

There is no doubt that the increasing thickness of society through the various manifestations of this grass-root 'thick social' is an important part of life in the contemporary Japan. However, whether the present situation, in which this grass-root thickness compensates for the increasingly thinning political, economic, scientific, and cultural frameworks, is good or not is yet a different question. Societies in general tend to be highly conservative, managing to keep the balance of the whole unchanged, so a change in one variable is often merely compensated by a change in another, resulting merely in a postponement of a problem and not its solution. And surely this increasing thickness of the grass-root sociality to compensate for the thinning mechanisms of mutual control in contemporary Japan is, in this sense, merely a postponement of the solution.

2 Here I will mention only a few of such activities. One is JDF (Japan Disability Forum) Hisaichi Shōgaisha Shien Center Fukushma (`http://jdf787.com/`), a centre supporting people with disabilities in Fukushima Prefecture. This centre published a report that gives a very rich account of the situation entitled «JDF Hisaichi Shōgaisha Shien Center Fukushma Annual Report of the Activities in 2011 and 2012» `https://gumroad.com/l/rxQY`; Another is Hōgen o Katari Nokosō Kai ed. *Magenetcha: Collected Works of Haiku on A Great Earthquake Disaster*, Ginnosuzu Co., Ltd., a book written by a person who experienced the disaster in Miyagi Prefecture; the third is Sendai Mediatheque (`http://www.smt.jp/`), an organisation, which is conducting various activities but is most notable for an ongoing archiving project collecting movies on the earthquake, thus documenting people's lives and damages in the quake-hit areas right after the earthquake.

In the essays included in *Steps to an Ecology of Mind*, unique thinker Gregory Bateson pointed out the limitations of «conscious purpose» (Bateson 1987, p. 432). According to Bateson, the 'consciousness' oriented to 'purpose' and concentrating only on limited causal relationships cut off from the whole matrix, in which the causal relationships are embedded, inevitably generates unintended consequences. He maintains that the unintended consequences are gaining an excessive influence at an alarming speed following the development of science and technology, and recently acquired an unprecedented ability to upset the balance of the whole. Therefore, Bateson insists on the necessity of 'wisdom', stating that «It may be essential for *wisdom* that the narrow purposive view be somehow corrected».

In the light of Bateson's arguments, we can understand the sceptical fanaticism and the increasing thickness of the grass-root social in contemporary Japan as an upset of balance of society as a whole through the excessiveness of conscious purpose. In other words, the phenomena we described above may show the limitations of the modern 'conscious purpose' constructed on a base of science and technology. What this paper tried to show are, therefore, some clues about how to deal with this upset balance. Although the problem of limitations of 'conscious purpose' and the task of solving it are not new, they need to be addressed once more. And the quest of fighting this 'conscious purpose' has been central in Bateson's research throughout his life, no matter which area he was working in.

Lastly, I would like to say a few words about what Bateson called 'wisdom' in his research. For him, human 'wisdom' is the mechanism that can correct the narrow purposive view. It goes without saying that 'conscious purpose', especially modern 'conscious purpose' closely connected with humanism and individualism, is one of the most prominent properties of human beings, and perhaps it would be simply impossible to eradicate it from human society altogether, by means, for example, of a holistic view of the world. What we need is to learn how to control it and lessen the damage it brings. And for me, the 'wisdom' that can help us here lies in the following three endeavours.

Firstly, to pay more attention to the grass-root social. As the scope of the established political, economic, scientific, and cultural frameworks based on 'purposive consciousness' gradually shrinks, little ways of doing things and little collectivities that absorb the people and experiences dropping out of the framework will become increasingly important. However, this grass-root sociality is not at all grand – it is often barely visible. We need many people to continuously work on it, pay attention to it, and keep it alive. The thickness of society generated through this sustainable development of the grass-root social will become the foundation that will enable our society to absorb the damage caused by 'purposive consciousness' and, in the course of time, to correct the narrow purposive view.

Secondly, to rectify the system of irresponsibility surrounding science and technology. This is the most straightforward approach to correction of the narrow purposive view, but it is also one that is highly difficult to execute, because the difficulty in rectifying it is one of the most remarkable characteristics of the system of irresponsibility. Nevertheless, vigorous activities, including various forms of critique, are being conducted even now to rectify the system. I believe that one example is that of the anti-nuclear movements in Japan, which are surely not only fighting against the nuclear power generation but also against the system of irresponsibility itself. And what we need most, if we are to break through the firewalls and reform the system of irresponsibility that surrounds science and technology, is to accumulate a description of it. One way to do this is to set up an investigating committee that could function as a tool to lay bare the concrete mechanics of the system of irresponsibility, and although this will require a lot of time and effort, it may well be the shortest way to rectification.

Thirdly, to learn the reality brought about by the narrow 'purposive consciousness'. As I have mentioned above, a system based on 'purposive consciousness' inevitably generates random sequences of events, and no one can take, or is going to take, full responsibility for any unintended consequence. Basically, it is impossible to control any consequence even if we act fully expecting the actions based on the 'purposive consciousness' to lead to unexpected results. The unexpected always appears, it is often perceived as (and is) a pressing problem, and that is why we often get 'new' algorithms and machinery that claim to solve such problems – algorithms and machinery, which quickly come into fashion and then just as quickly disappear. If it is so, it is better to dispense once and for all with the illusion that we can control the results of our 'purposive consciousness'. Rather, we should reconcile ourselves to the fact that unintended consequences will occur no matter what, making this understanding the central pillar of our planning, of our philosophy; this idea that our intended actions may and will generate unintended consequences out of our control will surely soften the damages of 'purposive consciousness'.

The Tōhoku earthquake and the Fukushima nuclear disaster may again show the limitations of our power to control nature. What is more, the state of society after the disaster shows how heavily the social balance was upset by the 'conscious purpose'. If we are to rethink nature in Japan as it is today, we may need much more than a successful anti-nuclear movement or the development of alternative energy resources – we may need changes on a far more extensive scale. What we need in order to rethink nature and our place in it now is wisdom that could help us correct our 'conscious purpose' by paying attention to the grass-root social. The grass-root social can furnish us with room for 'play', making it possible for individuals to detach themselves from the 'conscious purpose', describing the 'secular' system of irresponsibility to rectify it, and giving contingency the seat of

the 'sacred' value that will break the tyranny of 'conscious purpose'. This and nothing else will help us to set right the balance upset by 'sceptical fanaticism', or 'system of irresponsibility'.

And this new kind of wisdom may well be needed for humans to coexist in the age of globalisation. Or to exist at all.

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Rethinking civil society in Japan
Before and after the Fukushima nuclear disaster

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Abstract This paper examines civil society issues before and after the Fukushima nuclear disaster. The topics include not only the relative weakness of civil society, but also the activities undertaken at grassroots level to make it stronger. After the accident, however, protests became active. The participant structure of public demonstrations has changed. Civil society is changing into a society where anyone can participate in a demonstration.

1 Is a Fukushima-type accident unique to Japan?

1.1 The Fukushima accident reflects the failure of the post-war system

The earthquake and tsunami on 11 March 2011 triggered a severe nuclear power accident. Reactors in Units 1, 2 and 3, and the spent fuel pool in Unit 4 of the Fukushima Daiichi Nuclear Power plant lost their cooling capabilities. Explosions occurred in Units 1, 3 and 4 when the hydrogen released from the damaged core filled the reactor buildings. The reactor core of Unit 2 also seems to have been seriously damaged. A large amount of radioactive materials has been released and spread. Japanese society has faced real nuclear risks. The author has described the sociological characteristics and lessons taught by the incident (Hasegawa 2012). The Fukushima nuclear disaster is the second largest nuclear accident after the Chernobyl disaster in 1986. The severity of both accidents was rated 7 on the International Nuclear Event Scale. Even in July 2013, many people in Fukushima Prefecture, around 150,000, are still in evacuation by Government order or by their own choice due to the threat of contamination from radiation and risk for children's health.

Right after the incident, the author published a book on the sociological backgrounds of the Fukushima nuclear accident, and the energy policy proposal to shift to denuclearisation (Hasegawa 2011b). Among the many topics to be discussed regarding the incident, the author would like to start by raising the following question: was the Fukushima accident unique to Japan or could this type of accident occur anywhere in the world? I will discuss the social conditions that induced the accident or, at least, allowed this severe accident to occur. The investigation reports on the Fukushima accident have been officially published by the Japanese Government, the Investigation Committee on the Accidents at

the Fukushima Nuclear Power Stations of Tokyo Electric Power Company (ICANPS 2012), by the Diet, and the National Diet of Japan Fukushima Nuclear Accident Independent Investigation Commission (NAIIC 2012). But what is lacking in each of the reports is a clear distinction between structural issues specific to Japan, and problems common to nuclear power plants world-wide.[1] Why did each investigator miss this question? In explaining a social phenomenon, the most basic task is deciding whether to focus on its uniqueness or on its commonness. The fact that these reports pay little attention to international comparisons seems to show their implicitly inward-looking nature.

In his memoirs, the first and last president of the Soviet Union Mikhail Gorbachev (1996, p. 193) perceptively described the problems associated with the Chernobyl nuclear accident as follows:

> Chernobyl shed light on many of the sicknesses of our system as a whole. Everything that had built up over the years converged in this drama: the concealing or hushing up of accidents and other bad news, irresponsibility and carelessness, slipshod work, wholesale drunkenness. This was one more argument in favor of radical reforms.

He also described the Chernobyl accident as «graphic evidence ... of the failure of the old system» (Gorbachev 1996, p. 189). Understanding the accident in the context of ills unique to the Soviet system, and looking upon the accident as a turning point, Gorbachev accelerated efforts towards *perestroika* (restructuring) and *glasnost* (openness). However, despite these efforts, the Soviet Union was dissolved in December 1991, five years after the Chernobyl accident.

Doesn't what Gorbachev described, except for the «wholesale drunkenness», apply directly to the present-day Japanese system, too? Doesn't the phrase «the failure of the old system» apply exactly to the entire post-war regime of Japan – the mutual links among politics, Government administration, the economy, scientists, the media, and social movements on which the country's rapid economic growth was founded? Doesn't the Fukushima accident reflect the failure not only of the promotion of nuclear power, which was led by the Ministry of Economy, Trade and Industry, but also of Japan's post-war system itself?

The former Prime Minister Kan Naoto stated the following while serving as a witness at a hearing of the NAIIC: Gorbachev of the former Soviet Union said in his memoirs that the Chernobyl accident had shed light on the illness in the country's system; Kan recognized that the Fukushima ac-

1 Although this question was not examined in detail, in the introduction of the final report, the Chair of NAIIC, Kurokawa Kiyoshi, attributed the background of the accident to Japan's high economic growth and unique social system (NAIIC 2012, p. 3).

cident had in some way shed light on the illness of Japan as a whole (*Asahi Shinbun* [online], 29 May 2012).

Meanwhile, the German Government clearly shifted its energy policy to the post-nuclear phase as described in section 3, significantly considering the Fukushima accident as a problem common to nuclear power plants worldwide.

1.2 Similarities among the nuclear village, the nuclear mafia, and the atomic circle

The relationships existing between politicians, bureaucrats, the nuclear industry, and the mass media, referred to as the «nuclear village», came under frequent fire before the Fukushima accident. After the accident, the media published a self-reflective study, providing a detailed historical investigation into the media's role in such relationships, and its contribution to forming the nuclear 'safety myth' (Jōmaru 2012).

The NAIIC (2012, ch. 5, p. 48) report discusses the organisational factors of the Fukushima accident as follows:

> It is not far from the truth to say that [the safety culture] existed in name only, and as a result, the notion of safety and security was 'sold off', cheaply and irresponsibly, to the whole nation. This then resulted in the nation having to pay a disastrously high price.

The report also criticises the regulatory agencies' lack of independence, transparency, and expertise by using the words «regulatory capture», meaning that «regulatory authorities became the 'captives' of nuclear operators and became devoted to maximising the interest of the nuclear operators that are supposedly placed under them» (NAIIC 2012, p. 12). As to the lack of expertise, it states as follows (NAIIC 2012, ch. 5, p. 55):

> Another prevailing situation was that personnel in regulatory bodies acquired their technical expertise directly from operators – in other words, they were 'masterminded' by operators. According to an NISA senior official, there were many cases in which operator employees accompanied NISA staff members during NISA hearings with external experts; if views inconvenient to the operator were raised by the external experts, the company employees intervened, overshadowing NISA's presence and depriving it of opportunities to improve their expertise. Such a practice had been considered problematic but nothing was done to correct it.

Is such a situation unique to Japan? Or can it be seen in other countries, albeit in slightly varied forms, extents and degrees? We are familiar

with the terms «nuclear mafia» in South Korea and «atomic circle» in the United States and France. The former French Environment Minister Corinne Lepage, who is currently a member of the European Parliament, emphasises similarities between the systems promoting nuclear power in France and in Japan in her book, *La vérité sur le nucléaire* (The truth about nuclear power), which was published in June 2011, three months after the Fukushima accident (Lepage 2011). The book criticises the current state of France, which is a major nuclear country. The problems afflicting France that are so accurately and clearly described in the book resemble the problems facing Japan: frequent accidents and problems, both big and small; an inadequate nuclear safety regulatory system; a cosy, corrupt relationship between supervisors and supervised; one-sided advertisements promoting the myth of nuclear safety; underestimations of risks; covert nuclear lobby activities; arrogance of those involved in nuclear power generation; direct and indirect financial support from governments; nuclear exceptionalism; secrecy; concealment; information manipulation; sophism; lost trust; resistance to renewable energies; risks associated with old reactors; high costs of dismantling decommissioned reactors; difficulties of issues surrounding radioactive waste disposal; and biased investment of Government funds in nuclear power.

The nuclear industry worldwide faces similar structural issues, because 'sensitive technologies' are involved (i.e., nuclear technologies that can be utilised for military purposes). These issues include secrecy and exclusiveness, reliance on national policies, and the fact that the industry is an enormous equipment industry where massive investments are provided, and where the parties concerned have huge vested interests. In this sense, a major nuclear accident can occur at any nuclear power plant in the world.

2 Civil society and the nuclear power plant

Unique to Japan are the grants provided by the Three Power Source Development Laws (Dengen Sanpō), a programme initiated in 1974 by the Tanaka Cabinet. This programme gives large grants to site areas with a power plant fuelled by nuclear, thermal or water power. For a long time, prefectures and site areas, including neighbourhood towns, have received grants in proportion to the electricity generated by their plants from the Ministry of Economy, Trade and Industry through the utility companies, making them increasingly dependent on their nuclear power plant or facilities. The author explained the workings of a «vicious chain» resulting when nuclear power plants were established: after towns hosted a single nuclear facility or unit, additional units were added one by one along with the constant expansion of existing nuclear facilities (Hasegawa 2004, p. 27). Typical examples are the Fukushima Daiichi (Number 1) nuclear

power plant of six units, and the Fukushima Daini (Number 2) nuclear power plant of four units, which make a: total of ten units concentrated in the site area.

Taiwan and South Korea introduced similar policies programme in 1988 and 1989, respectively, but their programmes provide benefits to areas with a nuclear power plant that are financed solely by the revenue of the power companies, unlike the Japanese programme, which is supported by consumers through an earmarked tax for which a special account exists. In Europe and the United States, various subsidies financed by governments with contributions from electric power companies are paid out to areas with a nuclear power plant, but there are no programmes like the Japanese one. The Three-Law grant programme that allows the Japanese Government to channel funds to site areas programme cannot be easily accepted in civil society.

In Japan, in metropolitan areas like Tokyo and Osaka, the Citizen's Nuclear Information Center and other NGOs have been involved in nuclear issues. However, since independent voices from civil society are generally weak, social regulation of the nuclear industry has not been particularly effective, and the structure of the nuclear village has so far been maintained. Before the Fukushima accident there was a strong tendency to suppress such criticisms of nuclear power, in particular, in major regional cities like Sapporo, Sendai, and Fukuoka, which are also home to the headquarters of electric power companies.

2.1 Civil society and anti-nuclear and citizens' movements before the Fukushima accidents

The author has previously analysed the history of Japan's anti-nuclear movements from the standpoint of the triangular model of social movement (TRIM), focusing on the structure of political opportunity, mobilised resources, and cultural framing, based on the work of McAdam (1996), see Hasegawa (2011a). Before the Fukushima accidents, I divided these movements into four historical stages according to points of issue and organisers. The first period (1954-1973) is the period of movements for the abolition of nuclear weapons. The second period (1973-1986) is the period of movements against the construction of nuclear power plants. 1986 was the year of the Chernobyl nuclear accident, the event, which greatly energised Japan's anti-nuclear movements, bringing about changes within them. The third period (1986-1992) is the period when grass-roots activities in metropolitan areas became active. It was at the end of this period, in 1992, that the uranium enrichment plant in the nuclear fuel recycling facilities in Rokkasho Village became fully operational. This led to the fourth period (1992-March 2011), a period of anti-plutonium movements.

I would like to add some information on the civil society in Japan (Hasegawa 2005). Japan's pre-war Imperial Constitution substantially limited civil liberties, and there were few civil society activities with the exception of those carried out by a handful of political parties, labour movements, and religious movements. It was not until 1960 that Japan saw the emergence of full-blown civil society activities primarily sustained by citizens. The movements for the abolition of nuclear weapons are a part of the peace movements closely related to the political movements of class struggle with hopes of socialist revolution, centred around labour movements led by the Japanese Socialist Party (JSP, current Social Democratic Party) and Japanese Communist Party.

In the latter half of the 1960s, the public became concerned with pollution and environmental damage, the outward manifestations of the underside of Japan's rapid economic growth. In response, community and local citizens' movements sprang up all around Japan for the first time. The issues they addressed ranged from promoting peace to opposing pollution and large-scale industrial development. This led to the emergence, in the early 1970s, of community movements around the country fighting to stop the construction of nuclear power plants. The public saw how community movements would allow them to register their objections to projects and effectively exercise their civil rights, leading to the rapid spread of such movements. Until the end of the 1960s, Japan's social movements and civil society activities were led by labour unions and poor young people with nothing to lose. Guided by socialist ideals, they dreamed of revolution, which they hoped to achieve through political reform and democratisation. From the mid-1970s onwards, though, social movements began to diversify, and the media and young people became increasingly 'apolitical'.

When the Cold War structures fell, Japan's social movements rediscovered the United States and West Germany as a country of NGOs and NPOs, a land of citizen activism and a democratic civil society. At the same time, they lost their long-held illusions considering the Soviet Union and Eastern European countries as highly developed welfare societies. In a sense, the Berlin Wall had fallen in Japan, too, and the new goal for Japan's social movements and NGOs-NPOs became the building of a vibrant liberal civil society that would counter the country's conservative, authoritarian and paternalistic politics.

On 17 January 1995, Kōbe, one of Japan's most beautiful cities, was severely damaged by an earthquake that killed more than 6,000 people. In the face of official impotence, emergency groups spontaneously formed as community members came together to help one another. Furthermore, thousands of people from all over Japan rushed to Kōbe to help the victims in an unprecedented outpouring of public concern. Until then, the Japanese had believed that Japan was the safest society in the world, with little crime and good public security. Another significant social and politi-

cal impact of the Kōbe earthquake was the way it dramatically changed old attitudes towards NGOs and NPOs among Japanese citizens, business and Government, opening the way for new legislation that would promote NPOs (Hasegawa, Shinohara and Broadbent 2007).

Under single-party LDP rule, a powerful system comprised of big business, politicians, and bureaucrats, known as the «iron triangle» or «ruling triad» (Broadbent 1998), held Japanese society in sway for over sixty years in the post-war period. During this time the public was exposed to environmental hazards, but it also enjoyed political, social, and economic stability. The public continued to believe that Japan's chief bureaucrats and corporate leaders were upright and capable, and nuclear power plants are a symbol of their partnership.

It was not until 1998 that Japan created a system to provide NGOs with corporate status as non-profit organisations, making it the last among the industrialised countries to do so. Incredibly, the NPO law is the first and only Japanese law to contain the word «citizen». The ruling LDP politicians and Government bureaucrats had previously avoided the word, as it implies individuals with a strong sense of independence, and a robust capacity for criticism.

Because the iron triangle of big business, politicians, and bureaucrats was so strong, and political opportunities closed to all but a select few, the public thought that the basic role of social movements was to criticise the errors of those in power – it had no idea that citizens' and community movements could organise and develop programmes, or make policy proposals. Consequently, such movements tended not to progress much beyond the point of mounting protests against specific local issues, such as opposing environmental damage or the construction of nuclear power plants. Before the enactment of the NPO law, they were merely voluntary associations, without any legal status, that had little apparent impact on a national level.

3 Germany's policy shift and civil society

3.1 Merkel's leadership and the role of the ethics commission

The German Government and the Ethics Commission for a Safe Energy Supply (2011), which published a report at the Government's request, resulted in an important case of recognition of the Fukushima accident as a problem common to nuclear power plants worldwide. On 14 March, three days after the Fukushima accident, German Chancellor Angela Merkel ordered a temporary three-month suspension of operations at a total of eight nuclear reactors, consisting of seven reactors that had started operating before 1980 and one trouble-prone reactor that had started operating after 1980. These

eight reactors were shut down on 6 August 2011, without resuming operations. Under the strong leadership of the Chancellor, 17 members were selected for this commission, including Ulrich Beck, Miranda Schreurs, and two other social scientists. The commission intensively discussed the issues over two months, including a public debate of more than 11 hours. This report stressed the role of socially responsible decision-making prior to technological and economic estimations. The overall approach was very democratic as well as ethical. «Sustainability», «human responsibility for nature» and «responsibility for future generations» are the key concepts. The role and the result of this commission could be regarded as the good practice of «taming risks through dialogue» (Eder 2000).

Eventually, in response to the report issued by the Ethics Commission, the cabinet decided to shut down the operations of all 17 of the country's active nuclear reactors by the end of 2022, and on 30 June the Bundestag (the Lower House) passed a bill demanding closure with majority support from the four major parties, not including the Left Party, which asked for the reactors to be closed much earlier than the end of 2022. The Bundesrat (the Upper House) also approved the bill on 8 July. Issues involving nuclear power are not only among the key issues on which the ruling conservative-centre coalition (formed by the Christian Democratic Union and the Free Democratic Party) and opposition parties (the Social Democratic Party and the Greens) disagree, but are also among some of the most contentious issues in Germany since the 1970s. However, in less than four months after the Fukushima accident, a social consensus was established with support from the majority of public opinion. Triggered by the Fukushima accident, political and social consensus was finally reached after long years of battle between pro and con sides of the nuclear energy debate. Merkel revealed her pro position in September 2010, when she decided to add an additional eight or fourteen years to the permitted length of operation of nuclear plants in Germany. In June 2000, after reaching an agreement with the four major power companies, the SPD and Greens' coalition cabinet introduced a new policy establishing that all nuclear reactors would be shut down after thirty-two years of operation. For ten years Merkel had criticised this policy as being too premature.

Although the report by the Ethics Commission for a Safe Energy Supply focuses only on nuclear power plants in Germany, it is consistent in its view that as a most severe accident occurred in Japan, one of the most technologically advanced countries, it could, therefore, also occur in Germany. The report does not provide an easy explanation for the Fukushima accident, that is, attributing it to earthquake and tsunami disasters of unprecedented scale and geological conditions unique to Japan. Rather, it consistently takes the view that the same type of accident could occur if the cooling system for a nuclear reactor failed due to a prolonged loss of the external power supply caused by an airplane crash, terrorist attack, or similar event.

3.2 Policy shift, deliberative democracy and civil society in Germany

Germany's policy shift has been attributed to the effect of discussions on nuclear issues over a period of nearly 40 years and to the existence of deliberative democracy. The antinuclear movement in Germany is the strongest in the world, and antinuclear activities have continued energetically since the 1970s. The swift policy shift after the Fukushima accident could be achieved because social movements led by the Greens and other groups and resistance movements in civil society wield power. In the Netherlands and other European countries, antinuclear movements stalled in the 1990s as nuclear issues were left in the background. By contrast, in Germany, antinuclear protests such as tractor protests against the transportation of spent nuclear fuel have continued mainly in Gorleben, a candidate location for a final disposal site. In April 2010, a 'human chain' demonstration was held with 120,000 participants connecting two nuclear power plants near Hamburg (120 kilometres apart; one of which was closed in 2007) when it was feared that the Merkel administration, which had started in the fall of 2009 as a conservative-centrist coalition administration and was now in its second-term, might allow an extension of operations for the country's nuclear power plants.[2] In September 2010, when Chancellor Merkel actually decided to extend it by 8 or 14 years, a large-scale protest was held in Berlin, involving 37,000 demonstrators according to the police. On Saturday, 12 March, the day following the Fukushima accident, a 45-kilometre human chain was formed by around 60,000 participants between Stuttgart and the nearby Neckarwestheim nuclear power plant. On Monday, 14 March, a total of around 110,000 people participated in protests held in more than 450 municipalities. And the biggest antinuclear demonstrations in the history of Germany were held on 26 March, and involved about 260,000 participants nationwide, with the slogan «Look at Fukushima, shut down all nuclear power plants!» In Berlin alone, more than 100,000 people turned out to protest.

