Journal of Contemporary Asia, 2015
Vol. 45, No. 3, 490–509, http://dx.doi.org/10.1080/00472336.2014.981283

Routledge
Taylor & Francis Group

Nuclear Policy and Regulation in Japan after Fukushima: Navigating the Crisis

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ABSTRACT *The aftermath of the Fukushima disaster, the worst nuclear accident since Chernobyl, has seen a public debate emerge over the future desirability of nuclear power in Japan. While Japanese citizens' suspicion of nuclear power has grown, the nuclear industry and electricity utilities have called on the central government to recommission the country's reactors amid warnings of devastation for the Japanese economy. This article analyses nuclear policy-making in Japan in the aftermath of Fukushima, with the aim to identify key theoretical, institutional and organisational drivers and constraints to future change in Japan's nuclear energy policy. Despite the growing anti-nuclear sentiment and concerns about the environmental risks of nuclear power, we contend that the continuing power of vested interests will make it difficult for Japan to completely abandon nuclear power during the course of the next decade. However, given the independence of the newly established nuclear regulator and the fact that an effective veto power is held by local government officials, some of whom are opposed to the recommissioning of nuclear plants in their prefectures, we argue that the nuclear policy and regulatory landscape in Japan will undergo moderate change.*

KEY WORDS: Nuclear power, vested interests, regulatory capture, crisis, energy security, Japan

The March 2011 Fukushima nuclear disaster has been described by one long-serving nuclear industry insider, Arnold Gundersen, as "the biggest industrial catastrophe in the history of mankind" (*Al Jazeera*, June 16, 2011). The plant's operator, Tokyo Electric Power Company (TEPCO), concedes that a large amount of radioactive material was released into the atmosphere and ocean, and the attendant environmental and social impacts are believed to eclipse those of Chernobyl (Busby, Satoko, and Muneo 2011; TEPCO 2012). The exclusion area in the immediate aftermath of the disaster – encompassing the tsunami and earthquake affected region and the radiation evacuation zone – spanned a 20-kilometer radius (1,256 square kilometres); houses, livelihoods and social networks were lost; and there continue to be significant impacts on food production and food quality, and marine and land ecology, due to radiation contamination (IAEA 2012).

While the earthquake and tsunami affected other infrastructure and services in Japan, the disaster has had a significant impact on the country's nuclear power sector. Before Fukushima, nuclear power accounted for 25–30% of Japan's electricity supply, and in its 2010 Basic Energy Plan, the former Democratic Party of Japan government forecast an

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increase in the share of nuclear power to 50% of electricity supply by 2030 (METI 2010; FEPC 2013).

Japan historically has viewed nuclear power as a major pillar in its longer-term energy strategy, the goal of which has been to reduce dependence on imported oil by developing alternative energy resources (Lesbirel 1990; Pickett 2002). This strategy in part originated in the concerns of the country's leaders, who interpreted history as a series of unreasonable assaults on a nation devoid of natural resources, leaving it exposed to supply disruptions. Successive leaders also argued that Japan would be vulnerable without recourse to an independent energy supply (Samuels 1994). In light of these sentiments, nuclear power has been considered an integral part of Japan's energy supply system, and its benefits arguably have been manifold: it has contributed to energy diversification, reduced dependence on oil, was produced at a stable price and has been emissions-free in the generation stage (Lesbirel 2004; Vivoda 2014).

In response to Fukushima, the Japanese government commissioned a safety review of the country's 50 remaining nuclear reactors. Consequently, between May and July 2012, all of Japan's nuclear reactors were offline. While two reactors were restarted in Ōi in July that year in a bid to avoid power shortages in the Kansai region during the summer of 2012 (they were shut down again for maintenance in September 2013), the nuclear shutdown has precipitated an unforeseen restructure in the country's electricity supply services. More specifically, the shutdown has led to increased production of electricity from emissions-intensive fossil fuels, leading to higher fossil fuel imports and increased greenhouse gas emissions.

