

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 Dai-ichi 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

An earlier version of this piece originally appeared as «Post-crisis Japanese nuclear policy: From top-down directives to bottom-up activism», Daniel P. Aldrich, *AsiaPacific Issues*, 103, January, 2012. The author thanks Elisa Johnston and the East West Center for permission to reprint this modified version and Andrea Revelant for her work in organizing the conference which created this edited volume.

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 Number 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 – Gensuikyo 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 Tokaimura 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 Enerugi 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 Hokkaido, 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 Onishi

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. Lesbi-rel 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 Tokaimura, 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 Tokaimura 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 up 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 that 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 en-

gineers 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 mairu* (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 Yuhei Sato 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. Tohoku 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 Kenzaburo Oe and musician Ryuichi 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 Nagatacho 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 nuclear 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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