With regard to institutional arrangements, in Germany state governments have regulatory authority over the issuance of permits to construct and start operating nuclear power facilities. The Federal Government has authority over the overall nuclear policy, nuclear reactor safety regulations, and radiation protection. Since the state governments can make independent decisions on the local tax on electricity rates, they hold considerable sway in electric power policy. If the Social Democratic Party and the Greens control a state government, and have the post of its environmental minister, it is likely that construction of a nuclear power facility would be stopped or a nuclear facility shut down.

2 Since the first-term Merkel administration was a coalition administration with the Social Democratic Party, nuclear issues were put aside as the ruling parties held different positions. Until the Fukushima accident, Merkel was a pro-nuclear politician.

We must not forget that Germany has a series of important environmental NGOs, such as BUND (Friends of the Earth Germany) with 480,000 members, Greenpeace and the WWF, each with 200,000 members, and the so-called green institutes (national-level, state-level, and private research institutes engaged in environmental issues). Well-known institutes include the Wuppertal Institute, which was established by the Federal Government, and the Eco-Institute, which is the largest private research organisation. These institutes have a great influence on policies concerning nuclear power, renewable energy, and global warming.

4 Post-Fukushima civil society

4.1 The 2011 anti-nuclear activities: the Japanese version of the Arab spring

The impact of the Fukushima accident, the fear of widespread radiation contamination, the anger at and disappointment with the Tokyo Electric Power Company and the central Government has caused civil society to adopt a more critical attitude to nuclear power. As I have already explained (Hasegawa 2011a), arguments and protests against nuclear power generation have been taking place in Japan since the mid-1950s. In 1988, after the Chernobyl accident, the antinuclear movement called «the anti-nuclear new wave» spread nationwide, mainly among housewives in major cities; however, the scale of the protests were limited to a maximum of 20,000 participants (Hasegawa 2004, ch. 8). In the history of social movements in Japan, with the exception of the May Day gathering in celebration of the labour movements, which involves more than 40,000 workers, it is extremely rare to see a political protest with 10,000 people or more, whatever the main issue is. The fact that the general public and the media tend to regard the antinuclear movement as a particular movement led by particular people who have been involved in nuclear issues for many years has long been a problem for this movement, making its dissemination in society difficult. After 2001 especially, when a nuclear renaissance was trumpeted throughout the world, and nuclear power generation was emphasised as a countermeasure to global warming, the antinuclear movement declined year by year, with few new participants joining the protests.

However the situation changed drastically after the Fukushima accident. According to the organisers, around 15,000 people participated in a demonstration held in Kōenji, Tokyo on 10 April 2011, and in another held in Shibuya, Tokyo on 7 May. These numbers were bumped up by the use of the social networking site Twitter and other media. On 11 June, demonstrations were held at approximately 140 locations nationwide, and one demonstration in particular, which was held in Shinjuku, Tokyo, attracted

around 20,000 people. About 65,000 people gathered for the 50,000-person rally for the abolition of nuclear power held at Meiji Park, Tokyo on 19 September, which was organised by Ōe Kenzaburō and the Japan Council against Atomic and Hydrogen Bombs.

By the end of July 2013, the «Anti-nuke Occupy Tent» protest began on 11 September 2011 at the headquarters of the Ministry of Economy, Trade and Industry, had lasted for 690 days. This can be regarded as the Japanese version of the illegal occupation movement – like the Occupy Wall Street Movements in the US – that spread in many countries in 2011. Coincidentally, the protest began right before the start of the Occupy Wall Street movement on 17 September. Whereas the Japanese Government did not interfere with the protest for fear of the strong public reaction had the protesters been forced to leave, the occupation of Zuccotti Park by the Occupy Wall Street protesters ended after a little less than two months on 15 November when the police evicted them from the park.

In 2011, large-scale anti-government protests – the so-called Arab Spring,in which people used smartphones and social media like Twitter – occurred in Tunisia in January, spreading to other Middle Eastern countries like Egypt, Yemen, and Libya, and bringing to an end long-lasting dictatorships in the four countries. The Arab Spring movement influenced people in Greece and Spain, and, in particular, in Spain, where the Indignados (or Indignant) led an 'occupation' movement in May and June, attracting 130,000 to 250,000 protesters nationwide. Through transfer of know-how the Spanish movement influenced the Occupy Wall Street movement, which began in New York on 17 September, and similar 'occupation' movements spread in around 70 US cities nationwide. Protests also spread to Russia, and a large anti-government demonstration was held in December 2011 to protest against suspected corruption in a lower-house election. Although *Time* magazine selected The Protester for its 2011 Person of the Year award (`http://www.time.com/time/specials/packages/article/0,28804,2101745_2102132,00.html`), its featured article did not mention either the antinuclear demonstrations in Japan or the Anti-nuke Occupy Tent. Nevertheless, Japan's post-Fukushima protest activities share common characteristics with the protests that spread from the Arab world to Europe, the United States, and Russia, showing their contemporaneity. Some of these characteristics include the use of smartphones and SNS like Twitter, YouTube, and Ustream as new tools to mobilise people; the mobilisation of people by individuals or small groups on a voluntary basis without relying on existing political parties, other political organisations, or labour unions; and the opportunities for self-expression provided by the protests, in which the protesters focus on expressing their objections rather than pursuing the achievement of concrete goals.

The protest was fuelled by the participants' anger about the Fukushima nuclear accident, their anger and distrust of the responses of the electric

power company and the central Government, and their own feelings and sense of daily life. In an interview with *Asahi Shinbun*, Matsumoto Hajime, one of the organisers, commented that it is okay to be festive, that it is desirable to have discussions on politics from the viewpoint of daily life, that opinions should be expressed by musicians through music, by craftsmen through their creations, and by dancers through dance, and that this type of protest would not last if it was not fun (*Asahi Shinbun*, 16 June 2011). Mothers, in particular, are worrying about their children's safety, and the level of contamination in foods, school lunches, water, homes, schools, swimming pools, on the paths leading to schools, and playgrounds. No matter where we are, whatever we do and whatever we eat, we are always aware of the level of radiation. Innocent smiles have disappeared. We can no longer trust official Government and media reports on 'safety'. During the final stage of the protest meeting held in Meiji Park on 19 September 2011, Mutō Ruiko, a woman from Fukushima, made an appeal (Mutō 2012, pp. 12-13), «We have become *the ogres of Tōhoku*, quietly burning with fury. […] Day after day, many inescapable decisions were forced upon us. *To flee, or not to flee? To eat, or not to eat?… To speak about something, or to remain silent?* There were various agonising decisions». She claimed people became estranged by these agonising decisions.

Hirabayashi Yūko conducted surveys on 11 June, distributing questionnaires to about 150 participants at each of the three protests held at the Shiba, Yoyogi, and Shinjuku Chūō Park in Tokyo. She lists the following three groups as typical participants (Hirabayashi 2013). The first consists of people aged 50 or over, who are also interested in protecting the Constitution and peace issues, and who lean toward leftist ideas. The second group mainly consists of women in their 30s and 40s, who bring their children or families, and who, as mothers, are interested in a policy shift toward renewable energies, practicing ecological lifestyles, and foods and organic farming. The third group consists of people aged between 20 and 35 who are interested in anti-poverty activities and job-hopper issues as well as nuclear problems. Their approach involves holding a kind of 'sound demo' led by noisy bands or shouting disc jockeys. The third group does not trust the existing media and tries to turn itself into a medium of information without criticising it. Hirabayashi calls this an approach of 'media activism'.

4.2 The 2012 uprising of the Kantei demonstrations

The protests following the Fukushima accident were expected to fizzle out by 2012; however, around 14,000 people participated in the demonstration at Tokyo's Hibiya Park and in the human chain surrounding the Diet building on 11 March 2012, the one-year anniversary of the earthquake

disaster. The protest, known as «the Kantei demonstration», was held in front of the Prime Minister's office and began with about 300 people on 29 March 2012; the organiser encouraged people to gather every Friday evening from 6 to 8 o'clock starting on 6 April.[3] The organiser, the Metropolitan Coalition Against Nukes, is a loose network of people without a representative or spokesman (Noma 2012). The number of participants shot up after the announcement on 8 June by Prime Minister Noda Yoshihiko of his intention to resume operations of Units 3 and 4 at the Ōi nuclear power plant: about 2,700 people participated on 1 June, reaching 4,000 on 8 June, 12,000 on 16 June, and 45,000 on 22 June. National network TV news programmes, which had barely covered the protests in the past months, began to dedicate considerable airtime to the event when the number of participants exceeded 40,000 on 22 June. Subsequently, the number of participants rose dramatically to 200,000 for the protest on 29 June (the last protest before Unit 3 resumed operations on 5 July), to 150,000 after the resumption, 150,000 on 13 July, and 100,000 on 20 July, the day before Unit 4 resumed operations. Approximately 170,000 people gathered for the planned 100,000-person rally for «the farewell meeting of nuclear power» held at Yoyogi Park, Tokyo, on 16 July. In an antinuclear protest held on 29 July, around 200,000 people surrounded the Diet building. Approximately 40,000 people gathered every week in August and September, and 100,000 people participated in the protests held in Nagata-chō and Kasumigaseki, Tokyo on 11 November. Large protests were held in cities in various regions across the nation for over eighteen months, showing heightened enthusiasm among people that had not been observed since the protests against the Japan-US Security Treaty in June 1960.

Eventually, the Government could no longer ignore the protests held in front of the Prime Minister's office. On 22 August, an official meeting was held in the Kantei between Prime Minister Noda and the main members of organisers, the Metropolitan Coalition against Nukes. It was the first time in Japan's history that representatives of a civil movement had met officially with the Prime Minister.

By the participatory observation of protests, the author could see that the protests are not being mobilised by a large organisation like a major labour union, but that baby boomers born between 1947 and 1949, people with family members, and young people are participating in them on a voluntary basis, individually or in small groups. The organiser does

3 In Japan, street demonstrations are regulated by each Prefecture's public safety ordinance, and require advance authorisation from its public safety commission. In the case of Tokyo Prefecture, demonstrators must march on the road. The «Kantei demonstration» (so named by the mass media) is a protest conducted on the pavements and is thus not a legal street demonstration (Noma 2012, pp. 50-52). The use of megaphones or placards is not permitted in the vicinity of the Diet building.

not necessarily have a structured programme and relies on participants' voluntary actions. The protesters intentionally refrain from expressing political messages other than criticism of the nuclear power plants and of the actions of Tokyo Electric Power Company. As a result, opposition to the use of Osprey aircraft in Okinawa, tax hikes, and the Trans-Pacific Partnership is only seen occasionally. Many of the participants seem to be new to protesting, and the events are more like peaceful walks than actual demonstrations, which makes excessive policing and the sizable presence of the police rather conspicuous (http://www.time.com/time/specials/packages/article/0,28804,2101745_2102132,00.html).

The following facts are remarkable in the history of civil society and social movements in Japan: 1) current protests are based on people's voluntary participation, not on organised mobilisation by major labour unions or other organisations; 2) large-scale street protests have taken place in the area surrounding the Diet building where strict regulations are in place against, for example, the use of megaphones; 3) the Kantei demonstrations have resulted in no rock-throwing or violence, and there have been only two arrests; 4) the weekly Kantei demonstrations have continued for more than sixteen months; and 5) protests have spread not only in Tokyo, but also to other cities nationwide.

4.3 What are the strategies of the post-Fukushima movements?

What are the strategies of the antinuclear movements after the Fukushima nuclear accident? The most serious problem is that there is no concrete political programme or agenda for the post-protest period. Questions that must be asked include what new energy policy should be promoted and shared by the protesters, how to take the anti-nuclear movements in new directions, what the next step should be, and who are their political partners?

Ōe Kenzaburō, winner of the Nobel Prize for literature, and other well-known figures called for 10 million signatures for denuclearisation on 15 June 2011. One year later, on 15 June 2012, about 7.5 million signatures had been collected and passed onto the central Government and the Diet (http://sayonara-nukes.org). Although the intention was to put social pressure on the Government by means of the signatures gathered, it will probably fail like the 1990 movement that collected signatures to demand the enactment of a denuclearisation law.

Nuclear energy was discussed as one of the central issues in the last general election in December 2012. At this election, the positions of the Liberal Democratic Party (the largest opposition party at that time) and of the Kōmei Party (the third largest party) were vague, but they still won, giving rise to the new coalition cabinet led by Prime Minister Abe

Shinzō. Although the Communist Party and the Social Democratic Party explicitly supported denuclearisation, the number of seats in the House of Representatives for each party is currently single digit, only 8 and 2 seats, respectively. The growth of anti-nuclear protests resulted in a smaller number of seats than before the election (9 and 5 seats).

So where are the antinuclear movement and public opinion heading under the current pro-nuclear administration? Will it be possible to maintain the number of participants of these demonstrations in the tens of thousands? As time passes, anti-nuclear movements without effective political strategies will lose their capacity to mobilise people. A major challenge is how to maintain the impetus of the movement at high levels. The leading anti-nuclear movements at international level are highly specialised, large-scale professional environmental NGOs such as the WWF, Friends of the Earth, Greenpeace, the World Information Service on Energy, and the Union of Concerned Scientists. But the WWF Japan has around 35,000 members, and Greenpeace Japan has only 4,500 supporters. It is necessary to improve the ability of Japan's NGOs and anti-nuclear movements to make policy proposals for the promotion of renewable energy and efficient use of energy, collaborating with scholars to re-examine the separation of electricity distribution from electricity generation, liberalisation of the electricity market, integration of climate change policy and energy policy, regulation for nuclear safety, and reviewing of the nuclear fuel recycling policy.

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Popularising the nuclear
Mangaesque convergence in post-war Japan

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Abstract In the aftermath of the Fukushima Daiichi nuclear disaster of 3/11, one disputed issue has been the acceptance of precedent nuclear energy policies among the wider population, despite Japan being a country of high seismic risk and a nation that experienced atomic bombing on its population during World War II. This paper investigates how the transmedia constellation of the *mangaesque* intersecting manga, anime, pop-art, governmental educational characters and youth subcultures has been strategic in domesticating contested meanings of nuclear related issues, as well as being deeply informed itself in its ground-breaking stages (*Astroboy*-Tezuka Osamu, *Barefoot Gen*-Nakazawa Keiji, *Little Boy*-Murakami Takashi) by these issues, contributing ultimately to their naturalisation and hegemonic reproduction from 'below'.

1 (Post)nuclear Japan: nation, hegemony from 'below' and media mix

3/11 marks a date of no return for post-war Japan, not dissimilar to 9/11 for the USA. It is a numerical symbol that has united the nation through the shared experience of such a catastrophic and tragic event – to the extent that the term '3/11 Generation' has been coined – but has also divided it due to the many critical voices regarding the founding assumptions of its politics, society, and culture.[1] In particular, the devastating incident at the Fukushima nuclear power plant highlighted an apparent paradox. How was it possible to reach hegemonic consensus on nuclear energy policies in Japan in the post-war period, when it was the only country in the world to have suffered from atomic bombings on its cities? How was it possible to build 54 nuclear reactors in a densely populated and small archipelago

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1 See Anais Ginori's interview with Azuma Hiroki «La guerra contro la natura della 'Generazione 11 marzo'» (3.11 Generation's War against Nature), *la Repubblica*, 14 March 2011. For an overview of critical voices and initiatives regarding the Fukushima accident in Japan (translated into German and partially into English), see the website *Textinitiative Fukushima* (`http://www.textinitiative-fukushima.de/pages/die-initiative.php`). While for the official report on the incident that points to responsibilities in the Government and TEPCO (the operator of the Fukushima nuclear power plant), extending its accusation to 'Japanese culture', see The National Diet of Japan (2012), *The Official Report of the Fukushima Nuclear Accident Independent Investigation Commission*.

with such a high seismic risk? And lastly, how was it possible that even local residents living close to the nuclear power plants would perceive them as bright and friendly places?[2]

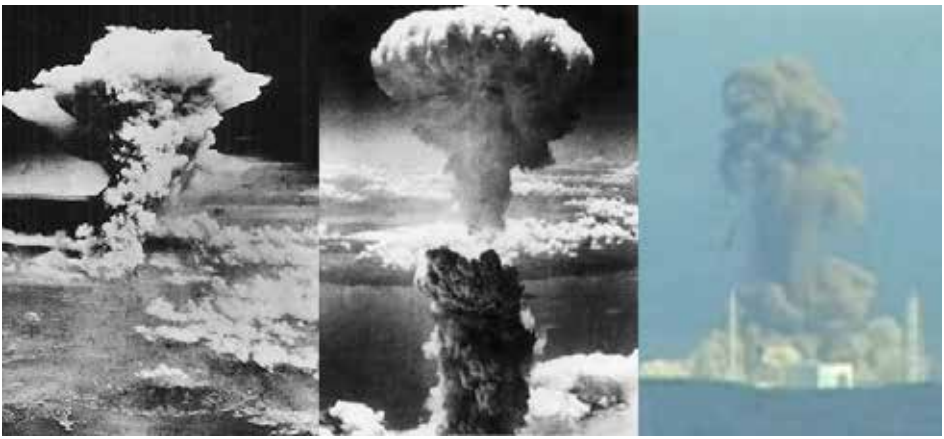
Until now, the investigation had mainly focused on how nuclear policies were institutionalised in different spheres, from the geo-political (USA-Japan relations), political (energy policies), economical (industrial lobbies) to the social (civil society, press) and geographical (marginalisation of non-urban areas) spheres.[3] However, as Antonio Gramsci reminds us, hegemony is not reducible to power imposed from 'above' in a unilateral way (Gramsci 1975). In order to be effective as a *historical bloc* of heterogenous social forces, hegemony requires a fluid and polyphonic process where both convergent and divergent discursive practices concur jointly to articulate each other.[4] In other words, the effectiveness of a historically constituted hegemony sustaining a given nation-state and its collective identity is proportional to its capacity to mobilise an active consent that is as diffused as possible among the wider population, intersecting cumulatively different levels of experience, from rational to more emotional ones. Hence, the utmost relevance of hegemony from 'below' in the modern age, and particularly of popular cultures as a strategic site for the (re)production and negotiation of any established order.

As convincingly put forward by Utsumi Hirofumi (2012) and Yoshimi Shun'ya (2012), discourses on the nuclear in post-war Japan have been extensively connected to national issues, popular self-images and dreams, making it possible to structure and domesticate most of the divergent perceptions. If in the immediate post-war period the prevailing image of Japan was that of the tragic victim of the Nuclear Age, symbolised by the atomic mushrooms of Hiroshima and Nagasaki, after the end of the USA-led occupation in 1952, and at the dawn of its first economic 'miracle', a shift occurred towards a more optimistic representation of the nation as a champion of peace, science, and technology. Under the hegemony of the US Cold War «Atoms for Peace» programme, Japan renounced, at least officially, the detention, production, and employment of nuclear weapons, which led to the declaration of the Three Non-Nuclear Principles (1971),

2 The initial research questions for this study are inspired by a personal communication from a former resident of the Fukushima area, who defined pre-3/11 perceptions among locals about the nuclear power plant as *akarui* (bright, friendly, cheerful). According to the informant, this was due not only to the economic benefits and job opportunities, but in particular for the visitors centre, festivals, concerts and other events organized by the Fukushima Daiichi and Daini nuclear power plant operator TEPCO (see also Sumihara 2002).

3 For a first overview of investigations in English after 3/11, see *The Asian-Pacific Journal: Japan Focus* (`http://www.japanfocus.org/`).

4 For an interpretation of the so-called 'nuclear villages' (*genshiryoku mura*) as a historical bloc, as a system of converging interests including the Government, bureaucracy, energy and construction industry, mass media, university, etc., refer to Itō 2011.



Figures 1a-c. Nuclear nation Japan: Hiroshima, Nagasaki, Fukushima

as well as the enactment of the Law on Atomic Energy (1955) inaugurating the nation's ambitious programme that would enable its most brilliant scientists to carry out nuclear research, and lead to the construction of the country's first nuclear energy reactors (figs. 1a-c).

This radical change of direction was also accomplished thanks to the strict separation of the two institutionalised discourses on the nuclear (Utsumi 2012). The first discourse is the nuclear as Alterity, as a dangerous, devastating and evil *weapon*, the source of mass destruction and lethal contamination. This alterity has been largely removed and exorcised by projecting it into the past (World War II) or into the Outside, or into something of foreign, monstrous or alien origin (the USA, the USSR, or Godzilla-like monsters in SF). The second discourse is the nuclear as Identity, as a pacific, safe, clean and good *energy*, directly projected onto present-day Japan, and expressing the hope for a bright, technological and wealthy future.

In pre-3/11 Japan, it was possible to be against the nuclear as a *weapon* for historical or ideological reasons (Hiroshima and Nagasaki municipalities, *hibakusha* or victims of the bombings, pacifist movements, labour unions, left-wing parties, intellectuals, students, etc.); or, on the contrary, to be against the nuclear as an *energy* for more contingent and local reasons (residents' associations, farmers, fishermen, mothers' associations, environmentalists, etc.). These two discursive worlds have tended to remain largely separate, even in the immediate post-3/11 scenario, to avoid risking the revival of the deep-rooted historical contradictions that have led post-war Japan towards its economic miracle and social stability, under the shadow of the US nuclear umbrella.

However, Japan also holds other, fortunately less tragic records in addition to the holocaust of Hiroshima and Nagasaki; they include the extraordinary development of its visual and consumer cultures, at least in quantitative terms. The film industry in the 'golden age' of the late 1950s produced more films than the USA, while, in the following decades, the baton would be passed to the manga, anime, and videogame industries (Desser 2006, p. 25; Storper 1994, p. 209). Since the 1970s, the manga market has consistently outperformed the European and North-American comics markets put together, and Japan has enjoyed primacy in both its videogame industry (ca 50% of world market in 2001) and anime industry, with an estimated production of ca. 60% TV series broadcast in the world (JETRO 2005). The Japanese films with record attendance are not live-action movies but anime films; in fact, the most successful films in Japanese box office history are all films by Miyazaki Hayao (*Spirited Away, Howl's Moving Castle, Princess Mononoke*).[5]

Concurrently, the globalised success of Japanese popular cultures in the 1990s has drawn attention to what may be called 'J-culture' in relation to the wider constellation of multiple media platforms, including manga, anime, videogames, graphic design, character goods, pop music, youth subcultures, etc. (Berndt, Richter 2008). It is no surprise that in the past decade the Government itself has appropriated the cultural contents industry as a cornerstone for the *Cool Japan* strategy in order to brand a new image of Japan in the 21st century, and to implement the nation's soft power on the international stage (Daliot-Bul 2009). In other words, popular cultures in post-war Japan have developed cumulatively into a transmedial universe where the trajectories of hegemony from 'above' and from 'below' are disseminated and intertwined along the circuits of its increasing *media mix*:

> The 'media mix' is a popular and industry term [in Japan] that refers to the practice of releasing interconnected products for a wide range of media 'platforms' (animation, comics, video games, theatrical films, soundtracks) and commodity types (cell phone straps, T-shirts, bags, figurines, and so on). It is a state of what we might call the 'serial interconnection of media-commodities' – wherein commodities and media types do not stand alone as products, but interrelate and communicate, generally through the existence of a principal character and narrative world. (Steinberg 2009, p. 4)

Thus in order to investigate the hegemonic range of collective discourses on the nuclear, this study relies on the basic assumption about the strategic relevance of the mutual relationality between prevailing representations

5 See `http://movie.goo.ne.jp/ranking/boxoffice/20080902.html` (2008-10-04).

of the nuclear, and the increasing transmedial environment of Japanese popular cultures. This perspective has been largely unnoticed or limited to the examination of single manga or anime works, with particular reference to the immediate post-war period. Firstly, attention will be paid to the specific *mangaesque* or *manga-related* media convergence of visual cultures in post-war Japan, from the 1950s to the 2000s.[6] It is revealing that the three works addressed in the following chapter do not only rely completely on nuclear related themes, but also mark the relevant stages of the *mangaesque* convergence.

However, *media mix* in its extended version as media convergence (Jenkins 2006) not only involves cross-cutting old and new media, high art and popular cultures, but also blurs the division between producers and consumers, generating new intersections between nation-state ideology, capitalistic production, ludic entertainment, and participatory appropriation. Accordingly, this paper will explore more recent and less well-known developments of the *mangaesque* convergence related to the cute personification of the nuclear: from governmental-didactic spheres addressing children to the more or less amateur spheres of *otaku* cultures (hardcore appreciators of manga, anime, videogames, figurines, etc.).

2 *Mangaesque* convergence of the nuclear: *Tetsuwan Atomu*, *Hadashi no Gen*, *Little Boy*

Manga played a historic paradigmatic role in the formation of media convergence in post-war Japan, transforming it into the so-called 'paradise of comics'. In the 1990s, the period of its greatest diffusion as a printed media, manga sales accounted for almost 40% of all items published in Japan (Schodt 1996; JETRO 2005). Manga has for decades been the main cultural hypotext in Japanese popular cultures, providing the original reference (narratives, characters, styles, settings, etc.) for an infinite chain of adaptations in the form of TV anime series and films, videogames, live action films, light novels, character goods, etc.; since its further transformation in recent decades, this role has been increasingly shared by anime and videogames.