The review of Japan's nuclear reactors was in part initiated to assuage rising domestic unease about the safety and regulation of Japan's nuclear program, especially as news of TEPCO's poor risk management practices, disaster planning and response to the crisis emerged. Coinciding with the review, the period since Fukushima has seen a proliferation in public and civil society concerns regarding the safety and desirability of nuclear reactors in an earthquake-prone zone (Iida 2012). "Not-in-my-backyard" opposition to the siting of nuclear power plants and occasional peaks in negative public opinion towards nuclear energy are not new phenomena for a country that suffered atom bomb attacks on two of its major cities, Hiroshima and Nagasaki, and that has a history of minor nuclear accidents (Lesbirel 1998; Scalise 2004; Aldrich 2008). However, public opinion surveys since Fukushima regularly have shown that 70% of the population is in favour of a permanent nuclear shutdown (*Asahi Shimbun*, December 4, 2013). Weekly anti-nuclear demonstrations at the prime minister's residence further exemplify increased anti-nuclear sentiment in Japan. At the same time, Japan's influential business community has expressed strong opposition to a nuclear phase-out, believing that such a course of action would result in an increase in electricity prices and operational costs. Moreover, the business community argues that the Japanese economy will not recover without the resumption of nuclear power (*The Conversation*, February 5, 2013).

The current Liberal Democratic Party (LDP) government led by Prime Minister Shinzo Abe has adopted a relatively cautious approach to energy policy-making since being returned to the treasury benches in December 2012, in an election where public sentiment against nuclear power proved insufficient to affect the outcome. Importantly, Abe has declared that Japan's energy policy will be reviewed during the course of the next decade through the publication of a new Basic Energy Plan. He also announced that his government will decide within three years whether to restart the 50 reactors that have remained

idle since the disaster. The government proposes to recommission nuclear reactors that have been deemed safe by the newly formed independent regulator, the Nuclear Regulation Authority (NRA).

The NRA, which was established in September 2012, has commenced a review of the country's nuclear reactors based on new safety standards that were finalised in July 2013. Although many believed that Abe's plans to restart idle reactors were all but cemented following the LDP's Upper House election victory in July 2013 (*Asahi Shimbun,* July 22, 2013), this has not materialised. Moreover, despite early suggestions to the contrary, the NRA has been steadfast against industry and government pressure to allow precipitous reactor restarts. Indeed, in November 2013, the NRA announced that it had no fixed schedule to complete safety checks at idle nuclear power plants, possibly delaying reactor restarts and the supply of cheaper energy desired by the Abe government (*Bloomberg*, November 19, 2013).

Against this backdrop, in this article, we analyse nuclear policy-making in Japan in the aftermath of the Fukushima disaster. Our aim is to identify key theoretical, institutional and organisational drivers and constraints to future change in Japan's nuclear energy policy. The article builds on several bodies of literature and contributes to the ongoing and important debate on the future of Japan's nuclear policy. We engage literature on energy security; crises as mechanisms for institutional and policy change; governance, specifically regulatory capture and the power of vested interests; and government–business relations in Japan; and we examine failings in the governance of the nuclear industry, focussing in particular on the omnipresent power of the "nuclear village," a vested interest structure of electric utilities, nuclear plant manufacturers, sympathetic bureaucrats, LDP members of the *Diet* and other business interests (Kingston 2012a). We also examine the lack of transparency, accountability and democratic participation in the policy-making process, and the rigidities prevalent in Japan's structures of governance.