The *mangaesque*, as well as contributing to some of the distinctive graphic styles displayed by Japanese popular cultures, provides other aspects, which are functional to the convergent development of 'J-culture': interconnection potential (intermedial grammar of comics in terms of reading-viewing temporality, and specific connection between images, texts, and

6 I owe the term *mangaesque* and the definition of its features to Jaqueline Berndt (Berndt 2007, 2012). It is used here in a wider sense as 'manga-like' or 'manga-related', focusing on its mutual connection with media convergence.

Figures 2a-b. Japan as nation of Peace, Science, Progress: cute nuclear superhero *Tetsuwan Atomu* (or *Astroboy*, 1951-1958; 1963-1966) by Tezuka Osamu

readers), post-critical ascertainment (preference for what is already known and emotional identification, such as the case of cute icons), extreme codification of signs and readers' conventions (for instance, high level of character artificiality/virtualisation), aesthetic hybridity (intertextual references to Euro-American, Asian and Japanese sources) (Berndt 2007, 2012).

Cute superhero Atom is a Pinocchio-like nuclear energy-driven flying robot of the 21st century, with superhuman strength and abilities, perpetually engaged in saving the earth and humankind from alien invasions, giant monsters, natural catastrophes, etc. He is the main protagonist of the manga series *Tetsuwan Atomu* (lit. «Ironfist Atom», English version *Astroboy*, 1951-1958), which represents a turning point in the development of modern manga (figs. 2a-b). The birth of Atom in the 1950s is informed by the innovations introduced by his author Tezuka Osamu (1928-1989), celebrated as the 'God of manga', which would strongly affect Japanese comics in the following decades: cinematic techniques (dynamic framing, editing, tracking shots), *story manga* (long narratives unfolding through thousands of pages, with complex plots, psychological introspection, universal themes, visionary scenarios), *kawaii* or 'cute, adorable' character

style (disproportionate heads, huge eyes, rounded limbs). They all jointly contributed to a kind of 'visualised narrative', to the fluid, dynamic and visually focussed aspects of mainstream manga, distinguishing it from the more static and text ridden 'illustrated narrative' informing the majority of Euro-American comics (Schodt 1996, p. 26).

Moreover, *Tetsuwan Atomu* was the first manga to be adapted to a TV anime series format (1963-1966). The concurring transmedial transposition on an industrial scale marks the pioneering stage of the media mix in Japan, inaugurating the local version of media convergence of multiple media platforms and serial interconnection of media-commodities (Steinberg 2009). More importantly, the series' 1963 broadcast not only marked the entrance of television into children's hearts, but also promoted Atom as the most popular manga/anime character in post-war Japan, as well as the cutest imaginable icon capable of exorcising the still vivid memory of the nuclear holocaust. In other words, Atom contributed to popularising the official post-war representation of the nuclear as Identity, as a symbol of the new Japan, as a pacific energy in the nation's service for a techno-scientific and wealthy future.

A further turning point in the following decade is the manga series *Hadashi no Gen* (1973-1987, Engl. *Barefoot Gen*) by Nakazawa Keiji (figs. 3a-b). Together with its full-length anime adaptations in 1983 (dir. Mori Masaki) and 1986 (dir. Hirata Toshio), it arguably represents the most read, viewed, or listened-to narrative in Japan on the atomic bombing of Hiroshima. The manga is inspired by the author Nakazawa's childhood experience in Hiroshima, and describes the sufferings of the protagonist Gen, a boy who, together with his family, endures incommensurable pain in order to survive within a completely devastated and nuclear-contaminated city. Notwithstanding initial difficulties in guaranteeing continuous publication, due to the crude graphic realism, the widespread critical acclaim, especially by peace movements, both national and international, marked the entrance of manga as didactic material in school libraries. In other words, *Hadashi no Gen* contributed to the institutionalised legitimation of manga to the status of 'culture' or 'serious culture' in the early 1980s, as a medium not necessarily reducible to commercialised or evasive entertainment (Yoshimura, Fukuma 2006, Berndt 2012).

But more importantly, this extensive approval contributed to further popularising the other official discourse of the nuclear in post-war Japan. If Atom became the national popular symbol of the nuclear as Identity (energy, peace, technology, progress), then *Hadashi no Gen* had a similar role for the complementary representation: that of the nuclear as Alterity (weapon, war, holocaust). Thanks to the projection of collective fears induced by the nuclear toward an external origin, both real (the USA) or imagined (monsters, aliens), or toward the past, the nation can be evoked as a passive victim of some foreign, mysterious or supernatural catastro-

Figures 3a-b. Japan as nuclear victim: *Hadashi no Gen* (or *Barefoot Gen*, 1973-1987) by Nakazawa Keiji

phe, not as an active and imperialist agent of World War II. Thus, all attention and affective investment can be retrospectively channelled towards internal and individual sufferings, as well to the heroic efforts made by the protagonist in order to survive unimaginable hardships and human losses.

Eventually, a third and more recent post-modern turning point emerged regarding the *mangaesque* convergence of the nuclear. *Little Boy*, the name given by the American pilots to the atomic bomb dropped on Hiroshima, is the title chosen by neo-pop artist and curator Murakami Takashi (1962-) for his huge multimedia exhibition *Little Boy: The arts of Japan's exploding subculture* (Murakami 2005; fig. 4). The show, which was inaugurated in 2005 in New York, definitively consecrated Murakami to international stardom status, making him the most acclaimed living Japanese artist worldwide. Murakami, together with other Japanese neo-pop artists, is accredited with the elaboration in the early 2000s of the so-called *superflat* aesthetics, a deliberate and ironic crossover between traditional fine arts, and more or less commercialised youth subcultures (related to manga, anime, videogames, monster toys, figurines).

For the *Little Boy* exhibition, Murakami and art theorist Sawaragi Noi, argue that in post-war Japan, the Pacific War, or World War II, was most-

Figure 4. Japan as post-modern simulacrum: *Little Boy: The arts of Japan's exploding subculture* (2005) by Murakami Takashi

ly visible and elaborated in urban youth cultures, like the male-oriented *otaku* cultures (Sawaragi 2005). They acknowledge the gradual removal or repression of public discussion about the Pacific War, especially after the defeat of Left-wing radical politics in the early 1970s, in favour of an ideology of peace, economic growth, and social stability. According to Murakami and Sawaragi, the removal of issues related to Japan's military invasion of Asia, the contradictions of the Peace Constitution and the role of the Emperor, and the atomic bombing by the USA have all caused a kind of distorted historic condition: a non-historical void capsule called 'Japan'. After the 1970s, all the unsettling anxiety, fears, trauma, and sense of guilt triggered by the Pacific War were removed from the public field, and were shifted and then liberated in the less controlled fields of subcultures instead. That is why popular cultures have developed a visual style so full of excesses, exaggerations, distortions: hyper-infantilism, hyper-sexuallity, hyper-violence. An exploding visual culture nurtured by its suspension from historic and empirical reality. In other words, the unresolved issue of the Hiroshima and Nagasaki atomic bombings has become an ambivalent energy, crosscutting aesthetic conventions and media platforms of Japanese popular cultures.

Apart from Murakami's own works (paintings, sculptures, installations), the exhibition includes a wide range of the most popular icons of post-war Japan, displaying monstrous, *kawaii*, SF, cyberpunk, post-apocalyptic versions of the nuclear: from the radioactive giant dinosaur Godzilla to the cute nuclear-robot Doraemon, from the *Battleship Yamato* to the giant mushroom cloud over Tokyo in *Akira*. Despite the parodic and critical

intentions of the curator, it may be argued that this exhibition addressing a Euro-American audience has further contributed to aestheticising and spectacularising not only the transmedial constellation of Japanese popular cultures, but also the experience of the atomic holocaust. Representations of the nuclear are like post-modern simulacra, becoming light, melting and being reconfigured within the increasingly globalised interconnections of *mangaesque* media convergence. In the end, these dispersed images paradoxically appear to be everywhere and nowhere, almost devoid of concrete referentiality and explicit ideologies, and consequently, of critical potential.

3 Nuclear anthropomorphism: from institutional *kawaii* to *moe* parody personification

The ubiquity of the nuclear as a simulacrum may become even more apparent if we turn our attention to the less mainstream and aestheticised spheres of the *mangaesque* convergence. The following examples relating to cute character-fication or personification illustrate how hegemony exercised from above by institutional agents of nuclear energy policies has been extended to a wider range of transmedial experience, addressing the bottom dimension of consent, in particular the younger part of the population.

Following the Chernobyl nuclear incident of 1986, which stimulated increasingly anti-nuclear media reportage, there was a dramatic shift in the approach adopted by ministries and commercial energy producers in order to reassure public opinion, and invoke sympathetic responses among local residents near nuclear power plants (Aldrich 2008). For instance, in 1987, the Tokyo Electronic Power Company (TEPCO) commissioned manga and novel author Uchida Shungiku to draw the character Denko Girl (Denko-chan), who has since become the official face of the company, together with her slogan «Be careful with electricity!» (figs. 5a-c). But more relevantly, from the early 1990s onwards, most nuclear power plants began to be equipped with futuristic multi-store visitor facilities offering a wide range of recreational opportunities: from science museums, exhibitions, and laboratories to cinemas, videogame centres, local product shops, swimming pools, baseball courts, etc. While past visitors facilities tended to be serious, dark and overtly didactic about the functioning of the reactor, and the usefulness and safety of nuclear power, the new ones articulate the same rhetoric in a much more engaging way, creating a friendly and bright atmosphere (Sumihara 2003).

A major attraction of the info-tainment tours provided by the new facilities are multi-media, high-tech, interactive installations, mediated by a wide range of *mangaesque* personifications of the nuclear. These cute characters function as official guides and protagonists of the installations, offering a multi-modal and transmedial experience, both as virtual

Figures 5a-c. Corporate character branding: Denko Girl by Tokyo Electronic Power Company (TEPCO)

manga/anime/videogame characters and as material mascots or costumed performers (*kigurumi*) during exhibitions or festivals at the power plant. The Japan Atomic Energy Agency (JAEA) has been among the most active in designing and employing characters such as Pluto Boy (Pluto-kun), Uran Boy (Uran-boya), Natrium Girl (Natrium-chan), displayed at the Atom World nuclear exhibition hall at the Tōkaimura nuclear power plant (figs. 6a-c).[7] And until March 2011, even the Agency of Energy (Ministry of Education, Culture, Sports, Science and Technology) had an entire website on nuclear energy called Atomin dedicated to children from kindergarten to high school. Atomin is a cute teacher character, who uses videos and guidebooks to explain what nuclear power and reactors are, and why Japan needs nuclear power to contribute to national and international wealth (fig. 7).[8]

Currently, the proliferation of character/mascot-based corporate or

7 For an investigation on nuclear narratives through cute characters, see Occhi 2011.

8 See `http://atomin.go.jp` (2011-04-24). At present an image of the homepage is available at `http://techpr.cocolog-nifty.com/nakamura/images/radioactive/20120210-atomin-top.png` (2014-03-01).

Figures 6a-c. Pluto Boy, Uran Boy, Natrium Girl by Japan Atomic Energy Agency (JAEA) for the exhibition hall *Atom World* at the nuclear power plant of Tōkaimura

power plant branding, and cute personification of single atomic elements for PR or didactic uses point to a greater shift towards 'superficial' de-narrativisation of the *mangaesque* media scape that has taken place in recent decades. Since Tezuka's classic elaboration, the cute, or so-called *kawaii* style framed by complex narratives has been a defining paradigm of manga and anime in post-war Japan. But since the 1970s, together with growing intermedial adaptation, franchising and merchandising of manga characters, *kawaii* characters have become more and more independent of their original manga character. The most famous commercialised example is Sanrio's Hello Kitty, the white cat originally designed as a character without a story, manga or anime that has since become a globalised icon of Japanese cuteness.

This kind of character-fication of the Japanese media scape has intensified in the last two decades, and has now entered a new stage. The change was pointed out by cultural critic Itō Gō, who declared in a recent book that «Tezuka is dead» (Itō 2005). Itō builds on the distinction between '*kyarakutā*' and '*kyara*'. *Kyarakutā*, best symbolised by Tezuka's manga and anime protagonists like Atom, are characters with a context and complex

Figure 7. Institutional character branding of the nuclear: Atomin for the educational website on nuclear energy by the Ministry of Education, Culture, Sports, Science and Technology

personality that are firmly grounded in a narrative; *kyara,* on the other hand, are independent of any particular context or narrative, thereby becoming available for infinite uses beyond their context. A *kyara* is created purely as an icon, without necessarily having a narrative development or linkage to an original story. His or her 'personality' is revealed through the representation of form. This design-driven and visually-led icon has no back-story or overarching narrative, so it can be used just like a sticker, attached to almost any object, attracting purely on the basis of its appearance (figs. 8a-c).

Urban youth cultures such as male-oriented *otaku*, have been indicated as one of the main social actors contributing to the shift from *kyarakutā* to *kyara*. Cultural theorist Azuma Hiroki (Azuma 2001) has focused on the generational break introduced by anime and SF fans born in the 1980s, whose main activity has moved to the Internet and web surfing. His core argument is that these pro-sumers of the digital age employ a new post-modern mode of reading, consuming, and producing media texts that he terms «data base consumption». Instead of relying on modernist grand narratives controlling texts through 'deep' or hierarchical meanings, these

Figures 8a-c. From *kyarakutā* to *kyara*: Tezuka's Atom, Sanrio's Hello Kitty, *otaku* oriented *moe* icons

users «read up texts» by accessing a heterogeneous database of settings and character elements, which can be freely dissected and reassembled. For instance, some recurrent elements of the resulting new icons are giant, pupil-less eyes, glossy skin, small (or no) breasts, maid outfits, cat ears, a sweet voice, and an innocent and pure personality.

The combination of these apparently bizarre elements, including ironic adaptation or parody of known mainstream characters, work together to inspire among *otaku* the ambivalent and complex affect of *moe*: an intense sensation of mingled protectiveness, empathy or yearning («sprouting») towards a fictional image or *kyara* (Galbraith 2009). *Moe* elements are the appealing, codified, recurrent aspects of *mangaesque* characters, plots and settings that evoke such feelings. At first glance, these *kyara* may appear to be shaped by conventional cute or *kawaii* style. But while *kawaii* still refers mostly to a desexualised, pure innocence-inspiring image, *moe* style is more sexualised or eroticised. *Moe* affect can be considered as a conflation of child-like innocence and adult desire, an ambivalent and polymorphous stimulation of pure, protecting and nurturing feelings for cute and helpless characters (*rorikon* or Lolita Complex), as well as stimulation

Figures 9a-c. *Moe kyara* as polymorphous and sexualised cuteness

of desire for eroticised young girls (*bishōjo* or «beautiful girls» genre) (figs. 9a-c).[9]

Moe-inspired fans developed an even purer expression of sexualised cuteness known as *moe* anthropomorphism (*moe gijinka*): the personification of inanimate objects or concepts as girls (Thompson 2009). Operating systems (Os-tan), voice generating softwares (Hatsunemikku), war machines (*mechamusume*), trains, food, convenience stores, history, nation-states, everything imaginable has been rearticulated as *moe* and transfigured into cute and beautiful girls among *otaku*.[10] And this process eventually incorporated nuclear-related issues and elements.

An illustrated guide to the Constitution of Japan, jointly authored by a lawyer and an illustrator, is characterised by the *mangaesque* anthropomorphism of all articles as *moe*-inspiring *Constitution Girls* (Morita; Hōgaku Future Labo 2011; figs. 10a-b). A double page is dedicated to each article, personified by a *kyara* on the left page and quotation of the article with textual comments on the right page. For instance, Art. 9 Girl (Kyūjo-chan) personifies the core article of Japan's peace constitution, which states that the nation will renounce use of military force to resolve international conflicts, and will, therefore, not maintain its own army (pp. 26-27). Art. 9 Girl stands against the background of a destroyed cityscape (recall-

9 *Moe* has been widely appropriated also among female-oriented subcultures, like the *fujoshi* (lit. «rotten women»), by combining cute *shōnen* and preadolescent characters (*shotakon* or Shōtaro Complex), as well as emphasising their intimate male-to-male relationality (Galbratih 2011).

10 For an investigation into female-oriented nation anthropomorphism in the manga *Axis Powers Hetalia*, see Miyake (2013).

Figures 10a-b. *Moe* anthropomorphism: cover of *Constitution Girls* (2011) and Article 9 Girl (Kyūjo-chan)

ing Hiroshima or Nagasaki), saying «I hope for eternal peace». The comment on her states that she is a very helpless and pity-inspiring creature, with weak legs and bare feet making it hard for her to walk by herself, and that like a flower-blossom she is a very gentle creature.

Element Girls is a similar illustrated guide, where all the chemical elements in the periodic table are personified as *moe* inspiring girls (Mitsuda; Studio Hard De Luxe 2008; figs. 11a-c). They include Uranium Girl, with the curious title caption «Uranium has also been used in the past in glass factories»; the only mention of military uses for atomic bombs is in the written text below (p. 190). Plutonium Girl is introduced by the title caption «Like the king of the land of the dead, a girl with outstanding destructive powers». She holds a long sickle and asks, «Who wants to be cut next?», while the text comment contains a brief mention of the fact that a plutonium bomb was dropped on Nagasaki (p. 191). Radium Girl is displayed in a cat pose saying «Listen all of you... you are all my prey». Her title caption is: «Be careful of the dark, the radiation girl may be aiming at you» (pp. 184-185).

On the one hand, a year after the Fukushima nuclear incident, most of the characters or *kyara* promoting atomic branding commissioned by governmental agencies and nuclear industry had been removed from websites, while school tours to the recreational facilities of nuclear power plants were temporarily cancelled. On the other hand, it is important to remember that *kyara*, anthropomorphism, and sexualised cuteness, such as those displayed for and by *moe* longing *otaku* cultures, are not necessarily reducible to infantile, escapist, or paedophile fetishes for post-modern consumption and entertainment. In contrast to the more unilateral didacticism or info-

Figures 11a-c. *Moe* anthropomorphism of the nuclear [from left to right]: cover of *Element Girls* (2008), Plutonium Girl, Radium Girl

tainment of the institutional nuclear *kyara* directed at children, parody has become one of the defining aspects of emergent youth cultures. Parody, including its eroticised versions of *moe* anthropomorphism examined above, always introduces a kind of ironic detachment with regard to its hypotext. Repetition, adaptation or deliberate transfiguration can refer to a specific original text, character, or style, but also to a wider range of conventional or hegemonic discourses, narratives, and meanings.

While in the immediate post-Fukushima scenario it is difficult to find *mangaesque* mainstream works critically addressing nuclear energy policies, or even addressing them at all, it is in the more amateurish and loosely controlled digital network of the Internet that nuclear related works have been visible, even in the mostly de-politicised or post-ideological circuits of *otaku* cultures. For instance, on 20 April 2011, just one month after the Fukushima incident, an illustrated poster parodying the myth of nuclear power safety was posted on the Japanese online art website pixiv, which has a total of about 4 million users (fig. 12).[11] The title caption «Poster Enlightenment of Nuclear Power Safety» rephrases the national contests organised over the past twenty years by the governmental Japan Atomic Energy Relations Organization for schools to submit posters on nuclear energy,with the best works receiving cash prizes (fig. 13).

The National Poster Contests are the main hypotext of the parody, which is interlinked throughout the illustration to many other parodies, like the

11 See Inono: `http://www.pixiv.net/member_illust.php?mode=medium&illust_id=18273983` (2011-06-24).

Figure 12. Post-Fukushima subcultural parody of the nuclear: Pluto Girl in the *Poster Enlightenment of Nuclear Power Safety* by Inono (2011)

almost invisible phrases repeated on the background: «Japanese nuclear power is safe, Japanese nuclear power is safe». In addition, the poster is scattered with famous atomic branding mascots, like the JAEA Pluto Boy with a speech bubble containing his most controversial catchphrase from a 1993 didactic video: «Nuclear power is safe, Plutonium is safe, even if you drink it. It is even good for your health». Then the author adds, «Let us all submit our illustrations on nuclear power safety and win 5,000,000 yen».[12] On the bottom left is Denko Girl, the official mascot of the Fukushima power plant owner TEPCO, saying her most famous phrase, «Be careful with electricity!», adding «And don't complain if we raise the cost of your electricity bills». And on the bottom right, there is a white deer character saying, «I like, I love Denko Girl». But the real protagonist is the gigantic Pluto Girl (Puruko-chan) at the centre of the poster, a new entry in nuclear anthropomorphism. She is a typical *moe* kyara, a cute (pre)adolescent wearing lin-

12 The PR video *Pluto Boy, the pal you can count on* (11 min) was commissioned in 1993 by the semi-governmental Power Reactor and Nuclear Fuel Development Corporation (today JAEO). It was projected online and in nuclear power plant visitors facilities until 3/11. See: `https://www.youtube.com/watch?v=Q_6yomWh05o` (2012-01-10).

Figure 13. The 17th Nuclear Energy Poster Contest 2010 for schools organised by the Japan Atomic Energy Relations Organization (JAERO)

gerie and no trousers, but with a broken cement brick attached to her belt. Her only comment is an onomatopoeic «Boom!», indicating her exuberant explosion though the cement bricks of the Fukushima nuclear power plant.

4 Conclusions: towards new frontiers of nuclear desires through *mangaesque* media convergence?

In this study, the mutually constitutive process between institutionalised representations and the growing transmedial environment of Japanese popular cultures was the starting point for an investigation of the hegemonic effectiveness of collective discourses on the nuclear in post-war Japan. The specific focus on the *mangaesque* aspect of Japanese media convergence has shown how some of its most significant stages are deeply inspired by nuclear-related issues: the pioneering media mix introduced by Tezuka Osamu's manga series *Tetsuwan Atomu* (1951-1958), the cultural legitimacy acquired by manga as a medium thanks to Nakazawa Keiji's manga series *Hadashi no Gen* (1973-1987), and the popart appropriation of the *mangaesque* and its international branding by Murakami Takashi's art exhibition *Little Boy* (2005). In other words, from the 1950s to the 2000s, discourses on the nuclear have been constantly reproduced through intersecting trajectories, both from 'above' and 'below'.

On the one hand, this has contributed to the popularising effect of hegemonic consent on the nuclear in relation to the nation, in terms of identity (peaceful and good energy, scientific progress = the nation as champion of the nuclear), alterity (dangerous and evil weapon, the past = the nation as victim of the nuclear), or post-modern parody (ambiguous, aestheticised = the nation as simulacrum of the nuclear); on the other hand, this study suggests that it is the very *mangaesque* convergence of nuclear-related issues, cross-cutting different media and modes of production, representation and consumption that cumulatively affects how the nuclear itself is perceived and experienced. *Mangaesque* convergence has activated a wide range of signifying practices and emotional mobilisation, which still remain unexplored by academic investigation, especially in relation to its most recent transformations and implications.

Thus, this study has addressed new forms of common sense among younger generations of the digital age, such as the increasing cutification, character-fication, and anthropomorphism of the nuclear. This process is arguably functional to the further dissemination of multiple media platforms, and the serial interconnection of media-commodities, and has been examined both in the institutional-didactic configuration from 'above', as well in the more subcultural and amateur pro-sumption from 'below'. It is, in particular, among the latter, such as the *otaku* cultures, that it is possible to observe emergent forms of *mangaesque* media convergence, which are

intertwined with the re-negotiation of prevailing meanings of the nuclear. *Otaku*-like pro-sumers are on the frontline in exploring new technologies of desire as well as the protagonists of the wider paradigm shift «from medium-specific content toward content that flows across multiple media channels, toward the increased interdependence of communications systems, toward multiple ways of accessing media content, and toward ever more complex relations between top-down corporate media and bottom-up participatory culture» (Jenkins 2006, p. 243).

Nevertheless, it is the very parodic intermingling of cute anthropomorphism and sexualised info-tainment displayed by these subcultures with regard to the nuclear that requires more in-depth examination. Against an overreading of single texts, images, and practices, it may be useful to remember that parodies can be characterised by a paradoxical relation to their founding hypotext: imitative confirmation in terms of pastiche as well as satirical impulse or critical inversion (Jameson 1991, pp. 16-19). And this refers, in general, also to the ambivalent relationship between youth subcultures and their hegemonic society of belonging.

Finally, one open question in the post-Fukushima scenario is whether emergent forms of *mangaesque* media convergence related to the nuclear will move towards conformity and passive reproduction of an established order, or, on the contrary, activate more divergent and critical readings and practices.

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From malnutrition to radiation

Reviewing food security and food safety in Japan (1945-2013)

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Abstract This paper looks into three aspects of food security in Japan from the 1940s to the present. It starts with the food shortage during the immediate post-war period, then moves on to the issue of a dramatically declining food self-sufficiency ratio and the safety of imported food, and finally concludes with the 2011 Tōhoku earthquake that led to anxieties about radioactive contamination of domestically-produced food.

1 Introduction

Since 1918, the year of the Rice Riots (Kome Sōdō), the issue of food security has remained at the forefront of public concern in Japan. The riots, which erupted in major Japanese cities after the outbreak of World War I when export restrictions on Southeast Asian rice by the British and French colonial authorities caused rice shortages, provided the first incentive for structural changes in the pattern of rice imports in Japan. They served as a direct stimulus for the Japanese Government to aim to make the Empire self-sufficient in food, a goal achieved by the 1930s, with the colonies of Taiwan and Korea supplying over 95 per cent of Japanese rice imports (Cwiertka 2006, p. 121).

A decade after reaching a critical point in the late 1940s, the food shortage disappeared as a problem. The issues that would now haunt Japan were food self-sufficiency and food safety. This paper provides an overview of these three aspects of food security in Japan from the 1940s to the present. It starts with the food shortage during the immediate post-war period, then moves on to the issue of a dramatically declining food self-sufficiency ratio, and the safety of imported food, and finally concludes with the anxieties about radioactive contamination of domestically-produced food following the 2011 Tōhoku earthquake led to.

2 Food shortage

The food shortage is a key factor in the history of the immediate post-war period. It features as a backdrop in practically every monograph that deals with the second half of the 1940s, regardless of research focus. All but

a few studies do not recognise food shortage as the fundamental condition that affected political and economic strategies of the time, as well as leaving a lasting imprint on the social and cultural development of Japan. The quest for food stood central to post-war life: from orderly lines at rationing points and meal coupon restaurants to rowdy food stalls at the black market (*yamiichi*) and crowded trains carrying city dwellers to the countryside to barter their belongings for food (*kaidashi*). Taking a variety of different forms, the 1940s food shortage assumed a prominent place not only in the everyday practices of the time, but has also become engraved in the public memory of the decade (See Havens 1978; Cook and Cook 1992).

When describing the food-supply situation in urban Japan between 1945 and 1947, expressions such as near-starvation, «on the verge of crisis», and «narrowly averting famine» are frequently used (Takemae 2002, p. 409). It is the clamour associated with the prospect of famine – rather than reliable statistics sustaining such predictions – that is responsible for leaving a historical impression of large-scale starvation among urban Japanese during the early years of the Occupation. Following the surrender, the Japanese authorities repeatedly issued warnings of mass starvation; one of the first, announced on 15 October 1945, predicted that 10 million Japanese might starve to death if food imports were not immediately forthcoming. Such announcements, along with understatements of crop yields and underestimates of stocks of staple crops, were the strategies employed by the Japanese Government to ensure sufficient flows of food aid. Warnings about impending famine, as Chris Aldous explains, «shaded into declarations of actual starvation, with the imminence and scale of the problem perhaps escalating the rhetoric» (2010, p. 255). Although the actual food relief had fallen far short of the minimum amounts requested, the predicted disasters did not occur.

While mass starvation did not take place, hunger and malnutrition did prevail in the immediate post-war years, especially in the cities. Symptoms such as weight loss, anaemia, chronic diarrhoea, delayed menstruation, and stunted growth in children were recorded in nutritional surveys conducted by the Welfare Ministry between 1946 and 1948. The urban populations experienced the severest food shortages. While available food was becoming increasingly scarce, over six million Japanese were repatriated from the colonies and occupied territories during the first two years following the surrender – additional mouths to feed that had thus far relied on the food resources produced outside of the four main islands (Cwiertka 2013).

Taking a variety of different forms, the food shortage of the 1940s not only assumed a prominent place in the everyday practices of the time, but has also become engraved in the public memory of the decade. During the 1950s and 1960s, the return to a rice-based diet served as the symbol of economic recovery, while the rising prosperity of the following decades was expressed in culinary gentrification and the increasing appreciation of foreign culinary trends.

3 Food self-sufficiency

As the Japanese economy began to recover after the outbreak of the Korean War, the food supply situation stabilised. However, a new problem began to emerge. Japan's food self-sufficiency ratio declined at a steady rate of nearly 2 per cent per year, dropping to 55 per cent by 1973 (MAFF 2008, p. 88; Kako 2009, p. 2).

The major reason for this decline was a steadily diminishing consumption of rice combined with a considerable increase in the demand for animal foods. Livestock production made Japan increasingly dependent on imported animal feed – mostly maize and soybeans from the US. The Japanese Government charged low tariff rates on imported animal feed with the intention of providing the Japanese livestock industry with a boost by using cheap imported animal feed. The same rationale was used to justify low tariffs on oilseeds, which enabled production of inexpensive oils and fats, which were also in high demand.

By the first oil crisis of 1973 a shift had already taken place from a grain-based diet characteristic of low-income societies to a diet relatively high in protein (characteristic of high-income countries), accompanied by a slow down in the income growth rate. These two developments resulted in a stagnating decline of the food self-sufficiency rate; between 1974 and 1984 it only declined by 2 per cent, from 55% to 53% (Kako 2009, p. 5).

According to Kako Toshiyuki, who is affiliated with the Department of Food and Environmental Economics at Kōbe University, the main cause of the further decline of Japan's food self-sufficiency during the late 1980s and early 1990s – 53 to 43 per cent (2009, p. 6) – was the rising value of the yen (from 235 yen per US dollar in 1985 to 94 yen per dollar in 1995). The price index of imported agricultural products declined by 44% during this period, and imports of livestock products, fish, shellfish, and fruits increased due to the sharp decline in the prices of these products. The average daily per capita supply of calories from rice further declined, as Japanese population embraced global culinary trends.

After the burst of the bubble economy in the early 1990s, the rate of increase of food imports decelerated due to the loss of the high yen effect. Yet, as Kako explains, Japan's food self-sufficiency ratio continued to fall, reaching 42% in 1996 and 40% in 2005 (2009, p. 7). Other factors were at play here. While the Japanese agricultural and fishery production increased in the first and second period (1960-1984), it experienced a sharp decline after 1986. This decline in agricultural production was intricately related to the reduction in rice production, since the demand for rice had been continuously falling since the end of the 1950s. The second important factor was the rise of food processing and restaurant industry. By 2000, pre-prepared foods and eating-out comprised 27% of the total food expenditure of Japanese households. The percentage of imported agricultural

products used in the food processing and the food service industry has been steadily increasing. A related factor was a worldwide trend towards agricultural trade liberalisation, exposing Japanese agriculture to growing international competition.

Japan is not the top net importer of agricultural products in the world (it follows the EU, US and China), but it ranks lowest in terms of food self-sufficiency among countries with a population of more than 100 million (MAFF 2013). The Japanese Government has taken various steps to tackle the problem. In 1999, it enacted the Basic Law on Food, Agriculture, and Rural Areas, followed a year later by the Basic Plan on Food, Agriculture and Rural Areas (Kako 2009, p. 11). Since no results were achieved, in 2005 the Food Self-Sufficiency Ratio Improvement Council was established, and the so-called New Basic Plan (Shin Kihonhō) was conceived, setting a new target intended to raise food self-sufficiency ratio to 45% by 2015. For example, the Basic Plan for Food, Agriculture and Rural Areas, the Japanese Government aims to increase feed self-sufficiency to 38% by 2020 through the production of eco-feed via the implementation of recycling loops. Since domestically raised livestock fed on imported feed does not count as domestic in origin, the high imports of feed also caused a decline in the self-sufficiency rate for livestock products (Marra 2013).

In 2005 the Government passed the Basic Law on Food Education (Shokuiku Kihonhō), which aimed to convince the Japanese public to buy local food products, and to develop a greater consciousness for a distinct Japanese food culture as part of Japanese national identity, and thus to counterbalance the high dependency on food imports by returning to domestic food products (Assman 2009, p. 4). An important tool in this strategy was the so-called Food Action Nippon campaign, launched by the Ministry of Agriculture Fisheries and Forestry (MAFF) in 2008, with the objective of promoting the image of the domestic product as ‘safe food’. As Assmann explains, the launch of the campaign coincided with the outbreak of a food poisoning scandal over frozen dumplings (*gyōza*) imported from China (2009, p. 6). The scandal involving Chinese dumplings confirmed the conviction of many Japanese consumers that domestic products (*kokusan*) were safe, while imported food was not.

4 Food safety

The Japanese consumers’ trust in the safety of domestic produce did not develop overnight, but was the result of a steady process to consolidate food safety awareness in Japan. It was inspired by widely publicised food poisoning cases in the 1950s and 1960s, such as the Morinaga milk incident of 1955 and Kanemi rice-oil case of 1968, all of which involved domestic food processing companies (Jussaume et al. 2000, p. 218). The rising

awareness of the issue of food safety led to the phenomenal growth of organic farming movement. The key to its success lay in the very diverse networks of grassroots organic food distributors, retailers and, above all, consumer co-operatives that worked together, jointly attracting a wide section of Japanese society. For example, in 1990, the Japan Consumers' Co-operative Union (JCCU, commonly known under the name Seikyō), the largest consumer co-operative alone had a national household membership of 14.14 million. If the family members of each co-op member are counted, this translates into more than 40 per cent of the Japanese population (Cwiertka 2006, p. 169).

The organic farming movement, with its long-standing support across Japan, along with new Government initiatives such as the Food Action Nippon campaign, contributed to a strong conviction among Japanese consumers that domestic products were safe. This trust was to be challenged by the developments following the Tōhoku earthquake of March 2011, the most powerful recorded earthquake to ever hit Japan. The earthquake is frequently referred to as the worst crisis that Japan has faced since World War II. An important aspect contributing to the gravity of the crisis was the fact that the tsunami triggered by the earthquake caused a nuclear accident in one of the world's biggest nuclear power stations – the Fukushima Daiichi Nuclear Power Plant, Okuma and Futaba, Fukushima Prefecture. Radioactive contamination, which has spread though the circulation of air, rain, dust, and water has left a lasting impact on Japan's food system. It brought a completely new dimension to the issue of food safety – anxiety about radioactive contamination of food.

As Aya Kimura describes in her detailed analysis of radiation standards set up by different organisations in Japan following the Fukushima disaster, reports of contaminated food started to appear just a week after the earthquake (2013, p. 12). On 19 March, the Government ordered the governors of four prefectures in the direct proximity to Fukushima to suspend shipments of spinach and milk. Social anxiety heightened as the media began to report on the growing number of food items found to be above the provisional food radiation safety levels established by the Government on 17 March, less than a week after the disaster. Many consumers started to avoid buying produce from north-eastern Japan, causing panic among the producers and worry in Government circles.

The necessity of regulating the risk associated with radioactive substances in food appeared for the first time after the Chernobyl power plant accident in 1986. In addition to a set of guidelines levels for radionuclides in foods put together by the Codex Alimentarius Commission of the United Nations, each country was allowed to set its own standards, in accordance with its own specific consumption patterns. However, Japan had never formulated any specific restrictions on radioactive substances in food before the disaster of 11 March struck. The Food Sanitation Act, the key law

responsible for regulating food-related risks for human health, does not mention radioactive contamination at all. On 17 March the Ministry of Health, Labour and Welfare adopted the so-called Provisional Regulatory Values for radioactive contamination, following the advice of the Nuclear Safety Commission of Japan. The levels were set without any assessment of possible effect on human health. They specified 200 Bq/kg of caesium for drinking water, milk and dairy products, and 500 Bq/kg for vegetables, grain, meat, eggs and fish (Kimura 2013, p. 15). All Government agencies began to use this standard to establish whether food was contaminated or not. The legitimacy of the Provisional Regulatory Values was tenuous from the beginning. The standard was firstly criticised for being too high, and for therefore unnecessarily harming food producers in the affected areas. Indeed, the new standards for safety of nuclear contamination, which were announced in January 2012 and went into effect in April 2012, set the levels of contamination for general foodstuffs, such as vegetables, grains, meat and fish, at 100 Bq/kg – one fifth of the Provisional Regulatory Values from March 2011 (Kimura 2013, pp. 16-17).

As Bachev and Itō have rightly pointed out in their recently published paper, in addition to the short-term radiation effects described above, the implications of the Fukushima nuclear disaster include a variety of long-term, indirect consequences for Japanese agriculture (2013). Research has shown that the attitude of consumers toward agricultural products from the region affected by the nuclear disaster has changed dramatically. The «Fukushima label», which once stood for high quality and safety of organic agri-food produce, has lost its market value. Even residents of Fukushima seem to be avoiding buying local products (Bache, Itō 2013, p. 26). The multiple safety tests and certifications imposed by the authorities or introduced voluntarily by the producers themselves add up to a loss in profit (Bachev, Itō 2013, p. 33). On the other hand, experts agree that the negative impact of the disaster on the food industries in neighbouring regions is moderate, and insignificant or nonexistent in other parts of Japan (Bachev, Itō 2013, p. 45). Some farmers and agri-businesses from non-contaminated regions have even benefitted from rising prices, and from better production and sales opportunities in the wake of Fukushima disaster.

5 Conclusion

While the food shortage disappeared as the chief concern of the Japanese authorities after the 1950s, the dramatically low level of food self-sufficiency, which surfaced for the first time during the 1918 Rice Riots, remains highly relevant even today. With consumers' trust in the safety of domestic produce unexpectedly damaged by the 11 March disaster, the problem has become more difficult to solve than ever.

As we have observed, over the course of half a century, the transformation from scarcity to affluence was accompanied by a growing public concern with food safety. As elsewhere, «the age of anxiety» has turned food safety into a major channel for articulating public anxiety represented by the feeling of losing control (Wallace 1998). This feeling stems from the growing realisation that even very mundane aspects of everyday life, such as food, have become extremely complex, affected by multifaceted factors hidden from public view and beyond the understanding of ordinary citizens.

The promotion of trust in local produce through emphasis on Japanese culinary traditions was one of the strategies undertaken by the Japanese Government to deal with both problems – food safety and the low food self-sufficiency ratio – that received particular attention. According to the clip produced by the MAFF spin-doctors, a return to consumption practices abandoned over the decades, as the Japanese embraced processed foods and foreign tastes, could be the solution to both problems (MAFF 2008). It remains to be seen whether the inscription of Japanese cuisine (*washoku*) on the UNESCO list of Intangible Human Heritage in December 2013 will aid the Government in reaching this objective.

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Japan at the Summit
Energy, climate change and a 'Gaggle of Gs'

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Abstract This paper focuses on how energy issues and climate change are addressed at the multilateral level, specifically by the Group of 8 (G8) and Group of 20 (G20). It will trace the development, trajectory, successes and failures of global summitry in addressing these issues. In addition, it will explore Japan's contributions to these processes, as well as its motivations.

1 Introduction

This paper shifts the focus of our discussion of energy issues and climate change to the international and, in particular, multilateral level. It will specifically highlight the role of the Group of 8 (G8) and Group of 20 (G20), alongside a number of other alphanumeric configurations collectively known as GX summitry or a 'Gaggle of Gs', in shaping and promoting multilateral approaches to these challenges. The G8 and G20 summits may not immediately spring to mind as the multilateral mechanisms charged with managing and pushing forward the international community's agenda on energy issues and climate change. This is largely because both have been written about chiefly in the context of global economic governance, and in terms of tectonic shifts in the global order and the latter replacing the former. However, in fact both groupings have a great deal in common in addressing these issues. Both were, *inter alia*, originally crisis-triggered responses tasked with stabilizing and managing the global economy. Both have also experienced a degree of 'mission creep' by which energy and the environment have found a regular place on the summits' agenda. Thus, as a result of their inherent and shared nature, both groups have over time and to varying degrees engaged with these issues either explicitly or implicitly.

In this light, this paper will trace the development, trajectory, successes and failures of GX summitry in addressing these issues. In addition, it will explore Japan's role in and contributions to these processes since the first meeting of the G8 leaders – or G6 as it was then[1] – in 1975 and the first

1 The original G6 of France, the US, the UK, Germany, Japan and Italy became a G7 in 1976 with the addition of Canada. EU representation was added the following year. Russia went through a series of different statuses through the 1990s before becoming a full member in 1998 of what we understand today to be the G8. In March 2014, Russia was removed from the G8 as a result of the crisis in Ukraine with its future within the group still unclear at the time of writing. For the sake of clarity, the alphanumeric term specific to the period under discussion will be used, and where appropriate G8 will be used as a blanket term throughout this paper.

meeting of the G20 leaders in 2008, highlighting successes and failures along the way. In conclusion, the paper will add to the discussion of what Japan has done by explaining why. By its very nature, an exploration of global summitry, and particularly the 'softer', more informal gatherings like the G8 and G20, tends towards the state-centric as a result of the central role of leaders and the informal relationships they construct that define these groups from more formal and legalistic international organizations. However, this analysis seeks to supplement this approach by highlighting the norms that Constructivists and English School scholars of International Relations would argue lie at the heart of the any state's motivations and resulting behaviour in global summitry. Finally, the conclusion will also point to recent and countervailing developments under the current prime ministership of Abe Shinzō.

2 The 'Gaggle of Gs' and Japan

The G8 finds its origins in the informal mechanisms established by the finance ministers of the developed world in the early 1970s to manage the macroeconomic challenges of the time. These informal mechanisms were soon upgraded to the leaders' level at the first meeting of a Group of 6 (G6) leaders of the leading economies in the Chateau of Rambouillet in November 1975. There was no intention to hold a second summit but the utility of this forum for discussion amongst like-minded leaders in deciding the direction and steering the global economy was clear when a second summit was held the following year in San Juan. Thereafter, the summit process steadily evolved in terms of membership and agenda items to become the forum we know today as the G8, which met most recently in Loch Erne, Northern Ireland in June 2013. The G8 was scheduled to meet in Sochi, Russia in June 2014 but in reaction to the Ukrainian Crisis the G7 boycotted the summit, temporarily removed Russia from the group and met as a G7 in Brussels.

Similarly the G20's briefer and more recent genesis follows a similar trajectory. Originally convened as a meeting of the finance ministers of the world's developed and rapidly developing major economies in the aftermath of the Asian Financial Crisis of the late-1990s, it went about its business from 1999 largely overlooked. However, in reaction to the global financial and economic crisis that began in 2008, the G8 was found to be both unrepresentative and ineffective. Thus, in its place, the G20 was upgraded to a meeting of leaders and met for the first time in November 2008 in Washington. Similarly concerned with predominantly macroeconomic issues, its agenda, alongside membership and hosting evolved organically. By 2011, the dust had settled to the extent that the G20 met annually and a future schedule of hosts had been decided.

Initial predictions of the G8's inevitable decline and the rise of a more (supposedly) representative and effective G20 proved to be wide of the mark (Bradford and Linn 2004; Foresti and Wild 2009).[2] Instead, a settlement of sorts has emerged whereby the G8 has continued to meet (usually in the late Spring/early Summer) to deal with security and political issues, whereas the G20 meets later in the year and addresses financial and economic issues. However, both Gs share a similar format in that these are informal bodies with no legal basis to exist and no constitution or charter. They rely on the willingness of leaders to come together and forge common responses to common challenges and then use their collective moral authority to ensure compliance. Equally, the agenda of both fora are flexible, moveable feasts and can be shaped by the demands of the external environment or an individual leader. Thus, as will be explored in the following two sections, both the G8 and the G20 have over time either explicitly or implicitly addressed energy issues and climate change. Before, we turn to this, the Japanese perspective on, and role in, these developments in the architecture of global governance require some brief explanation.

The G8 has traditionally mattered to Japan and the reasons for this are straightforward and uncontested. In other, more traditional, mechanisms of global governance, Japan has been regarded as a 'latecomer'. This can be seen in the case of the United Nations (UN), International Monetary Fund, World Bank and Organization for Economic Cooperation and Development, in all of which Japan was initially excluded and came to regard eventual admission as symbolic of postwar recognition and reintegration into international society. In contrast, Japanese prime minister Miki Takeo was an original participant in the Rambouillet summit. In addition, Japan is the only non-North American, non-European member of this self-appointed elite. As a result, Japan has forged two identities and roles in the G8 over time – that of bridge (*kakehashi*) between East and West, in addition to the representative of Asia (*Ajia no daihyō*).

The rise of the G20 not only places the continued existence of the G8 under threat (although so far these doubts have been unwarranted), but also expands the number of seats at the top table of global summitry available to Asian countries. Australia, China, India, Indonesia and South Korea are all now represented alongside Japan, thus diluting the need for a regional representative and raising questions of whether Asia should caucus to achieve common goals. The Japanese government's response to this has been confused and contradictory at times. On the one hand, the Japanese government has sought to secure the success of the G20 as a

2 The G8 represents roughly 50% of global economic output, two-thirds of international trade but only 14% of the world's population. In contrast, the G20 represents 90% of global economic output, 80% of international trade and two-thirds of the world's population (The World Bank 2014).

true believer in multilateralism and internationalism, but its efforts have been half-hearted insofar as the Japanese government does not want the G20 to succeed at the expense of the G8 – a position that alienates Japan from some of its G8 colleagues. Equally, the Japanese government has encountered difficulties in terms of continuing to play the role of Asian representative and instead has at times engaged in competition with the new Asian additions to the G20 (Dobson 2012a). So much for Japan's response to the changes in the global balance of power and their impact upon the architecture of global governance, a subject to which we shall return in the Conclusion. Let us now turn to the G8's and G20's treatment of energy issues and climate change.

3 The G8's role in energy issues and climate change

As mentioned above, the G8 was originally conceived as an informal grouping of like-minded leaders with the goal of discussing and reaching a consensus on how to address macroeconomic issues of the day. In the first half of the 1970s these discussions were driven by the chaos caused by the collapse of the Bretton Woods system and the sudden rise in oil prices instigated by the Organization of Petroleum Exporting Countries. Thus, at a time of oil shortages and price hikes resulting from the 1973 and 1979 energy crises, it was not long before the G7's discussion turned from the pressing issues of the day such as promoting free trade and non-inflationary growth, to the issue of oil consumption. The G8 Research Group of the University of Toronto has counted the words in G8 summits dedicated to the topic of energy and however blunt this bean-counting measurement may be, it does show that energy has been a constant theme in G8 summits from 1975 (G8 Research Group 2010). This discussion spiked for the first time at the 1979 Tokyo Summit, the first to be hosted in Asia, when 62% of the summit declaration was given over to the topic. As will be discussed in Section 5, this provided an opportunity for Japan to demonstrate leadership.

The 1979 Tokyo Summit was dubbed the 'energy summit' at the time and resulted in an eleventh-hour agreement on G7 members' energy consumption by which the leaders agreed to country-by-country targets through to 1985. US levels of consumption would be limited through to 1985 to the 1977 levels of 8.5 million barrels per day. The EC was to restrict its consumption to the 1978 levels from 1980 through to 1985. In the case of Japan its oil consumption would be limited to 1979 levels for 1980 – 5.4 million barrels per day – and then somewhere in the region of 6.3 to 6.9 million barrels of oil per day through to 1985. At the same time, the Japanese government pledged to meet a growth rate of 5.7% from 1980 as special dispensation for conceding on the oil issue. This momentum continued the

following year at the 1980 Venice Summit where the G7 leaders added a number of concrete measures to conserve oil use and sought to «rely on fuels other than oil to meet the energy needs of future economic growth» (G7 1980). Although these agreements may have created some short-term stabilization, these targets were never met.

Thereafter, energy issues broadly defined appeared annually on the summit agenda of G8 leaders, although they have not received the same attention as at the time of the 1979 oil shock (G8 Research Group 2010). Depth in GX summitry has also been in evidence over time with ministerial meetings supporting the leaders' discussion. The G7 energy ministers met as early as 1979 after the Tokyo Summit of that year, although this has since proved to be a one off. In contrast, G8 energy ministers have met since 1998 in Moscow albeit on an irregular basis with the last time being in 2009 in Rome.

As regards nuclear energy, although it has received treatment at previous summits, the 2011 Deauville Summit provides a clear demonstration of the nature of summitry. Ahead of the summit and in response to Fukushima, G7 central banks jointly intervened in the currency markets (the first time in a decade) to stabilize the value of the yen and Japan's exports. At the actual summit, the discussion topic of «Solidarity with Japan», which included both expressions of sympathy alongside reassurances as regards nuclear safety, was shifted to the headline issue on the first day of the summit. This makes clear not only the sense of fraternity that exists amongst the G8 leaders and comes to the fore in a time of crisis (exactly the same thing happened in 2005 in response to the London bombings whilst the G8 leaders met in Gleneagles), but also the flexible nature of summitry that allows an immediate issue to be pushed up its agenda.

As regards the G8's treatment of climate change, the environment first appeared as a topic for summit discussion at the 1985 Bonn Summit at the instigation of German Chancellor Helmut Kohl. The Economic Declaration that emerged from the summit dedicated 217 words to the topic by which the leaders pledged to coordinate initiatives through existing international organizations such as the OECD (G7 1985). Thereafter, the topic appeared in summit discussions with enough regularity that it could be regarded as a traditional summit subject. As a result of a French initiative at the 1989 Paris Summit, a 1,700-word section on the environment was included in the resulting Economic Declaration by which G7 leaders pledge to explore how environmental protection could be inputted into individual government policies (G7 1989). The deepening of the summit process was also in evidence when the environment ministers of the G7, independent of and in addition to its leaders, came together for the first time in Spring 1992 in Germany and met annually from 1994 onwards. At the 2005 Gleneagles Summit, climate change took second place to African poverty in the media's attention but it was still the focus for much discussion, although little progress was made in the face of US intransigence on the Kyoto Protocol.

This was obvious to all in UK prime minister Tony Blair's summary of the summit: «[t]hose of us who have ratified the Kyoto Protocol remain committed to it, and will continue to work to make it a success». The only point of agreement amongst the summit leaders was «that climate change is happening now, that human activity is contributing to it, and that it could affect every part of the globe» (G8 2005).

Climate change became the dominant and emblematic theme of two subsequent summits, the German-hosted Heiligendamm Summit of 2007 and the Japan-hosted Tōyako Summit of 2008. At the former, German Chancellor Angela Merkel's first summit as host, the G8 leaders declared that:

> [i]n setting a global goal for emissions reductions in the process we have agreed in Heiligendamm involving all major emitters, we will consider seriously the decisions made by the European Union, Canada and Japan which include at least a halving of global emissions by 2050. We have agreed that the UN climate process is the appropriate forum for negotiating future global action on climate change. (G8 2007)

The momentum created at Heiligendamm was maintained partly a result of prime minister Fukuda Yasuo placing it on the agenda of the Tōyako Summit at a very early stage when he spoke at the World Economic Forum in Davos in January 2008. This was then promoted in the media as the «Fukuda Vision» centred on pledging to cut greenhouse gas emissions by 60% to 80% by 2050 from current levels, although prospects of having this adopted by his fellow summiteers were bleak – even more so as regards the adoption of any mid-term targets for 2020. Inviting a number of developing countries and major emitters to participate in the discussions at Tōyako was a necessary step but also made the chances of reaching any agreement even slimmer.

Eventually, a commitment was made to achieving at least 50% reduction in emissions by 2050:

> We seek to share with all Parties to the United Nations Framework Convention on Climate Change (UNFCCC) the vision of, and together with them to consider and adopt in the UNFCCC negotiations, the goal of achieving at least 50% reduction of global emissions by 2050, recognizing that this global challenge can only be met by a global response, in particular, by the contributions from all major economies, consistent with the principle of common but differentiated responsibilities and respective capabilities. (G8 2008)

Comparing this with the statement made at Heiligendamm, incremental progress is clear from 'serious consideration' to actual action and targets.

However, the language used in summit statements is notoriously vague and tends to be the result of compromise so what 'seek and share', 'consider and adopt' concretely amounted to was unclear. What is more, there was some disparity between the English and Japanese translations of the above declaration with a stronger and clearer commitment implied in the Japanese version (MOFA 2008a). Equally, there was no agreement on mid-term targets or consensus on baseline years and it is debatable how committed G8 (or whatever forum may still be meeting) leaders will be to agreements made 42 years previously. On the plus side of the ledger, the US agreed for the first time at Tōyako to concrete targets to cut emissions. In addition, the incremental and iterative fashion in which the G8 functions is clear: the leaders shifted from agreeing in 2007 to seriously consider a 50% cut by 2050 to pledging a year later to promote the initiative within the UNFCCC negotiations. Another important aspect of these statements is the reference to the United Nations. The G8 leaders knowing the extent of their influence and abilities, instead recognized and reinforced the UNFCCC as the most appropriate and effective mechanism for addressing a global problem of this nature. So, all in all, this summit has been dubbed 'a curate's egg' in that its outcomes were good in parts (Dobson 2008), but this characterization also captures the G8's treatment of both issues over time.

4 The G20's role in energy issues and climate change

Turning to the G20's engagement with energy issues and climate change, it has obviously not benefitted from same length of time as the G8 to create momentum and even a legacy in these policy areas. Since its first meeting in Washington in November 2008, the G20 has met a further seven times at the leaders' level: London, April 2009; Pittsburgh, September 2009, Toronto, June 2010; Seoul, November 2010; Cannes, November 2011; Los Cabos, June 2012; and Saint Petersburg, September 2013. There has been no evidence of institutional depth in terms of creating G20 ministerial meetings to address these issues. Nevertheless, even at its first gathering, the G20 experienced the mission creep in its agenda similar to that experienced by the G8 in its early years. As a result, the G20 has been tasked with a range of issues in addition to its original financial and macroeconomic focus of which energy issues and climate change are but two.

As regards energy, G20 statements reveal an increasing level of engagement with energy issues starting from minimal discussion at Washington:

> We remain committed to addressing other critical challenges such as energy security and climate change, food security, the rule of law, and the fight against terrorism, poverty and disease. (G20 2008)

At the second London Summit there were no references to energy. However, at Pittsburgh later that year numerous statements accounting for over 10% of summit documentation were given over to highlighting issues such as energy efficiency, clean energy and energy security.

In 2010, the Toronto Summit's treatment was not so sustained and it dedicated a single paragraph to energy:

> We note with appreciation the report on energy subsidies from the International Energy Agency (IEA), Organization of the Petroleum Exporting Countries (OPEC), OECD and World Bank. We welcome the work of Finance and Energy Ministers in delivering implementation strategies and timeframes, based on national circumstances, for the rationalization and phase out over the medium term of inefficient fossil fuel subsidies that encourage wasteful consumption, taking into account vulnerable groups and their development needs. We also encourage continued and full implementation of country-specific strategies and will continue to review progress towards this commitment at upcoming summits. (G20 2010c)

Later in the same year, the Seoul Summit Leaders Declaration included no mention of energy issues but the accompanying Seoul Summit Document dedicated a section that covered commitments to phasing out inefficient fossil fuel subsidies, strategies to contain volatility in fossil fuel prices, in addition to welcoming and encouraging the progress of «the Global Marine Environment Protection (GMEP) initiative toward the goal of sharing best practices to protect the marine environment, to prevent accidents related to offshore exploration and development, as well as marine transportation, and to deal with their consequences» (G20 2010b).

Although the 2011 Cannes Summit was pretty much hijacked by the Eurozone crisis, sections in its various declarations and statements were dedicated to the promotion of clean energy and the smooth functioning of energy markets to avoid price volatility and ensure energy efficiency. It tasked the G20 finance ministers to press ahead with reforms and report back a year later. A year later and the Los Cabos Summit reiterated the declarations made at Cannes and tasked its finance ministers to take concrete measures in future discussions.

The statement issued at Saint Petersburg in 2013 dedicated a section to the issue and reiterated pledges to enhance energy cooperation, ensure the accuracy of energy market data and promote cleaner and more efficient energy technologies.

To cut a long story short, the G20 has essentially sought to play the role that GX summitry can play best, as a steering committee. However, expectations are naturally high ahead of the Australian Presidency of the G20 in 2014 that it can play a greater leadership role.

A regards climate change, a number of civil society groups have targeted

the G20 in an attempt to shift its attention away from a narrow focus on economic growth and ensure that any consensus includes consideration for climate change. In addition, it is the richest countries represented at the G20 that are responsible for the majority of emissions so there is a rationale for the G20 to add climate change to its agenda. However, the G20's role is only ever going to be that of catalyst and ultimately it will be the UN that is the legitimate body to deal with the issue. The best a GX summit can do on any issue is overcome deadlock and create a consensus that then needs to spill over into the more legitimate and legal bodies of global governance. At a time when UN negotiations have stalled, this provides an appropriate opportunity for the G20 to step in.

Take, for example, the financial transaction tax (FTT, or more popularly the Robin Hood tax) that has been mooted as a measure that could generate the billions of dollars needed to addres issues such as climate change and poverty. These taxes have found their way onto the G20's agenda and a surprising degree of consensus has even emerged with Argentina, France, Germany, South Africa, Spain, and the EU all in favour. Statements by former foreign ministers Okada Katsuya and Maehara Seiji during 2010 expressed for the issue and at the 2011 Cannes Summit Japanese prime minister Noda Yoshihiko even expressed interest in exploring the measure further. However, UK prime minister David Cameron has opposed a measure that would damage the City of London.

However, for a number of years, G20 summits were dominated, and their agenda hijacked, by the crisis in the Eurozone. Partly as a result, at its most recent meeting in Saint Petersburg, the G20 simply repeated the anodyne statements that tend to dominate summit documentation by declaring that:

> Climate change will continue to have a significant impact on the world economy, and cost will be higher to the extent we delay additional actions. We reiterate our commitment to fight climate change and welcome the outcome of the 18th conference of the Parties to the UN climate change conferences. We are committed to a full implementation of the outcomes of Cancun, Durban and Doha and will work with Poland as the incoming presidency towards achieving a successful outcome at COP-19. We are committed to support the full implementation of the agreed outcomes under the United Nations Framework Convention on Climate Change and its ongoing negotiations. We strongly welcome the efforts of the Secretary-General of the United Nations to mobilize political will through 2014 towards the successful adoption of a protocol, another legal instrument, or an agreed outcome with legal force under the convention applicable to all Parties by 2015, during COP-21 that France stands ready to host. (G20 2013)

In effect the G20 was kicking the issue into the long grass and leaving it to others to attempt (and fail) to make progress.

5 Japan's role and contribution

As would be expected in these mechanisms of global governance that stress the collective leadership that presidents, prime ministers and chancellors provide, it is the Japanese prime minister that has occupied the central role. However, he is not alone and the role of the sherpa as personal assistant should not be overlooked as well as the contribution of various ministries, particularly the Ministry of Foreign Affairs but also the Ministry of Finance and others on occasion.

With these actors in mind, and despite some of the weaknesses associated with them in the context of informal summitry, Japan's contribution to these developments has at times been both significant and multifaceted. Starting with the 1979 Tokyo Summit, although he described feeling «naked-like a little child» after the summit, prime minister Ōhira Masayoshi played a central role in ensuring the success of the summit generally and specifically with regard to reaching the agreement outlined above amongst fellow summiteers on oil consumption (Putnam and Bayne 1987, p. 257). At a relatively early stage, according to an article in *Japan Times* on 1 June, Ōhira placed energy and OPEC's sudden raising of oil prices at the top of the summit agenda. The fact that this would be a divisive issue between the United States and Europe was well known and as reported in *Japan Times* on 7 June, German Chancellor Helmut Schmidt went as far as to ask Ōhira to act as a middle man – a role that Japan has played on occasions through the history of GX summitry. The reactions to the summit outcomes and the eleventh-hour agreement on oil consumption targets were largely positive with the Japan Communist Party the lone voice critical of Ōhira. According to a *Yomiuri Shinbun* article published on 1 July 1979, the approval rating for his administration was in fact bolstered by the summit rising from 37.6% beforehand to 39% after the summit. Nicholas Bayne, doyen of summit watchers and summit grader, the Tokyo Summit of 1979 received one of the more successful G7/8 summits with a grade of B plus. Energy issues featured predominantly on the agenda of the following year's summit, the first Venice Summit. However, Japan was prevented from following up on the diplomatic success of the Tokyo Summit when Ōhira passed away on 12 June 1980 ten days before the summit was due to begin.

Moving forward in time to another Japan-hosted summit, the Tōyako Summit of 2008, other significant contributions can be seen in the role played by the Japanese prime minister of the day, Fukuda Yasuo, aided by his sherpa, Kōno Masaharu. Fukuda expressed his desire to work with the rising powers not included within the G8 and One of the original developments of the summit was the creation by the Japanese hosts of space and time for the G8 and G5 (Brazil, China, India, Mexico and South Africa) to meet separately and together before then being joined by Australia, Indonesia and South Korea on the final day of the summit as a Major Economies

Forum (MEF), or G16, to discuss climate change. Thereafter, Japan was active in creating the consensus that this forum had a role to play and should continue, particularly in shaping the debate on climate change within the UN and this innovation in global summitry was adopted at the following year's summit in L'Aquila (Dobson 2012a). However, Japan's contribution appears to be largely in the area of global governance architecture and as regards the Tōyako Summit's statement on climate change mentioned above in Section 3, the reaction of summit watchers was for the most part one of confusion.

It is worth mentioning that Japan also hosted the Tokyo International Conference on African Development (TICAD-IV) prior to the Tōyako Summit and sought to create synergy between the two (although chiefly with the goal of ensuring the success of the G8 agenda on climate change rather than African development (Dobson 2012b). The Yokohama Declaration that resulted from TICAD-IV stated that:

> African countries appreciated Japan's «Cool Earth Promotion Programme» and acknowledged Japan's efforts in seeking to develop an international framework looking beyond the first steps taken in the current Kyoto Protocol on greenhouse gas emissions.
>
> In this regard, the Participants welcomed the announcement by the Government of Japan, in January 2008, of its intention to establish a «Cool Earth Partnership» with US$10 billion Financial Mechanism on the basis of policy consultations between Japan and developing countries – including African countries – to address the effects of climate change and to modernize their industries, by way of technology-transfer, to render them more energy-efficient and more environment-friendly. (MOFA 2008b)

Considering that original drafts of the declaration had included considerably stronger phrases like 'lauded' and 'supported', rather than 'appreciated' and 'acknowledged', this is hardly a ringing endorsement of Japan's initiative.

Another measure of Japan's contribution to the G8's treatment of the climate change and energy issues is the level of compliance with commitments made at each summit. The G8 Research Group at the University of Toronto has tracked many of these commitments over time. As regards the G8's commitments on climate change between 1987 and 2006, Japan posts the highest compliance score of 79% with Germany on 74% and 52% as the average level of compliance amongst G8 countries (Kirton 2007, pp. 22-23). As regards energy, the average level of G8 compliance with commitments made between 1996 and 2005 is 61% but Japan finds itself towards the foot of the rankings with a compliance score of 50%.

As regards the G20's treatment of the FTT mentioned above, Japan's

response has been vague at best. As reported in *Japan Times* on 1 November 2011, Japanese civil society organizations are in favour of the tax and petitioned Noda stressing that a 0.005% tax on currency transactions could raise more than 600 billion yen a year and be used as part of the 3/11 recovery. In contrast, business organisations, like Nippon Keidanren, have been against it (Nippon Keidanren 2010). Japan had previously scrapped a similar tax but as regards the FTT, little consensus within the GOJ has existed. However it did appear to have been gaining ground within the Democratic Party of Japan (DPJ) before its landslide defeat in the 2012 election. According to Okubo Tsutomu, head of the committee in charge of fiscal and monetary issues within the DPJ's policy council, in light of the rise in the value of the yen, and the chances of the success of strategies such as intervention in the currency markets, the possibility of a FTT needed be considered. Moreover, if Europe were to introduce such a tax then Japan would need to follow suit to avoid the inevitable flight to the yen (Ito 2011). Finally, this may appear attractive to Japan as a means of also financing the commitment made at the 2008 TICAD-IV to double aid to Africa.

Finally, the G20 Research Group has also tracked G20 compliance scores and in February 2013 was able to report on the G20's most recent progress in reaching its goals on development. Included in these commitments is the issue of energy efficiency, for which Japan demonstrated full compliance so far with the 2010 Seoul Summit's pledge that «we will take steps to create, as appropriate, the enabling environments that are conducive to the development and deployment of energy efficiency and clean energy technologies, including policies and practices in our countries and beyond, including technical transfer and capacity building» and the 2011 Cannes Summit's commitment to «support the deployment of clean energy and energy efficiency (C3E) technologies». Japan was seen to have taken steps to create the enabling environments that are conducive to the development and deployment of energy efficiency and clean energy technologies both at home *and* in other countries, specifically in the Asia Pacific and North Africa.

6 Conclusion

So much for what GX summitry and in particular Japan have done, or not as the case may be. In conclusion, the paper will discuss the underlying motivations behind Japan's behaviour. A range of different theoretical approaches will inevitably highlight different pushes and pulls. A traditionally Realist approach would explain Fukuda's various initiatives through the lens of undiluted national interest. For example, the creation of the MEF would be regarded simply as an attempt on the part of Japan to dilute the role of the G5 and the central role of China. Equally, the countries that the

MEF initiative embraced – Australia, Indonesia and South Korea – were some of the most vocally supportive of Fukuda's «Cool Earth» initiative to halve global greenhouse gas emissions by 2050. However, a purely Realist approach lacks nuance and presents an overly unproblematised view of Japan's behaviour. For example, Japan has been conflicted even in its support for its own initiatives like the MEF and this requires explanation.

At the heart of Japan's response is an impulse based on the norms of internationalism and Asianism but also Japan's self-perception of its status in the international system. In this light, the Japanese government has been committed to ensuring the success of GX summitry and to this end hosting successful summits. This can be seen not only in the various grades awarded by the G8 Research Group to Japan-hosted summit, but also in Ōhira's speech to the Diet at the beginning of 1979, the year Japan hosted the first Tokyo Summit, which demonstrated the lengths the Japanese hosts would go to in order to ensure a successful summit:

> It is most significant that the summit meeting of major industrialized countries will be held in Japan this year for the first time in Asia. This meeting is a very important forum for the leaders of the nations concerned to discuss frankly their policies and to seek international cooperation for the stable expansion of the world economy. We intend to do our utmost as host country in preparation for this meeting and to work with the other participating countries for its success. (Ōhira 1979, 180)

This commitment has continued through to the present day and it appears that Japan's behaviour falls within the English School's particular definition of 'great power' status. To quote Morris (2011, pp. 328-329) and his treatment of Hedley Bull's work, great powers

> are not just unusually powerful states, but collectively constitute an institution of international society. Accordingly, great powers must conform to certain behavioural expectations and in particular must «manage their relationships with one another in the interests of international order». (Bull 1977, p. 202)

In Bull's classic formulation, great powers have «a special mission [as] ... custodian[s] or trustees[s] of the interests of international society» and are required to «accept the duty, and are thought by others to have the duty, of modifying their policies in the light of the managerial responsibilities they bear» (Bull 1977, p. 202).

In other words, by playing a number of 'recognition games' (usually played by rising powers to assert their increasing influence) that seek to reinforce its status as a great power of the day, Japan has exhibited the *sense of responsibility* that the English School identifies as one of the de-

fining qualities of great power status. Even if it is evidently a great power in relative decline, certain responsibilities remain that are constitutive of this status and thereby shape behaviour. To risk banality for a moment, this is the Spiderman adage that «with great power comes great responsibility». The Japanese government has demonstrated a belief that it should act not only as a Great Power but also as a 'Great Responsible' (Morris 2011, p. 329, in reference to the coalition government led by UK prime minister David Cameron).

However, this internationalist impulse has come directly into conflict with the hard-nosed Realism outlined above. The result has been contradictory and unpredictable behaviour at times over recent years and even paralysis on other occasions. For example, Japan has worked for the success of new mechanisms of global governance such as the G20 and demonstrates innovation in creating bodies such as the MEF. However, its enthusiasm has clear limits: the success of these new and more representative bodies should never be at the expense of Japan's preferred central mechanism of global governance, the G8. This has resulted in a more qualified internationalism than has traditionally been on display in Japan's G8 summitry. The strategy by which successive Japanese governments have recently sought to pursue these apparently contradictory objectives has been to stress the democratic values at the heart of the declaration that came out of the first Rambouillet Summit, and which are so much harder to discern in the G20. Although for a time this strategy dovetailed nicely with prime minister Asō Tarō's values-oriented diplomacy, it has generally been regarded as a hollow and retrograde approach. Equally, a surprising lack of coordination between policymakers has come to the fore on occasion, one example being prime minister Kan Naoto's idea of inviting China to future G8 summits mooted at the 2010 G8 Summit without prior consultation with MOFA officials (Dobson 2012a).

These are dilemmas that Japanese leaders have struggled to overcome not only in the way they manage the changing world order and the institutional architecture of global governance but also in terms of the global issues with which they grapple. However, the return to power of the Liberal Democratic Party in December 2012 suggests a possible resolution of this impasse, although not one that ardent supporters of global governance might welcome. Since returning to power prime minister Abe has demonstrated a more coherent approach to the mechanisms of global governance than his DPJ predecessors. With one eye on the domestic reception, he has explicitly and consistently used these mechanisms to promote and secure international support for his three-pronged economic policies popularly known as «Abenomics» as well as his more robust (some would say 'nationalistic', whereas some would say 'normal') initiatives in foreign and security policy. The resulting behaviour across the calendar of global governance from the World Economic Forum in January through to the

UN General Assembly in September is certainly more joined up, strategic even. However, it focuses on national interest to the exclusion of any vision of global governance, normative impulse or sense of leadership that have previously been the hallmark of Japanese participation in global summitry (Dobson 2014). As Abe's position appears to be relative secure with no upcoming election or intra-party threat, more of the same is to be expected.

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Top down versus bottom up
Post-crisis Japanese nuclear policy

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Abstract While the Japanese Government successfully created one of the most advanced commercial nuclear power programs in the world through a mix of top-down directives and well-funded policy tools, the compounded disaster of 11 March 2011 drastically altered the political and social landscape for atomic energy there and abroad. Local residents throughout Japan along with non-governmental organizations (NGOs) have seized the opportunity to carry out bottom-up responses to the accident, including radiation monitoring, challenges to bureaucrats' authority, and mass protest. Where other scholars have looked more closely at the activities of private-sector actors and political parties, this chapter briefly reviews the past five decades of Japan's nuclear power program with a focus on the interaction between state and civil society and the ways in which the disaster has induced grassroots citizen science and activism.

1 Introduction

Until the tragic events on 11 March 2011, the long-term trajectory of Japan's energy policy seemed crystal clear. The central Government had long supported atomic energy as a way of achieving a modicum of energy independence and pumped millions of dollars a year in incentives to rural host communities. Opinion polls showed that roughly two-thirds of the general public supported the expansion of Japan's nuclear reactor program and Government white papers envisioned enlarging the amount of energy generated by atomic reactors from 30% to 50%. The long-dominant Liberal Democratic Party (LDP) and large businesses along with their lobbying organizations such as the Keidanren (Japan Business Federation) supported nuclear power. Electric utilities had plans to construct new nuclear power plants along Japan's coast. The 9.0 magnitude earthquake, accompanying tsunami, and nuclear meltdowns at three reactors of the Fukushima Daiichi complex on 3/11 altered the political landscape in Japan and abroad. Among other countries, Germany, Belgium, and Italy decided to either shut down or scale back their nuclear plans. Even China, a strong proponent of nuclear power, placed a six month moratorium on new nuclear plant

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construction. Within Japan, the accident reversed public opinion on nuclear power and created doubts among many residents about the safety of nuclear power plants.

This chapter traces public opinion and civil society activities in the field of nuclear power from the creation of Japan's nuclear program immediately following World War II until its recent sea-change following the 3/11 disasters. It seeks to understand precisely how average citizens across the country have understood their political roles vis-à-vis energy policy following the Fukushima tragedy. Using primary and secondary literature along with extensive fieldwork in affected communities I look closely at the interaction between the Government agencies responsible for the regulation and promotion of nuclear power and the broader public in the country. Given the existing studies of interactions between the state and business in the field of nuclear power (Samuels 1987; Lesbirel 1998; Scalise 2013), I limit my attention to Tokyo-based central Government bureaucrats and the citizenry. While recent events have clouded the future of nuclear power in Japan, the new channels and approaches used by citizens interacting with the state are far clearer.

This chapter begins with a review of Japan's nuclear power program since the mid-1950s, proceeds to illuminate the events of 3/11 along with responses from civil society to the disaster. I closely trace the institutional changes on the Japanese Government side along with the ways that ordinary people engaged state decisions. The chapter moves through various ways that citizens have engaged the state following the Fukushima accident and ends with a discussion of the changes among decision makers and citizens alike.

2 Japan's 'Nuclear Allergy' and Top Down Directives

Japan's unique history at the end of World War II created what was known as a *kaku arerugi* (nuclear allergy) among the broader population. The atomic bombings at Hiroshima and Nagasaki created a strong anti-nuclear weapons sentiment in Japan, as did the Lucky Dragon incident less than a decade later. In March 1954, the 23 fishermen onboard the Daigo Fukuryū Maru (Lucky Dragon N. 5) boat passed through the fallout created by a Pacific Ocean test of the American hydrogen bomb. Soon after returning to Japan, Aikichi Kuboyama, the radio operator, succumbed to the acute radiation contamination and became the first victim of the hydrogen bomb. Newspapers covered the incident and monitored his deteriorating health, detailing the health effects of radiation in front-page stories which captured the public's attention. Motivated by this tragedy, residents of the Suginami Ward in Tokyo began a petition drive to ban hydrogen bombs, and by August of 1955 they had secured more than 30 million signatures.

Put another way, roughly one-third of Japan expressed their support for the banning of nuclear weapons; many respondents envisioned nuclear power as equally unwanted. The two longest standing anti-nuclear organizations in Japan – Gensuikyō and Gensuikin – emerged from these events and continue to hold rallies and disseminate information on nuclear issues (cf. Yoshioka 1999).

The wide scale distrust of radiation and nuclear issues among Japanese civilians following the bombings at Hiroshima and Nagasaki has allowed Japan to remain free of nuclear weapons, an outcome explained by some as a function of Japan's new postwar pacifist norms and by others as the outcome of institutional design (cf. Hymans 2011). At the same time, though, Japan built up one of the most advanced commercial nuclear power frameworks in the world. Where the United States and France abandoned experimental technologies such as fast breeder reactors, mixed oxide (MOX) fuel, and plans for a closed fuel cycle (Hecht 1998), Japanese decision makers stuck with these schemes (Campbell 1988; Pickett 2002). Even recent events have not brought about a major challenge to the Government's drive to reach indigenous and self-contained energy production.

Japan's nuclear power program is not the outcome solely of market forces, a lack of access points for anti-nuclear groups, or a top-down hierarchical political culture, as past scholars have argued; instead, the Government has designed and refined a broad repertoire of policy instruments to further its goals. In the same year as the Lucky Dragon accident, the young politician Yasuhiro Nakasone (who eventually became prime minister) proposed that the central Government allocate money to nuclear research. The Diet passed the Atomic Energy Basic Law and developed Japan's own Atomic Energy Commission to mirror institutional developments in the United States. Soon, however, Japan departed from America's primarily market-based approach to energy policy (although the 1957 Price-Anderson Act remains a clear example of the US Government amortizing the industry's risks). Rather than allowing private energy utilities throughout the nation to handle the issue of siting and public acceptance on their own, the Japanese Government developed an extensive repertoire of policy instruments and soft social control techniques designed to bring public opinion in line with national energy goals. Authorities and regulators overcame opposition and concerns among the broader population and in specific demographic groups, such as coastal fishermen and students, through focused policy instruments intent on manipulating public support.

The Government provided a number of different types of support to Tokyo Electric Power Company (TEPCO) and other regional power monopolies in the early years of nuclear power; one form of help involved logistical and financial support in mapping out potential host communities throughout Japan. Government bureaucrats assisted the utilities both in the physical charting of potential locations – to ensure that they met certain technocratic

criteria, such as having access to cooling water, and location near existing power grid lines, and relatively aseismic rock, and so forth – and in mapping the social characteristics of nearby communities. Internal documents from the Japan Atomic Industrial Forum (JAIF) industry group showed that planners of the late 1960s and early 1970s were very cognizant of the dangers posed by well organized horizontal associations, especially fishermen's cooperatives (*gyogyō rōdō kumiai*). Analyses of the siting of nuclear power plants in Japan have demonstrated that planners placed these projects in rural communities which were less coordinated and more fragmented, and hence less likely to successfully mount anti-nuclear campaigns (Aldrich 2008). To overcome any remaining opposition in such localities the Government often offered jobs and assistance to fishermen to ensure that the nuclear power plant would not be seen as curtailing their livelihoods.

Initially, the Government agency known as MITI (the Ministry of International Trade and Industry, or Tsūshō Sangyō Shō) popularized by the work of Chalmers Johnson (1982) had only a handful of techniques to induce public support for nuclear energy. Yet it needed little leverage as protests were scattered and sporadic. Some communities rallied against planned nuclear complexes in their backyard – fishermen at the Tōkaimura nuclear complex, for example, expressed their opposition through boat rallies and marches, and others stopped a planned teaching reactor for Kansai University in a densely populated urban area near Uji City – but large scale opposition was yet to develop through the 1960s and early 1970s. By the late 1970s several national anti-nuclear umbrella organizations sprang up and began to organize protests across the country. The oil shocks of the 1970s pushed Japan's energy bureaucracy into high gear as its nominal price skyrocketed upwards and the market price quadrupled, so a barrel which had been $3 became $12.

The high and unstable price of oil – critical for Japan's large scale petrochemical industries as well as a host of other fields, including automobiles and oil refining – created a new goal for Japanese planners: energy security. The Government hoped that between hydroelectric dams and nuclear power plants Japan would be able to wean itself off of oil from the Middle East. This would require the consent of citizens in Japan on a large scale. As a result of this new push, the system of benefits for actual and potential nuclear power plant host communities became so complex that the central Government created a new agency, the ANRE (Agency for Natural Resources and Energy, Shigen Enerugī Chō) which in turn spun off the Japan Atomic Energy Relations Organization (see `http://www.jaero.or.jp/` for the institution's website), the Japan Industrial Location Center (Nihon Ricchi Sentā, see `http://www.jilc.or.jp/index.html`), and the Center for the Development of Power Supply Regions over the following decade. The personnel and budget of these agencies focused primarily to assisting with the placement of new nuclear power plants throughout the country. Where governmental and quasi-governmental agencies had previously only

a handful of tools for interacting with and persuading the public, the Oil Shocks and increasing resistance brought about the creation of many new ones. Policy instruments for improving nuclear power's image included pep talks from central Government bureaucrats, the development of science curricula for school aged children, Nuclear Power Day, and annual fairs where local fishermen and farmers could sell their products.

ANRE bureaucrats listened closely to the concerns of these demographic groups, who often feared 'nuclear blight' – that is, the inability to sell their fishing and agricultural products because of fears of radioactivity – more than they feared health risks or environmental damage. In response, the various Government agencies worked to set up an annual, large scale exhibition outside Tokyo called the Electricity Hometown Fair where fishermen and farmers from nuclear power plant host communities would be ensured a profit thanks to the hundreds of thousands of tourists and consumers who descended on the convention center Makuhari Messe outside Tokyo. Similarly, local Government officials began to worry about recall elections which ended the political careers of several pro-nuclear mayors, so the central Government organized workshops where local elected officials could learn what had worked – and what had failed – at past attempts to boost nuclear plants in localities around the country. Mayors and governors who supported attempts by local chambers of commerce and businesses to bring in atomic reactors would find themselves invited to the prime minister's residence in Tokyo for a public recognition ceremony of their assistance of national energy goals. These hortatory tools sought to create pro-nuclear agents at the local level who would help rally support for nuclear power plants and overcome any opposition (Aldrich 2010).

The Government provided up to 20 million dollars a year to acquiescent communities through the Three Power Source Development Laws (known by their abbreviation Dengen Sanpō). What had initially been a series of *ad hoc* measures designed to win public support for nuclear power complexes became a tremendously well funded policy instrument which funneled hidden taxes on electricity use into a pooled account. Bureaucrats then distributed these funds to host communities throughout rural, coastal Japan. Through this institutionalized redistributive system and a variety of other measures designed to convince local residents that nuclear power was both safe and necessary, the Japanese Government created many host community volunteers among the rural, depopulating towns and villages in the nation. For these small communities, such as Futaba in Fukushima and Tomari in Hokkaidō, the promise of a nuclear power plant meant potential jobs, millions of dollars in grants and loans, new infrastructure, and the prospect of survival. Commentators have argued that the flow of money into often older, impoverished rural communities has created a «culture of dependence» and a «cycle of addiction» (Fackler and Ōnishi 2011; Hasegawa 2004, p. 26).

The body of policy instruments designed to manipulate public opinion has not guaranteed success at siting, however. Research has shown that of the roughly 95 attempts to site nuclear power plants over the postwar period, only 54 were actually completed. With well organized and informed opposition groups, including the Citizens' Nuclear Information Center (CNIC, Genshiryoku Shiryō Jōhō Shitsu) and the Anti-Nuclear Newspaper (*Hangenpatsu Shinbun*) leading the charge since the early 1980s, many communities fought back in well publicized battles. The accidents at Three Mile Island and Chernobyl worried many Japanese residents, but authorities reassured them that these would not be possible in Japan, given its strong engineering credentials, defense in depth, and highly educated and motivated staff. In response to mounting opposition, the Government deepened the field of projects to which the Dengen Sanpō funds could be applied, lengthened the period for which they would be available, and increased the pot of funding provided to local communities. Overall, the Government and regional energy monopolies saw few reasons to worry about the future; one white paper envisioned the construction of an additional 17 nuclear power plants in Japan by 2024 which would enable the nation to move from one-third of its electricity generated by nuclear power plants to roughly one-half. These optimistic visions of nuclear power's future, however, were not to be.

3 The Final Straw? The Ongoing 3/11 Disaster

By the late 1990s, siting planners encountered serious bottlenecks in the system of constructing new nuclear power plants. The time between the proposal of the plant and its activation stretched from less than a decade in the early 1970s to more than three decades by the late 1990s (cf. Lesbirel 1998). Citizen opposition to nuclear power because of potential health effects, a lack of a long-term storage facility for nuclear waste, and potential proliferation concerns grew steadily. The CNIC and the *Hangenpatsu Shinbun* publicized ongoing fights against siting attempts and sought to provide advice to would-be opposition groups. Across the industrialized democracies, residents began to demand more from their governments and moved beyond materialist concerns to a focus on the environment, sustainability, and health (Inglehart 2008). In addition, a series of large and small-scale accidents and cover ups in the industry, including three fatalities at a nuclear facility in Tōkaimura, chipped away at public support for the industry in the mid-1990s.

On 8 December 1995, the experimental sodium-cooled fast breeder reactor known as the Monju experienced a large scale sodium leak and resulting fire which was hot enough to melt various steel structures in the chamber. The Japanese agency in charge of the Monju, however, decided to suppress details of the accident and to doctor a publicly released videotape

of the leak and its aftermath. Local residents fought attempts to restart the experimental reactor all the way to the Supreme Court, which eventually (in the summer of 2005) allowed it to do so (as of the summer of 2014 it seems that the project may finally be dead). Some four years later Japan experienced its worst nuclear accident until that point. On 30 September 1999, three workers at the nuclear fuel cycle company known as JCO located in Tōkaimura were preparing fuel for one of Japan's experimental fast breeder reactors when they set off a criticality which exposed them to tremendously high levels of radiation. Two of the three passed away due to extreme radiation exposure and local residents in the nearby town were told to remain indoors to avoid contamination. These were not the only events which began to break apart public support and faith in the industry.

TEPCO – the Tokyo Electric Power Company – itself has covered ups numerous accidents, leaks, and cracks since the 1980s. Engineers came forward in the early 2000s to admit that over the past decades there had been at least 30 serious incidents which were hidden by the company's management. In response, several upper management executives lost their jobs and the central Government ordered the shutdown of TEPCO's 17 nuclear reactors in 2002. These events further undermined the industry's credibility, and the recent (and ongoing) accident in the spring of 2011 may have been the straw which broke the camel's back.

On 11 March 2011 a 9.0 magnitude earthquake struck off Japan's north-eastern coast, but by itself caused very few fatalities (as data now show than fewer than 6% of all deaths were caused by the collapse of buildings). The earthquake set off a tsunami as high as 50 feet in some places which swamped existing seawalls along the shore and devastated communities, causing at least 20,000 deaths, primarily in Iwate, Miyagi, and Fukushima prefectures. Estimates of the damage go beyond 220 billion dollars. The highly touted back-up systems at the Fukushima Daiichi nuclear complex operated by TEPCO – namely the diesel generators and batteries – went offline soon after the earthquake and tsunami, although research has yet to pin down which event was primarily responsible for their failure. As a result, even though the reactors which had been in operation automatically shut down with the earthquake, residual heat caused fuel meltdowns in three of the six reactors at the site. The temperatures rose tremendously in the first day after the tsunami, soaring above 2000 degrees Fahrenheit and melting the zircaloy tubes containing the fuel pellets in the reactors. Engineers sought to reduce the growing pressure inside the containment units by deliberately venting the reactors to the atmosphere (thus releasing radioactive elements into the air), and then tried to cool the reactors and ensure that the spent fuel rods would remain underwater by pumping in hundreds of thousands of gallons of seawater. This procedure which engineers refer to as a «feed and bleed» resulted in approximately 100,000 tons of contaminated water accumulating in the basements of the reactors,

flowing into the ground and water table nearby, and being dumped into the ocean. Adding to the chaos, hydrogen explosions blew the tops off three of the buildings containing the reactors when the gas was released by the interaction of zircaloy and water.

Japanese authorities eventually categorized the incident as a 7 («major accident») on the International Nuclear Event Scale (INES) due to the amount of radiation released; the 26 April 1986 Chernobyl disaster is the only other atomic disaster to date in this category. Then prime minister Naoto Kan initially set up a 12 mile evacuation zone around the Fukushima Daiichi plant, and moved to expand the radius of the evacuation over the next two weeks. As of April 2014, more than 40,000 residents of the area remain unable to return to their homes in Fukushima Prefecture because of high levels of radioactivity. Foreign governments, including the United States, strongly encouraged their citizens in Japan to evacuate the immediate area (and, in some cases, the country) when details of the accident began to circulate in mid-March 2011. Since the accident began, a number of agricultural companies were forced to stop exporting food from the area due to radioactive contamination of tea, beef, rice, and citrus products. Fish production from Fukushima has all but disappeared due to a lack of demand for such products.

Many Japanese parents have shown increasing anger over reassurances from the central Government that their children are safe despite tests of blood and urine showing high levels of exposure even in areas far removed from the Fukushima area, such as northern Tokyo, Yokohama, and Saitama. As the Japanese Government struggled to deal with a rising death toll from the tsunami, a slow release of information about the accident from TEPCO, and rising citizen distrust, governments around the world have begun to reevaluate their own commitments to nuclear power. The event's political fallout has spread well beyond Japan's borders. Italy, Germany, and Switzerland, among other industrialized nations, used the Fukushima nuclear crisis as a focal point for a policy shift away from nuclear power towards less potentially catastrophic sources.

To add fuel to the fire, managers at the Kyūshū Electric Power Company tampered with a public opinion poll on 26 June 2011 focused on the restart of the nearby Saga nuclear power plant complex evidently at the suggestion of Saga prefectural governor Yasushi Furukawa (*Yomiuri Shinbun*, 9 July 2011). The scandal, known as the Yarase Mēru (staged mail) scandal, involved employees at the utility sending 140 supportive comments into the station, which were enough to tip the balance of opinions in favour of restarting (Dawson 2011). When the media first reported the problem, the company denied having done anything wrong, but later apologized for its actions.

Public opinion polls done by the Roper organization in early August 2011 of some 1,000 Japanese residents across Japan reported that nearly 60% of the respondents had either little or no confidence in the safety of

Japan's nuclear power plants. Regular polls since the 3/11 disasters have confirmed that some 70% of Japanese citizens would prefer that Japan not restart its nuclear power plants. Gaffes from Government ministers have not improved matters; Yoshio Hachiro, at the time the new trade minister, called the village near the Fukushima Daiichi complex a «town of death» and then had to apologize after tremendous criticism. He soon stepped down from the post (*Japan Times*, 10 September 2011). Then prime minister Yoshihiko Noda has apologized to Fukushima governor Yūhei Satō for the Government's «inadequate response» to the disaster. After years of manipulation and incentives from the central Government, the recent actions of the regional monopoly to alter public opinion has pushed many citizens to step up and mobilize in the wake of the crisis (cf. Cooley and Marten 2006; Kiminori, Ken'ichi and Masafumi 2009).

4 Molding the Future

Along with altering the decision making calculus on nuclear power for Japan and other nations, the events of 11 March have opened a window for bottom up initiatives and boldness which give hope that the event will not merely result in 'business as usual'. Only a handful of Japan's 50 remaining reactors have been restarted in any capacity since the disasters, and restarting and reintegrating them into plans for meeting Japan's national energy demand will require tremendous public relations work. Despite the prevalence of anti-nuclear sentiment among the public, business groups have regularly argued in public forums that Japan's industries require the cheap, consistent electricity from nuclear power. Japan's major financial newspaper, the *Nikkei Shinbun*, published a series of surveys showing that many corporations plan on relocating their manufacturing to offshore locations – including India, China, and Malaysia – if the Japanese Government cannot create a plan to ensure stability in electricity supply over the next three years. One Japanese business analyst argued that «If we completely abandon nuclear power generation … I think most industries would lose competitiveness and go out of Japan» (quoted in *Business Day*, 27 July 2011). Many observers have underscored that firms dislike uncertainty, and uncertainty about disruptions in Japan's power supplies (or a spike in costs for electricity) have made many firms in Japan anxious.

Given the two decades of economic difficulties the nation has faced, new threats of hollowing out are being taken quite seriously. Some private firms, such as the energy utility KEPCO, have stepped forward with new plans for safer alternative energy sources, such as a new 10,000-kilowatt solar facility in Osaka Prefecture. Tōhoku Electric Power Company has stated its intent to double the capacity of its wind farms by 2020 (Reuters, 30 September 2011). Popular entrepreneur Masayoshi Sun, creator of Soft-

Bank, pledged an investment of a billion yen in the new Japan Renewable Energy Foundation which is centered around solar energy. Nonetheless the actual impact of these non-nuclear renewable energy systems will be only a drop of the bucket in terms of overall energy need.

Beyond economic concerns from the business community, several new initiatives show how Japan's civil society has been energized by this tremendous tragedy. The new *Safecast* project embodies a new focus on citizen science – that is, the participation of everyday residents as volunteers in data collection, technical measurement and analysis in fields such as ecology, biodiversity, and astronomy (Smith, Lintott and the Citizen Alliance 2010; Dickinson, Zuckerberg, Bonter 2011; Devictor, Whittaker, Beltrame 2010). Participants in such collaborative projects work together, often using web-based platforms along with affordable instrumentation, to achieve results that lone researchers in highly funded laboratories would not be able to accomplish. *Safecast.org* provides an example of the new citizen activism and citizen science which has emerged in the environment of mistrust among the Japanese people towards both TEPCO and the central Government itself.

The full map available on the project website is made up of more than 4 million data points collected by Japanese citizens – not TEPCO engineers, central Government bureaucrats, or sub contractors from the nuclear industry. Instead, citizens and foreign residents who own Geiger counters have traveled throughout Japan (including areas in Fukushima), measured radiation levels, and electronically uploaded the data that they collected to a central website. Volunteers have turned the data into a map which illustrates the amount of detected radiation in each spot. In doing so, Safecast has created a public source repository generated through transparent methodology in real time. This trumps the data released by the Government and TEPCO, whose collection methodology has been opaque and whose release has been slow. At a time when many survivors of the tsunami have fled their homes in Fukushima seeking what they see as safer shelter in Tokyo, this kind of data can shed some light in an otherwise dark time. Japanese Government bureaucrats have taken notice of the surge in citizen science. Minister of Education and Science Masaharu Nakagawa told reporters that «Citizen's groups have played a very important role in examining their neighbors closely. I really appreciate their contribution, as it's most important to eliminate as many hot spots as possible» (quoted in *Wall Street Journal*, 19 October 2011).

Citizen activism has raised its profile quite visibly at public meetings hosted by central Government bureaucrats since the Fukushima meltdowns. These meetings have typically been 'rituals of assent' where bureaucrats make statements and the audience says little in response (Gusterson 2000). Many citizens in nuclear plant host communities reported that Government-sponsored citizens regularly lectured to them on

the necessity and safety of nuclear power plants beginning in the 1990s. Following Fukushima, many citizens have not been willing to accept statements from the Government or industry at face value. Several videos of Fukushima citizens challenging grim-faced bureaucrats on YouTube have garnered nearly a quarter of a million views so far. One video shows a number of clearly angry citizens facing down bureaucrats with statements such as, «People in Fukushima have a right to avoid radiation exposure and live healthy lives, don't they?».Residents forced from their homes in Fukushima have similarly shouted down Government representatives trying to justify 60 page applications for Government assistance. Observers saw citizens yelling «We don't know who we can trust! Can we actually go back home? And if not, can you guarantee our livelihoods?» (quoted in *Reuters*, 18 October 2011). While past large scale polling, such as the World Values Survey, have shown that Japanese residents are less likely to participate in large scale demonstrations, the Fukushima disaster has brought out a new type of activism.

A *Wall Street Journal* article quoted Tokyo resident Taichi Hirano who said that while in the past he had shied away from protest rallies, «I wanted to go somewhere where I could say loudly that I was scared and not be ashamed» (C12, 11 September 2011). He and many other previously uninvolved residents have used social media platforms such as Twitter to seek out other participants for marches in the capital. Organizers across the country carried out a Sayonara Nuclear Power rally in Tokyo's Meiji Park in mid-September 2011 which drew in roughly 40,000 participants. Holding placards and chanting «End nuclear power!» the large crowd listened to talks from celebrities such as popular author Kenzaburō Ōe and musician Ryūichi Sakamoto (*AP News*, 19 September 2011). These coordinated anti-nuclear protests were significant not only because they are relatively rare and indicate new levels of activism, but also because the very act of participation in public protest deepens Japan's democracy and enhances the capacity of often unrepresented demographics, such as urban workers and youth, in the public sphere (Haddad 2010, 2010a). Weekly protests at the home of the prime minister against nuclear power have continued since the accident with reduced numbers of participants (usually in the hundreds).

5 Conclusions

A number of changes to institutions and procedures in the field of nuclear energy indicate the Government's desire to at least publicly demonstrate a move away from decades of top-down, technocratic decision making processes to ones which take seriously the will of the people. While the pre-Fukushima plans for national energy strategy involved the siting of up to 15 more nuclear power plants over the next few decades to increase

nuclear power's share of production to 50%, the Government has clearly taken a new direction. The new basic energy plan from the Government names nuclear power as one of a number of different types of electricity-producing approaches but does not seek to build new reactors or name a target percentage of production through atomic energy. Further, the Government has moved to separate nuclear regulators from nuclear promoters – given that MITI (now METI) had the unsustainable tasks of both ensuring that the industry cut no corners and encouraging firms to create new plants with Government subsidies to host communities.

The new institution – called the Nuclear Regulation Agency (NRA) – has taken over the position of the Nuclear and Industrial Safety Agency (NISA) and absorbed radiation monitoring activities carried out by bureaucrats within the Ministry for Education, Culture, Sports, Science, and Technology (often known as MEXT). To avoid criticisms that the same bureaucrats will simply be reshuffled into the new agency, the Government drew on personnel from the Ministry of Environment to staff it. Further, the NRA itself has been located far from the 'beltway' of downtown Tokyo, using physical distance from the Kasumigaseki and Nagatachō areas to emphasize the supposed independence of this new agency.

Former prime minister Naoto Kan spoke of moving Japan away from nuclear power, and while many companies may be wary and skeptical of the Government's ability to fill in the gap with renewable energy sources, the public is convinced that Japan needs a new energy policy. Local mayors and governors, who in the past could be counted on to support restarts of nuclear power in their communities, seem unwilling to move forward even half a year after the accident. Surveys in March 2014 showed that only one in five local host communities would be willing to allow nuclear restarts in their backyards (*Japan Times*, 3 March 2014). Former prime minister Noda called plans for building new reactors 'unrealistic' but sought to temper their reduction with recognition of the tremendous financial costs it will entail (*New York Times*, 2 September 2011). Further, Noda and the Democratic Party of Japan (DPJ) sought out alternative cost estimates for maintaining Japan's extensive nuclear program beyond those provided by the 'nuclear village' (that is, the firms, bureaucrats, and politicians deeply committed to the field). Initial reports indicated that they saw costs as far higher than the costs typically stated by the industry and its supporters, and this could strengthen Government support for solar, geothermal, and wind power (*Asahi Shinbun*, 14 and 16 September 2011). While there are now political and social challenges to the Iron Triangle of the nuclear industry, there has been no public discussion of any potential changes to the elaborate Dengen Sanpō system or to begin eliminating subsidies to rural host communities. Only time will tell if this large scale catastrophe will break the cycles of addiction created by more than thirty years of redistribution to the periphery of Japan.

Japan's tragedy has taken more than 18,000 lives, destroyed homes and communities, and slowed down an already underperforming economy. But it has also awakened a civil society that for decades has been seen as weak and nonparticipatory. Citizens have stepped forward to engage in community-based science, challenge the information and explanations given to them by Government officials and other authorities, and protest existing policies. In the spring of 2014, Japan's formerly pro-nuclear Government had been forced to move away from business as usual, alter political institutions in the field, and recognize the anger of the population over the issue. Even the conservative judicial system has recognized that Fukushima has ended 'business as usual' in the country. One district court has ordered a Japanese nuclear utility not to restart its reactors because it «could pose a risk of harming personal rights» (*Jiji Press*, 21 May 2014). Decision makers in Japan's energy field seem suspended in time, and the NRA has not hurried to restart reactors. Intense pressure from the Keidanren, large businesses, and the Liberal Democratic Party (LDP) may force decision makers to begin restarts within the next five years. Nevertheless, at the crossroads of the future of energy and politics, Japanese citizens may have the chance to help guide the nation as it moves into the future.

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Can Japan build resilience in the face of climate change?

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Abstract This chapter asks whether the Japanese Central Government's energy policies are likely to build resilience in the face of rapidly climate change as well as paradigmatic shifts centred in the power economy. As with many of its counterparts elsewhere, Japan's Abe Shinzō government – in office from December of 2012 – is powerfully influenced by vested energy interests. Japan's nuclear village in fact wrested firm control of energy policy in the early 2000s. It remains committed to an ambitious programme of restarts and new nuclear build as a way to increase domestic energy self-reliance as well as ramp down greenhouse gas emissions. Japan has since evolved an increasingly ambitious ICT-centred growth strategy that could lead it to develop and deploy the smart city infrastructure (including distributed renewable power and radical efficiency) essential to mitigating and adapting to accelerating climate change as well as achieving energy independence. Japan apparently cannot have it both ways, because the more political, financial and other capital it invests in nuclear power, the lower the incentives to develop and deploy radical efficiency and renewables. In other words, the country confronts an inexpressibly profound and historic choice.

1 Introduction

Through the economic policy of Abenomics, in 2013 Japan entered into perhaps the world's most risky and ambitious economic experiment, aimed at raising inflation to 2% and boosting real economic growth to 3% by 2020. As part of this experiment, the cabinet of prime minister Abe Shinzō passed Japan's information and communications technology (ICT) growth strategy (ICT growth strategy) on 14 June 2013. The ICT growth strategy ostensibly aims at the evolution of a new model of efficient, resilient and green urban and rural infrastructures, and is rooted in a rapidly emergent set of technological revolutions. These revolutions include the renewable-centred 'electricity revolution' outlined by Brookings energy security specialists (Ebinger, Banks 2013), the 'resource revolution' detailed by McKinsey analysts (Heck, Rogers 2014), and 'the second machine age' described by MIT economists (Brynjolfsson, McAfee 2014). Among global firms, General Electric is a leader in applying ICT, which it depicts as the 'Industrial Internet', to its power systems. General Electric's application of ICT in enhancing efficiency and 'predictivity' shows that what one can measure and monitor in real time, one can manage in real time, and thus realize significant efficiencies as well as innovate other capacities such as rapidly updated forecasting (DeWit 2013b). Together with domestic businesses, Japan's central agencies, associations of local governments, and

the Abe regime's regulatory and fiscal initiatives have been working to deploy cutting-edge innovation in a swath of smart city initiatives as well as special zones. Some observers deride these initiatives as comparable to the failed technopolis policies of the 1980s. But this chapter argues that if Japan's initiatives are properly managed and coordinated, they may aid the global community in addressing the very real 21st century challenges of increasing urbanization, expensive and depleting conventional energy, as well as the enormous threat from climate change and the sobering 'death' of stationarity (wherein past hydrologic and other data can no longer be used to predict the future; Milly 2008).

This combination of threats is of deep concern to energy experts in the US Department of Energy (US Department of Energy 2013), the US military,[1] as well as planners of waterworks, power and other crucial infrastructures. Globally, these infrastructures represent trillions of US dollars of sunk costs and annual new investment. Japanese infrastructure stock, for example, is worth roughly 800 trillion yen, and confronts increasing costs due to ageing of the assets as well as the ravages of a rapidly changing climate (Ishikawa 2014). These issues take on added urgency in light of climate denial whose effect has been to conceal the scale and speed of the crisis from the academic community and attentive public. The loss of stationarity means the global community are essentially in uncharted waters concerning the stressors that water, power, transportation, and other urban infrastructures need to be resilient against, now and increasingly over time. So a critical question is whether Japan's Abenomics initiative, particularly the ICT growth strategy, can deal with the death of stationarity and help answer the global community's urgent collective need for sustainability.

2 Climate change and its accelerating risks

The mainstream democratic discourse on climate change realities and risks has not kept pace with the science and the activism of military and other actors. That lack of engagement could be very costly in pecuniary and human terms, even in the short run, because of the acceleration of climate change and the ongoing investment in infrastructure that is probably not resilient to climate change. The awareness deficit concerning climate change was seen in the run-up to, and aftermath of, the 27 September 2013 release of the International Panel on Climate Change's (IPCC) Fifth Assessment Report's first instalment and summary report.

1 *The Quadrennial Defense Review* 2014, like its 2010 predecessor and many other US military publications, emphasizes the threat from climate change and the need to respond by renewable energy, efficiency and other elements of resilience (US Department of Defense 2014).

The release was preceded by a sadly effective 'denialist' media campaign that positioned the IPCC report as alarmist while also claiming that it showed the previous decade and a half had seen a 'pause' in climate change (Fischer 2013). This disinformation campaign continued after the report's release.

The global public debate's incredible disconnect with the reality of increasingly frequent extreme weather and other phenomena is dispiriting. Because of the widely held belief that climate change is only a catastrophe for coming generations (in itself, a morally odious complacency), this chapter reviews solid evidence that climate change is very much a present and rapidly worsening peril.

Geographically, the *Global Climate Risk Index 2013* shows that the countries most affected in 2011 were Thailand, Cambodia, Pakistan, El Salvador and the Philippines (Harmeling, Eckstein 2012). A more comprehensive and nearly real-time accounting of climate risk and adaptive capacity has been pioneered since 2011 by the Alliance Development Works/Bündnis Entwicklung hilft, a coalition of German development and relief agencies.[2] Working in conjunction with the United Nations University's Institute for Environment and Human Security,[3] the Nature Conservatory,[4] and others, they have compiled the World Risk Report. In addition to the worsening effects of climate change, the Report's risk-weighting takes into account social and economic factors relevant to adaptation and disaster response.

2 On the composition of Alliance Development Works, see their organizational overview at: http://www.entwicklung-hilft.de/About-us.180.0.html.

3 The United Nations University's Institute for Environment and Human Security has its own Expert Working Group on Measuring Vulnerability: http://www.ehs.unu.edu/article/read/measuring-vulnerability.

4 The Nature Conservatory was founded in 1951, and is primarily a science-driven (employing 550 scientists) 'conservation by design' programme that is active in all US states as well as 35 countries. They describe 'conservation by design' as «a systematic approach that determines where to work, what to conserve, what strategies we should use and how effective we have been»: http://www.nature.org/ourscience/conservationbydesign/index.htm.

Table1. World Risk Index

Rank	Country	Risk (%)
1	Vanuatu	36.43
2	Tonga	28.23
3	Philippines	27.52
4	Guatemala	20.88
5	Bangladesh	19.81
6	Solomon Islands	18.11
7	Costa Rica	16.94
8	El Salvador	16.90
9	Cambodia	16.90
10	Timor Leste	16.85
11	Papua New Guinea	15.90
12	Brunei Darussalam	15.80
13	Mauritius	15.18
14	Nicaragua	14.89
15	Japan	14.10

Source: WeltRisikoBericht 2013 p 9

As is evident from Table 1, the *World Risk Report 2013*, released (in German)[5] in September of 2013, indicated that the countries most at risk from the impacts of climate change were concentrated overwhelmingly in the Asia-Pacific (Alliance Development Works, Bundnis Entwichlung Hilft's 2013).

Incredibly, Japan's immense wealth – second only to that of the US – was not enough to offset its exposure, and its risk assessment placed it 15th. This is in sharp contrast with the other developed states, as the US is ranked at 127th (3.99%) and Germany is 146th (3.24%).

The US National Oceanic and Atmospheric Administration (NOAA) satellite measurements of trends in sea surface levels provide another arresting indication of the threat level in the Asia-Pacific. The NOAA work shows that sea-level rise from 1992 to 2010 was not uniform across the world ocean, but rather varied greatly by region. Sea levels in the mid-oceanic area of the Pacific decreased over the relevant period, whereas the Western Pacific and South Asian regions saw dramatic increases. These regions' trends in

5 *The nature conservancy* was not a party to the 2013 *Report*. The English version of the *Report* is slated for publication in October of 2013.

sea-level rise exceed those recorded elsewhere, and lead to greater vulnerability to storm surges, coastal erosion, and similar threats (NOAA 2012).

Moreover, the NOAA work is part of a December 2012 report compiled by the NOAA in conjunction with the United States Geological Survey, the US Army Corps of Engineers and the US Department of Defense Strategic Environmental Research and Development Program (SERDP). The SERDP is co-managed by the Department of Defense, the Department of Energy and the Environmental Protection Agency, serving to bond these agencies, and is thus a key institution in the American military-centred green industrial policy initiative (DeWit 2013c).[6] These federal agencies continue to expand their collaboration, including the above-noted December 2012 report. This research was background material for America's 2014 National Climate Assessment, which was released on 6 May 2014 Especially relevant to our purposes here, the SERPD et al. report warns that:

> [a] wide range of estimates for future global mean SLR [sea level rise] are scattered throughout the scientific literature and other high profile assessments, such as previous reports of the NCA [National Climate Assessment] and the Intergovernmental Panel on Climate Change (IPCC). Aside from this report, there is currently no coordinated, interagency effort in the US to identify agreed upon global mean SLR estimates for the purpose of coastal planning, policy, and management. This is an important gap because identifying global mean SLR estimates is a critical step in assessing coastal impacts and vulnerabilities.

In short, the key scientific-military agencies of the US state are collaborating in order to make up for the shortcomings of the IPCC.

The IPCC report's findings were labeled as alarmist by denialists bent on defining the limits of debate. Would that the IPCC were indeed an exaggerated account of what we collectively confront. But in fact the IPCC process omits from its purview such significant feedback effects as methane release from thawing permafrost,[7] the dramatic increase in 'anthropogenic' forest and bushfires, and other factors (Glikson 2013).

6 See the SERDP's introduction at: http://www.serdp.org/About-SERDP-and-ESTCP

7 On this omission, see the UN Environmental Programme's (UNEP) call for the IPCC to «consider preparing a special assessment report on how CO_2 and methane emissions from thawing permafrost would influence global climate to support climate change policy discussions and treaty negotiations. All climate projections in the IPCC Fifth Assessment Report, due for release in 2013-2014, are likely to be biased on the low side relative to global temperature because the models did not include the permafrost carbon feedback». The UNEP warn that the failure to include this source of greenhouse gas emissions may lead to overshoot of the globally agreed 2C limit on warming, and that nations with significant permafrost (especially Russia, Canada, China and the US) risk being unprepared for the effect of permafrost degradation on critical infrastructure (UNEP [Schaefer, Kevin et al.] 2012).

The IPCC is also not able to incorporate the flood of recent and robust research results. For example, the IPCC report omits the 18 February 2014 news release from the NOAA that its satellites have detected significant reduction of the Arctic albedo. Satellite measurements were used to calculate that the reduction in the reflectivity of the Arctic had gone from 52% in 1979 to 48% in 2011, a magnitude roughly twice that determined in previous studies. The NOAA scientists' new calculation of albedo change in the Arctic estimates that the effect of the phenomenon is about one-quarter that caused by increased levels of CO_2 in the atmosphere (Monroe, Viñas 2014). That level of influence is a massive addition to the other positive feedback effects noted earlier.

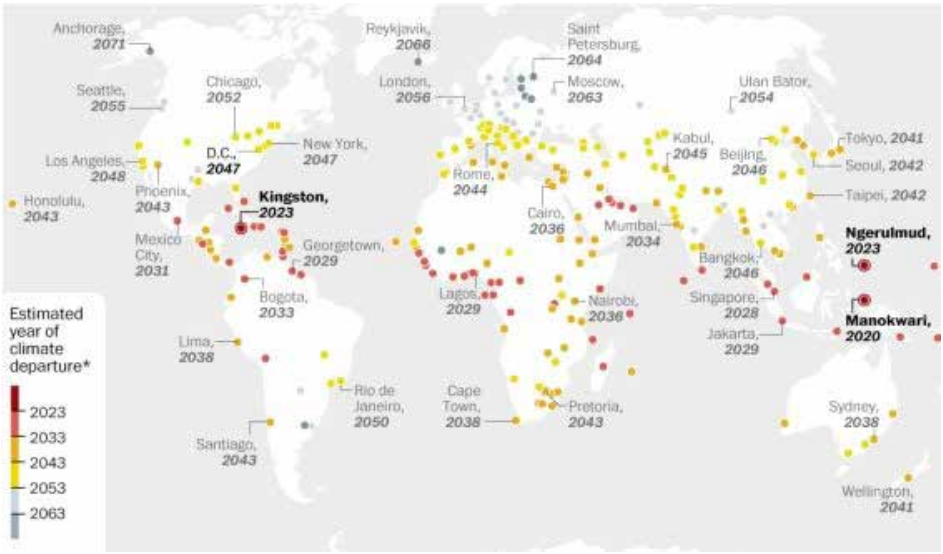
Yet another very pertinent oversight is detailed by urban planning expert Brian Stone in his 2012 book *The City and the Coming Climate*. He warns that climate scientists rely on about 6,000 weather stations globally, and that scientists deliberately adjust the temperatures recorded at the urban-area stations in order to have them conform to temperature readings in nearby rural areas. Yet this adjustment of the data means that «climate scientists are effectively removing the known effects of land-use changes from the global temperature record». As a result, their data do not reflect the absolute warming of the planet, but only that due to greenhouse gases. Stone points out that cities comprise only about 3% of the Earth's surface, so this practice of adjusting the data does not mean that surveys miss much of the big picture of warming per se. Rather, they overlook what is happening in cities: «global-scale climate trend analyses carried out by GISS [NASA Goddard Institute for Space Studies] and other global climate research groups provide little insight into the pace and extent of climate change underway in urban environments».

This particular oversight, in conjunction with under-estimates of albedo change and other feedback effects, seems likely to be of enormous significance over the coming years. The Military Advisory Board of the US Center for Naval Analysis, in its May 2014 report on *National Security and the Accelerating Risks of Climate Change*, warns that 15 of the world's largest urban areas are near coasts, and that 14 of the 20 largest urban areas are in Asia (US Center for Naval Analysis 2014). Over 50% of the 7 billion global population now live in cities. This share is expected to increase to 60% urban by 2030 and 70% by 2050, the latter number representing some 6.4 billion people (World Health Organization 2013). Thus, under business as usual, most of humanity will be in heat islands close to increasingly dangerous shores. In spite of these sobering statistics, there are no regular surveys of urban-area warming being undertaken to fill in the gap left by the cautious smoothing of the weather-station data. Considering the peril implied by this state of affairs, Stone appears correct in depicting this «approach to climate change monitoring that effectively ignores the most heavily populated regions of the planet» as «an irony seeming worthy of

a Seinfeld skit: ask a climate scientist how rapidly the climate is warming and you will get an answer; ask a climate scientist how rapidly your city is warming and you will get a shrug» (Stone 2012, pp. 80-81).

As of 13 October 2013, that shrug can be replaced with a sobering citation. In the wake of the IPCC Report's release, a meta-analysis, or overview, of climate trends sought to calculate «[t]he projected timing of climate departure from recent variability» (Mora et al. 2013). The analyses used historical (1860 to 2005) temperature data for areas of the terrestrial surface, and then ran a meta-analysis of climate models to determine when any given area's coolest monthly temperature would exceed the historical average for its hottest year. The study determined that on average, with no mitigation of current emissions of greenhouse gases, temperatures across the world's cities are likely to exceed their historical norms by about mid-century. As figure 1 reveals, the Indonesian city of Manokwari is expected to exceed its historic temperature norms by 2020, and Tokyo will follow roughly two decades later.

Figure1. Hot spots: global temperature rise

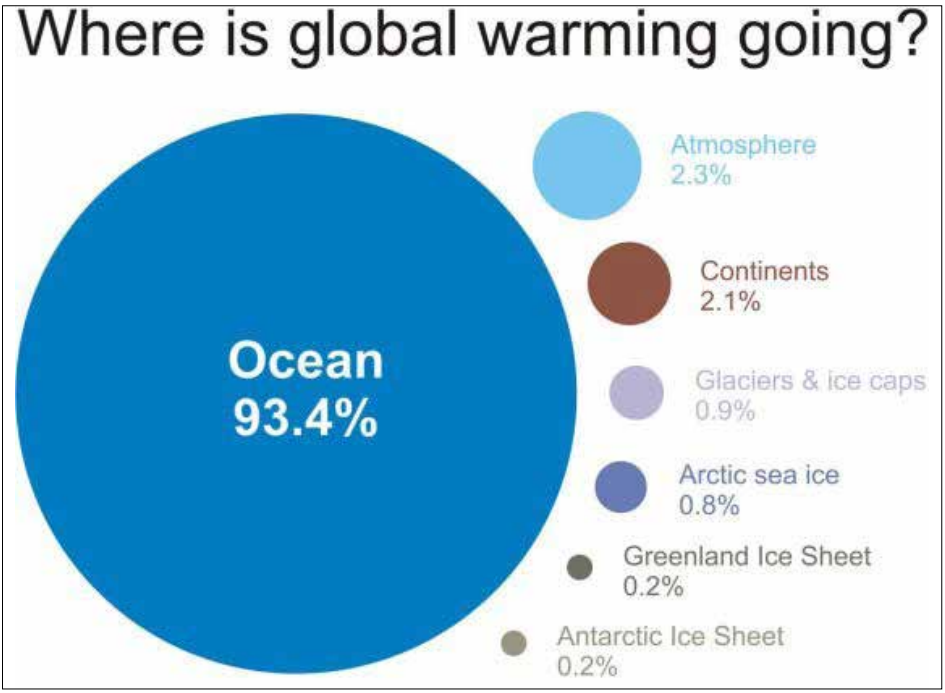


Source: Nature. Graphic: Leonard Bernstein; Gene Thorp, *The Washington Post*, 9 October 2013

And contrary to the dangerously distracting denialist claims, there has been no pause in climate change. Atmospheric temperatures plateaued at the 1998 peak, but the heat content of the world ocean did not. The world ocean is roughly 800 times the density of air at sea level, covers just

over 70% of the terrestrial surface, and comprises 98% of the 1.4 billion cubic kilometres of water on Earth («Ocean Stratification» in Schlosser et al. 2007). This immensity makes the world ocean the biggest element of the climate system, an element that absorbs well over 90% of the roughly 4 Hiroshima bombs per second of excess heat trapped by anthropogenic greenhouse gas emissions (the calculation in terms of Hiroshima bombs is in Church et al. 2011). The percentages are depicted in figure 2 below, which illustrates heat absorption by major climate system components over the period 1993 to 2003, as calculated by the IPCC's 2007 report (AR4, Section 5.2.2.3. IPCC 2007).

Figure 2. Heat absorption by terrestrial climate systems

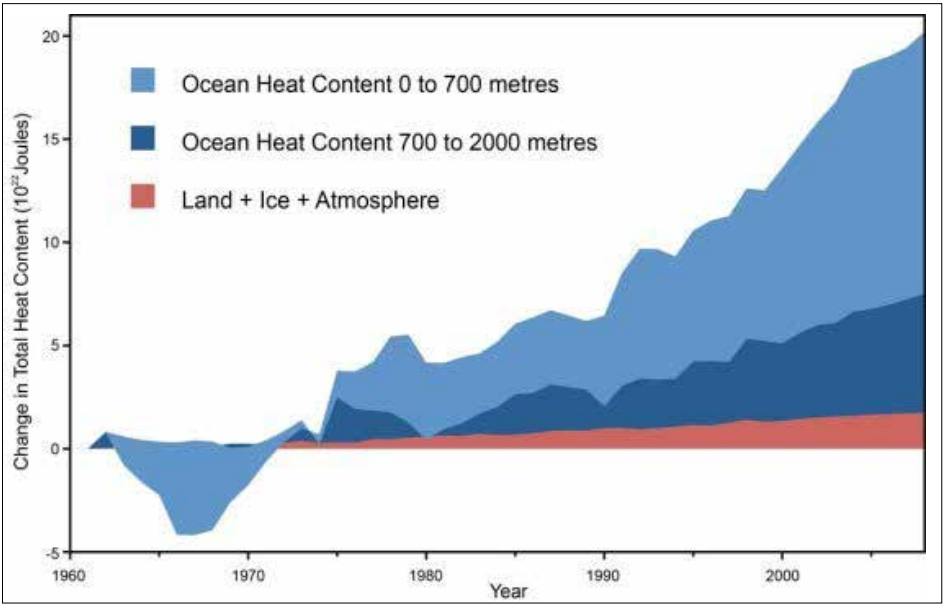


Source: http://www.skepticalscience.com/no-warming-in-16-years.htm

The role of the ocean in absorbing heat over time – since 1960 – is portrayed in figure 3. The colossal absorptive role of the world ocean in the climate system is due to the fact that water is roughly 800 times the density of air at sea level and there is so much of it. Waves have 1,000 times the kinetic energy of wind (Ocean Energy Council 2014), which is the reason

intense storm activity in the UK during early 2014 saw years of average rates of coastal erosion take place in a few hours in some locations (Beament 2014). These facts are just a few clues as to why the US Navy is a leader on climate change and renewable energy. The Navy works in the water, and hence is compelled to understand climate change as an empirical fact. Indeed, it is painfully aware that its – and the world's – largest naval base in Norfolk, Virginia (Naval Station Norfolk) is vulnerable to flooding and that all infrastructure investments and planning must be made with that in mind lest they be expensive waste years or decades later (Cahn 2013).

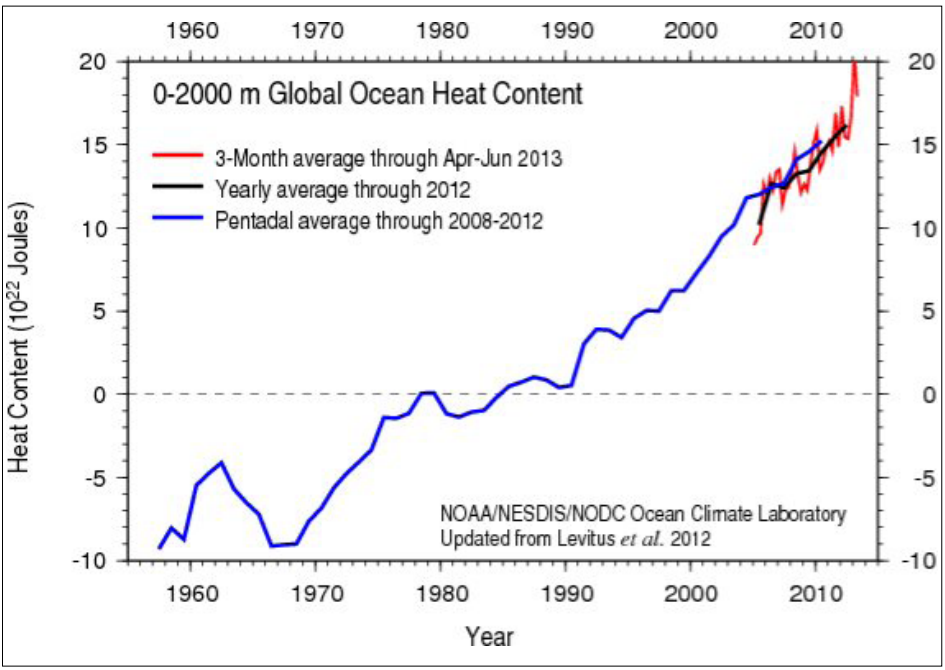
Figure 3. Trends in climate system heat absorption, 1960-2008



Source: http://www.skepticalscience.com/docs/Comment_on_DK12.pdf

Figure 4 from the US National Oceanographic Data Center gives an indication of trends in oceanic heat content, together with disturbing evidence of recent acceleration. These data are also confirmed by the European Centre for Medium-Range Weather Forecasts' Ocean Reanalysis System 4 (ORAS4), using buoy and other data inputted into a highly sophisticated model. The ORAS4 assessment cautions that «recent warming rates of the waters below 700 m appear to be unprecedented» (Nuccitelli 2013).

Figure 4. Five decades of global ocean heat content, 0 to 2,000 meters



Source: http://www.nodc.noaa.gov/OC5/3M_HEAT_CONTENT/

With this evidence in mind, the IPCC hardly seems alarmist. Indeed, in a startling demonstration of – to be frank – how hobbled the IPCC's inherently conservative reporting process has become, its scenarios are generally ignored by SERPD and other agencies that require comprehensive and real-time assessments.[8] The IPCC certainly deserves high praise as humanity's biggest-ever collaborative scientific endeavor, and justly received the 2007 Nobel Peace Prize for its work. But the IPCC compiles its roughly septennial reports from already published research, often several years old. It also has to reach a consensus. Worse yet, the IPCC's April 2014 summary report, a 33-pages overview for policymakers that is what most people actually read, was «gutted at the insistence of government officials» according to report co-author Harvard University Professor Robert Stavins (Clark 2014).

8 One indicator of how urgent such assessments are is seen in the draft version of the US 2013 National Climate Assessment. The assessment's chapter 29 lists research goals, and prioritizes – as «Research Goal 1» – «understanding the role of feedbacks, thresholds, extreme events, and abrupt changes that may disrupt natural and socioeconomic systems, as well as the implications of more gradual changes and also the degree and effectiveness of response actions» (*US Global Change Research Program* 2013, p. 1035).

These and other problems leave the IPCC well behind the curve of scientific discovery and disabled in the public debate. Hence, military and other institutions that see the world in terms of risk, confront the fallout from that risk in their operations, and are thus compelled to act have turned elsewhere. The global insurance industry, for one, has been emphasizing catastrophe modeling for over a decade, and is moving towards an «open modeling platform» (Clark 2013a). And as SERPD reveals:«In coordination with the efforts of the other federal science providers, SERDP's goal is to ensure DoD [Department of Defense] has the necessary science and tools to support climate change-related vulnerability and impact assessment. A suite of SERDP projects are *developing the methodologies and tools* [emphasis added] needed to assess the physical effects of sea level rise and storm surge and the impacts to mission-essential infrastructure over a broad range of both geophysical settings and extant climate conditions» (SERDP [no date]).

That point deserves to be underlined. These US federal agencies, with the military at their core, are constructing analytical mechanisms to appraise and adapt to a multifaceted phenomenon of unprecedented speed and scale. They have good reason to: the current pace of climate change has recently been authoritatively assessed as «at least 10 times faster than any climate shift in the past 65 million years» (Carey 2013; Diffenbaugh, Field 2013). Most of the institutions of civil society and public governance – 19th century institutions using 20th century policy to address 21st century crises – are distracted by the well-funded denialist politics of climate change (the best analysis of the denialist strategy and campaign is Oreskes, Conway 2010). An additional hurdle appears to be human beings' socio-psychological predisposition to ignore a comparatively gradual but increasingly costly, and potentially catastrophic, phenomenon like climate change (one of the most instructive explorations of this fact is Kari Marie Norgaard's study of well-educated and aware Norwegians' complacency; cf. Norgaard 2011). But climate change's already quantifiable impacts on energy, water and other infrastructure have forced military and other institutions sensitive to atmospheric and oceanic signals to respond. Most national governments are too beholden to vested interests in large swathes of the economy, leaving militaries, many cities[9] and other actors to implement wide-ranging programs to strengthen vulnerable infrastructure, reduce greenhouse gas emissions, and otherwise respond to environmental disasters globally.

9 On the role of cities, see the detailed and well-designed visual presentation from the C-40 cities *Global Leadership on Climate Change* group: `http://www.c40cities.org/ending-climate-change-begins-in-the-city`. The Asian Cities Climate Change Resilience Network (ACCCRN) is also focused on the threat to the Asian region: `http://www.rockefellerfoundation.org/our-work/current-work/climate-change-resilience/asian-cities-climate-change-resilience`.

3 Sayonara stationarity

The OECD has provided a glimpse of the scale of the threat posed by the failure of national governments and their international agencies to prepare. Roughly co-incident with the September 2013 release of the IPCC summary report, the OECD published their survey of *Water and Climate Change Adaptation: Policies to Navigate Uncharted Waters*. The OECD study examined all 34 member countries and the European Commission's policies on water and climate change adaptation. These surveys are usually quite dry and of interest only to a very few specialists. But fortunately the OECD framed the survey with a concise and cogent argument that «climate change is to a large extent water change. Climate change affects all aspects of the water cycle and water is the main way through which the impacts of climate change will be felt». The OECD also advises that there is a «growing recognition that climate change presents a singular challenge for water systems by rendering the historical assumption of stationarity increasingly irrelevant». The best short definition of «stationarity» is «the idea that natural systems fluctuate within an unchanging envelope of variability» (Milly et al. 2008). In the OECD's view, the end of stationarity «means that a fundamental assumption upon which water management, infrastructure design and planning, and ultimately many economic and resource management decisions are founded will no longer be a reliable basis for future planning and management» (OECD 2013).

This observation is profound in its implications. It not only backs up the meta-analysis of temperature shifts described above; it also details some of the implications. The end of stationarity means that expensive, multi-decadal infrastructure decisions lack reliable measures for how hardened they should be to contend with water, the biggest element of the climate system. Urban managers and others can have no confidence in future levels of precipitation as well as how rapidly to try and adapt. The loss of stationarity also means that past investments in roadways, waterworks, energy systems, and the like may be vulnerable.

One concrete example is that in Tokyo, between 23 July and 15 August of 2013, there were 77 recorded 'guerrilla rain' (intense rainfall) events, roughly 6 times the level of the year previously. Wary of these realities, the Japanese Ministry of the Environment set up a committee to study the effects of climate change, which first met in August of 2013. The committee is slated to produce a report on countermeasures by the spring of 2015, and then refer the report to the Japanese cabinet for approval. Yet there is already concern that the accelerating pace of extreme weather events may mean that it is going to take too long to study extreme weather, arrive at some assessment of risk, and then start building or

bolstering infrastructure to cope with it.[10] The global community saw a startling display of what the end of stationarity means when Hurricane Sandy hit New York City in late October of 2012, knocking out its power grid and turning sections of its subway system into a sewer (Metcalfe 2012). In late August of 2013, 60% of the Philippine capital Manila was flooded by torrential rains that unleashed more than a month's worth of precipitation in a single day (Hranjski 2013). And then on 8 November of the same year, Typhoon Haiyan struck the central region of the Philippines as perhaps the strongest-ever storm to make landfall (Lum, Margesson 2014). Much of the urban infrastructure that has been built and is being built could become death-traps, particularly for children and the elderly, in the midst of natural disasters.

The enormity of the disaster threat makes it difficult to exaggerate the degree of urgency when it comes to water. But on top of that, water has a huge and largely irreplaceable role in all aspects of conventional energy. Studies of water stress and interrelated resource crises in Asia highlight the vulnerability of China and India. These studies include work from such international agencies as the World Bank (Rodriguez et al. 2013) and the IEA (Morales 2012), General Electric[11] and other multinational firms, military think tanks, and national governments. The US Woodrow Wilson Center was among the first to caution that business as usual will see China's northern provinces, the source of 70% of its coal and 20% of its grain, run out of water by the end of the present decade (Liu 2013).

The flip side is the growing vulnerability of conventional-energy infrastructure to water crises, even in very developed countries. For example, the US Department of Energy's 16 July 2013 report on *US energy sector vulnerabilities to climate change and extreme weather* details the impact that more frequent and severe floods, droughts, heat waves and other phenomena are delivering to America's energy infrastructure and other aspects of its built environment (US Department of Energy 2013). The July 2013 edition of *Public Utilities Fortnightly* also outlines America's ever more visible and costly problem in a lengthy article on «The growing footprint of climate change» (Kintner-Meyer, Kraucunas 2013). The denialist campaign, along with socio-psychological complacency, has diverted and impeded governments and their publics from paying attention and acting, but the evidence of dire and increasingly costly crises is visible even in trade publications.

10 See (in Japanese) «Build an escape route for floods: The city explores underground», *Nikkei Ecology*, March 2014.

11 General Electric has built 270 gas turbines, 70 steam turbines, 40 gasification turbines, and well over 1000 wind turbines in China. The company's China Technology Center in Shanghai is one of GE's four top global research centres. See «China», General Electric, Energy, 2013: `http://www.ge-energy.com/solutions/regions/china.jsp`.

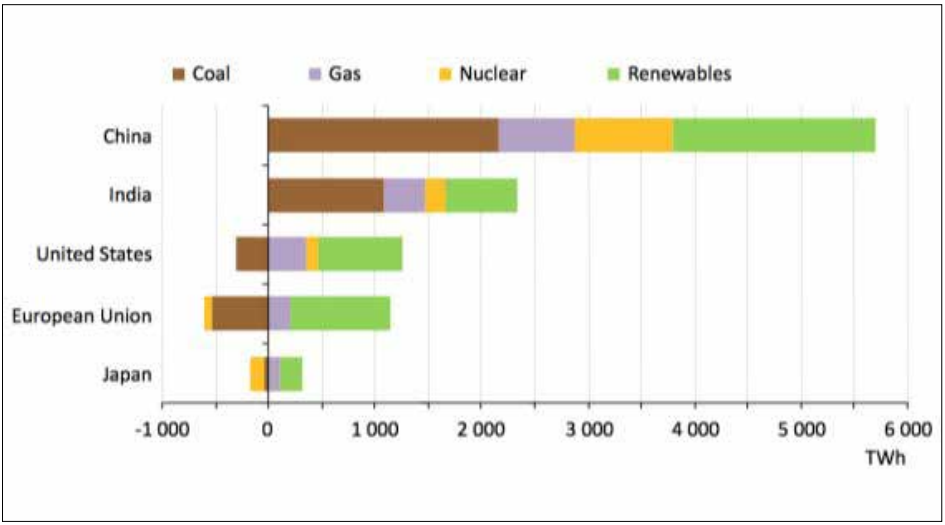
In short, the rapidly unfolding reality of climate change is expressed most palpably and dangerously through the hydrologic cycle. That unfolding is pressing on the urban and other infrastructures that were not designed with such stressors in mind. And the loss of stationarity means that it is unclear what to do, save to maximize resilience as rapidly as possible.

4 Is abenomics up to this challenge?

Japan's Abe regime is not especially interested in the above facts. Like many of its counterparts elsewhere, the Abe cabinet is powerfully influenced by vested energy interests. In Japan, the nuclear village gained firm control of energy policy in the early 2000s, and was bent on an ambitious programme of new nuclear build as a way to increase domestic self-reliance as well as ramp down greenhouse gas emissions. Abe has repeatedly made it clear that he wants to restart as many as possible, and as fast as possible, of the 48 reactors shut down due to the 11 March 2011 disaster at Fukushima Daiichi and its fallout.

For its part, the nuclear village is desperate not merely for restarts of idled plant, but is openly pursuing a commitment to new nuclear build («Genpatsu no shin zōsetsu o» 2013). So this is a crucial time for the Japanese energy economy in particular as well as the overall economy per se. As noted in the introduction, Japan has an ICT-centred growth strategy that could lead it to develop and deploy the smart city infrastructure (including distributed renewable power and radical efficiency) essential to mitigating and adapting to accelerating climate change. But the more political, financial and other capital Japan invests in nuclear restarts as well as new nuclear build, the lower the demand for radical efficiency and renewables. As we see from figure 5 below, the IEA's 2012 World Energy Outlook suggests that Japan is not going to grow as a power economy over the ensuing two and a half decades. And note that the IEA's figures are perhaps conservative, in that they do not reflect the possible shrinkage of the power economy overall through radical efficiency, especially in capturing waste heat.

Figure 5. Change in power generation: 2010-2035



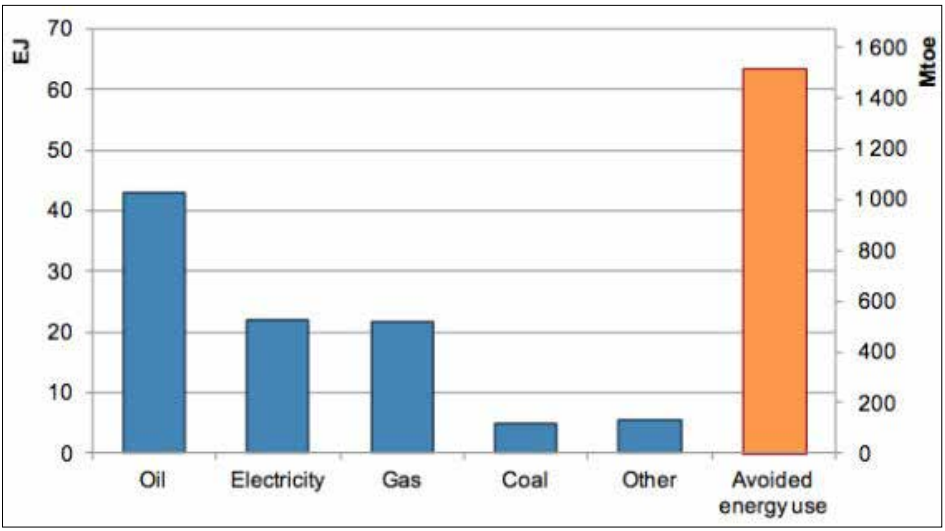
Source: IEA, World Energy Outlook 2012

Figure 5 suggests that unlike the United States, where 'all of the above' is the ostensible strategy of the Obama regime, Japan does not have the luxury of obfuscating choices. Japan's energy politics is largely a zero-sum game, wherein turning back to nuclear will reduce the country's incentives to deploy radical efficiency and renewables as well as further innovate new technologies and business models in these crucial areas of the smart-city paradigm.

It would likely be unwise to weaken those incentives. Diffusion of efficiency and renewables are key to the ICT growth strategy as well as ramping down demand and emissions. And the simultaneous development of new technologies and deployment of competitive business models are key to leadership in the global contest to innovate robust mitigation and adaptation models. The IEA Energy Efficiency Market Report 2013, released on 16 October of 2013 strikingly demonstrates how potent efficiency has become in an era of high energy prices. Figure 6 shows that efficiency has led to avoided energy use for 2010 in 11 IEA member countries[12] that greatly exceeds even the consumption of oil. And the IEA stresses that there is a lot more efficiency potential to be exploited.

12 The countries are Australia, Denmark, Finland, France, Germany, Italy, Japan, the Netherlands, Sweden, the United Kingdom and the United States.

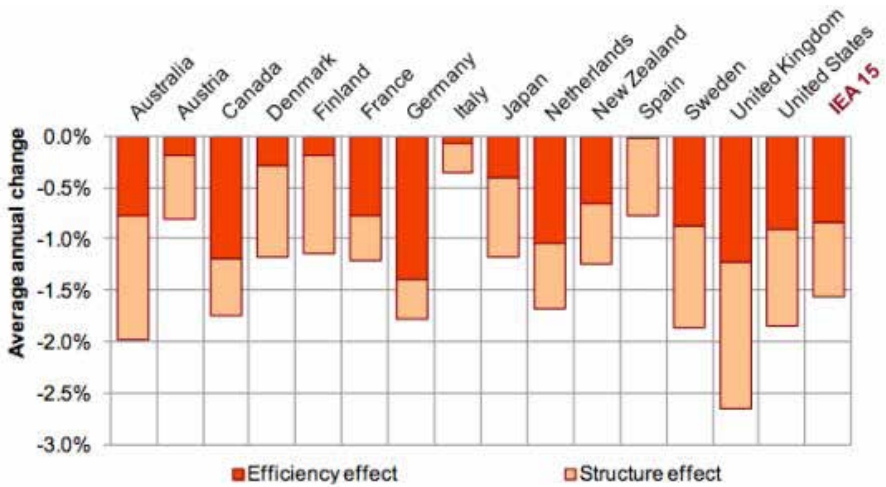
Figure 6. The 'first fuel': contribution of energy efficiency compared to other energy resources consumed in 2010 in 11 IEA member countries



Source: IEA Energy Efficiency Market Report 2013, Figure 3.4

Figure 7 shows us that Japan's performance in achieving efficiency gains between 1990 to 2010 was respectable. Japan achieved greater efficiency gains than Spain and Italy, but it was not a leader comparable to the UK or Germany. Just as Japan's renewable deployment was held back by poor policies, over the past decade and a half the country has also lacked robust policies for efficiency.

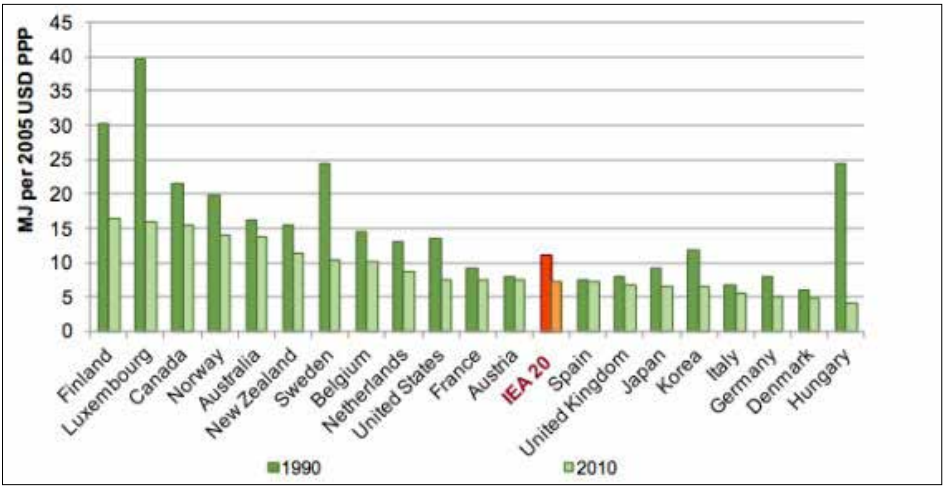
Figure 7. Changes in aggregate intensities of 15 member IEA countries, decomposed into structure and efficiency effects, 1990-2010



Source: IEA Energy Efficiency Market Report 2013, Figure 3.10

Japan's middling performance in increasing efficiency is not due to being the 'wrung-out sponge' claimed by the business lobby Keidanren (De-Wit 2013a). Keidanren routinely makes this argument in insisting that Japan's efficiency, especially its industrial energy efficiency, is number one in the world. Its rhetoric is aimed at fostering overseas sales as well as avoiding more stringent targets than its member firms decide via the voluntary action initiatives. Their efforts are to be lauded, but it would appear that more stringent, better-coordinated policies are in order. Japan needs to remain competitive in the core areas of energy, the world's largest and most strategic business sector. But figure 8 demonstrates that Japanese efficiency in industrial energy use per unit of value-added is matched or exceeded by a growing number of competitors.

Figure 8. Industrial energy use per unit of value-added for 20 IEA member countries, 1990 and 2010



Source: IEA Energy Efficiency Market Report 2013, Figure 3.11

Notwithstanding drawing-board fantasies of small-modular reactors,[13] it seems very unlikely that a nuclear-powered model will become core to the smart city. Like other centralized power in an era of climate change, nuclear is threatened by its reliance on lots of water as well as the effects of water and temperature on its critical infrastructure. Moreover, there is no nuclear that is not reliant on extensive and far more generous government subsidies than those directed to renewables, which in fact are already competitive – even against natural gas and coal – in parts of the United States, Australia, and elsewhere.[14]

At this critical juncture, for Japan to choose restarts, let alone more nuclear build, would likely see it evolve into a high cost, uncompetitive and environmentally unsustainable Galapagos. It would undermine its incentives to move ahead in renewables and efficiency. But were Japan to choose radical efficiency and renewables, with its ambitious ICT growth strategy at the core, and coordinated by a focused cabinet and prime minister, it could become the model for a sustainable and resilient 21st century urban and rural economy.

13 Dr. Mark Cooper, senior fellow for economic analysis at the Institute for Energy and the Environment at Vermont Law School, has calculated that these reactors would be even more costly than conventional nuclear as well as distract from the development and deployment of renewables power and radical efficiency (Cooper 2014).

14 These facts have even been recognized by the *Financial Times* (Clark 2013b).

5 Grounds for optimism

In spite of the Abe cabinet's limitations, there are grounds for expecting results from Japan. The cabinet is distracted by geopolitics and historical revisionism, to the extent that in mid-May of 2014 famed Wall Street hedge fund investor Jim Chanos came out and gave voice to the growing concern that Abe is an ultranationalist and the most dangerous figure in Asia (Copeland 2014). A distracted cabinet increasingly finds it difficult to dominate the energy-policy outcome, allowing alternatives to proceed. It would be better to have the prime minister focused on the ICT growth strategy, of course, but at least his distraction precludes him from meddling.

Contrary to Abe's preference for the nuclear village, the shock of the Fukushima meltdowns in March of 2011 destabilized and delegitimated it in the public eye. A 18 March 2014 poll by the Asahi Shinbun indicates that 59% of the Japanese public hence oppose restarts of any nuclear capacity, whereas only 28% support restarts. The poll's results not only confirm that the opposition to nuclear is holding; it also shows a great sensitivity to risk. According to the poll, only 12% of the Japanese public have either no or only minimal concern regarding the risk of further nuclear accidents at facilities other than the infamous Fukushima Daiichi plant. By contrast, 50% have a fair degree of concern, and 36% have a very high degree of concern. In addition, the poll shows that only 4% of respondents regard the lack of nuclear waste disposal facilities as of no or only minimal concern. By contrast, 19% believe it is to some extent a problem. And a massive 76% regard it as a serious problem («Genpatsu sai kadō 'hantai' 59%...» 2014).

Moreover, at the end of 2013, Japan's 16 trillion yen power market featured 192 independent power producers, including such new entrants as Toyota. That number was 79 at the end of 2012, and there has thus been a 240% increase in the number of firms («Shin denryoku, kōri kyōkyū wa 2 wari domari...» 2014). Japan's 'feed in tariff' policy support for diffusing renewables, effective from July of 2012, saw over four gigawatts (roughly four large nuclear reactors worth) of new renewable capacity deployed in the initial year. And the Pew Research 3 April 2014 publication of *Who's Winning the Clean Energy Race? 2013* argues that «Japan experienced the fastest investment growth in the world, increasing 80%, to almost $29 billion» (Pew Environmental Initiatives 2014).

Most important perhaps, Japan's local governments exhibit increasing eagerness to seize the opportunity for economic development and local resilience in the emergence of alternatives to highly centralized and concentrated nuclear power. Centralized power, such as nuclear reactors, led to concentrated economic benefits for a few communities whereas the risks of accident were distributed among a much broader range of communities. Fukushima Prefecture's post-3-11 commitment to 100% renewable energy

by 2040 encouraged other prefectures and cities, including Tokyo, Kyoto, and Osaka, to adopt ambitious targets (DeWit 2014).

In short, the context of Japan's energy policy has been dramatically altered by Fukushima and subsequent developments. New ideas and influence in power and energy policymaking continue to spread out among a larger range of actors within the central government and among the regional governments. In the wake of 3-11 many of these actors used regional blocs and other vehicles to collaborate and apply pressure to central government agencies for accelerated rollout of distributed generation and other key elements for modernizing the power- and energy-economy. This collaboration has also focused on the smart cities and smart grids and other ICT-centered infrastructure that the nuclear village has always been wary of as a threat to its business model. The nuclear village recognized the threat to their paradigm of centralized power production and highly concentrated income streams. But the rebuild of Japan's devastated Northeast region provided a significant foothold to expand the rather constrained smart city projects that had been under way since the late 2000s and increase their diversity as well as their deployment of renewables and more radical efficiency.

As to scale of the opportunity, the Japanese Ministry of Internal Affairs and Communications (MIC) indicates that the role of ICT in the Japanese economy is already large. Its 2013 White Paper on Communications indicates that nominal output by the various sectors of the Japanese economy totaled 918.6 trillion yen in 2011. The ICT industry represented 9% of that output, or 82.7 trillion yen. This total was considerably larger than such sectors as wholesale, which accounted for 6.5% of economic activity or 59.4 trillion yen. Construction, once the key sector in Japan's domestic economy, accounted for 5.6% of economic activity or 51.2 trillion yen.

The MIC data also suggest that a strategic focus on ICT can help countries grow their economies by consuming less. The data also demonstrate that investment in ICT has a significantly larger multiplier effect than general investment. The 'multiplier effect' refers to the amount of economic activity generated as a result of a given volume of investment. Drawing on a growing body of work suggesting that investment in software and other such 'intangibles' (as opposed to such 'tangibles' as plant and equipment) is very productive, the MIC project that the multiplier effect of ICT investment in 2015 may be as high as 1.98 versus 1.19 for general investment.

The ICT-centred growth strategy was approved by the Abe Cabinet on 14 June 2013. The growth strategy is also very powerfully informed by the disruptive potential opened up by the rebuild of the devastated regions on the basis of renewable and distributed energy. As with the ICT-centered 'industrial Internet', 'machine to machine', 'big data', and related emergent paradigms, the growth strategy is aimed at a profound restructuring of the energy economy as well as much of the rest of the infrastructures that

make up the modern urban community and the exchange of resources and information among citizens, businesses and their governments. This emergent paradigm is not peculiar to Japan. The smart city model had begun to accrete, as idea and practice, in the early 2000s. But from the beginning of the 2010s, worsening resource, economic, and climate crises were paralleled by such technical advances as the diffusion of 'big data' analytics via the cheapening and miniaturization of sensors. Enabled by the rapid diffusion of increasingly inexpensive ICT, distributed energy, smart public policy, and such vendors as Hitachi, Toshiba, Mitsubishi, Toyota, IBM, GE, Bechtel, Siemens, AT&T and others desperate to deploy the most competitive business models, there are now thousands of projects and a market whose scale and growth defy calculation (Smart Cities Council 2013).

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 very well (Townsend 2013),[15] these trends are already reshaping urbanization. These developments increasingly point to the disruption not just of centralized power generation and transmission but also of a resource-intensive growth dynamic that has characterized the developed economies over the past six decades.

We have seen that Japan itself is threatened by climate change, along with its region overall, so building resilience into all infrastructures is truly in its own existential self–interest as well as its enlightened self-interest as an exporter. This argument has not yet gained the status of common sense in the overall policy debate. Even so, ideas do change and interests alter their strategies. Consider how in Japan the nuclear-centred power economy was the reigning common sense of just a few years ago. Its delegitimation among the public and among local governments suggests how rapidly the structure of incentives and ideas can shift. Japan is in the midst of an unprecedented economic experiment, in the midst of accelerating crises. Japan may fail to grasp hold of the opportunity it confronts, consigning itself to escalating costs and plunging competitiveness. On the other hand, Japan may yet deploy a distributed, resource-lite, and resilience-focused paradigm that increases its competitiveness as a political economy and also enhances the sustainability options of the emerging economies that are going to add 2 billion new urban residents over the next 15 to 20 years.

15 An excerpt from this important and timely book can be found here: http://www.ssireview.org/articles/entry/smart_cities_big_data_civic_hackers_and_the_quest_for_a_new_utopia.

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Analytic index

This volume builds on the international conference of the same title held at Ca' Foscari University of Venice in 2013 with the support of the Japan Foundation, which discussed the earthquake, tsunami and nuclear accident of 11th March 2011 in northeastern Japan. The papers bring together research in the fields of political science, international relations, sociology and anthropology to offer a multidimensional perspective on the complex issues relating to the triple disaster of 3/11 and its aftermath.

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