Despite the growing anti-nuclear sentiment and concerns about the environmental risks of nuclear power, we contend that the power of vested interests will make it difficult for Japan to completely abandon nuclear power during the course of the next decade. We argue that the nuclear policy and regulatory landscape in Japan is likely to undergo moderate change. Our argument is supported by recent political developments and newly emerged constraints, which include the independence of the nuclear regulator, anti-nuclear statements by prominent public figures, such as former Prime Minister Junichiro Koizumi, and effective veto power held by local government officials, some of whom are opposed to the recommissioning of nuclear plants in their prefectures (*Reuters*, October 29, 2013; *Financial Times*, November 12, 2013). On the one hand, dictated by the reality of an energy security crisis, the nuclear village holds veto power and desires a return to the pre-Fukushima status quo. Nevertheless, the agents for change, hitherto on the margins of Japan's nuclear policy-making apparatus, have a growing voice in Tokyo.

Methodology

The data for this article were gathered using two different qualitative research methodologies. The first stage of data collection involved a desktop review and critical analysis of the existing literature on energy security, Japanese nuclear politics, crises as mechanisms for change, government–business relations in Japan and the power of vested interests.

Materials reviewed included Japanese government publications, corporate reports, non-government and industry organisation publications, journal articles, books, media reports and other publicly available data. The second stage comprised a series of semi-structured interviews, which one of the authors conducted with Japan-based respondents in Japan in January 2013. The respondents were selected both for their expertise and for their ability to bring a broad range of viewpoints to the subject matter. Respondents had a range of backgrounds and occupations, and were drawn from government, industry and academia. Japan-based foreign nationals with experience in the energy sector, and scholars and experts specialising in different areas of the energy field also served as informants. Respondents' knowledge principally has been used to strengthen the background context of the article, with most respondents indicating that they did not wish to be directly quoted in the text.

Nuclear Power and Japan's Energy Security Challenge

Recent years have witnessed a lively debate on how to define energy security. While acknowledging the polysemic nature of the concept, this article adopts the United Nations Development Programme's (2004) definition of energy security as the availability of energy at all times in various forms, in sufficient quantities and at affordable prices, without unacceptable or irreversible impacts on the economy and the environment (Chester 2010). While Japan's energy strategy has not changed substantively over the past two decades, with energy security remaining a prominent theme, Japan has engaged in increasingly assertive regional energy diplomacy since the end of the Cold War (Gasparatos and Gadda 2009; Phillips 2013, 25). In setting the course of its energy policy, the government has endeavoured to enhance: economic security, by minimising energy costs; national energy security, by reducing dependence on imported energy; and environmental security, by supporting sustainable energy solutions that do not adversely affect the environment (METI 2006). These policies were conceptually recast as the 3Es: (1) economic growth; (2) energy security; and (3) environmental protection (IEA 2008). However, as a consequence of Fukushima, Japanese citizens now are paying more for energy, the supply of which increasingly is less secure. Moreover, the higher cost of the energy mix, which is more and more reliant on fossil fuels, arguably has had adverse impacts on the economy and the environment.

The shutdown of nuclear power plants has precipitated a sharp rise in fossil fuel consumption in the power generation sector, thereby increasing demand for liquefied natural gas, low-sulphur fuel oil and crude oil in order to substitute for lost nuclear power generation. The percentage of thermal generation as a share of total generation increased from 63% in 2010 to 74% in 2011, and to 88% in the first ten months of 2012, the highest on record (IEA 2013). Importantly, the increased use of thermal plants resulted in higher fuel import costs, which were borne by Japanese consumers and industries, and partially contributed to the first trade deficit since 1980 (Bloomberg, June 2, 2013). The 2011 and 2012 trade deficits stood at ¥2.56 trillion (US$30.72 billion) and ¥6.93 trillion, respectively. In both years, these deficits in part were caused by the increase in the value of fossil fuel imports: Japan's mineral fuel imports increased from ¥17.4 trillion in 2010 to ¥21.8 trillion in 2011 and to ¥24.1 trillion in 2012 (MoF 2013). The Ministry of Economics, Trade and Industry (METI) estimates that electricity costs will increase up to 20% if nuclear plants remain idle (World Nuclear Association 2013). Corporate

customers in and around Tokyo have paid up to 18% more for their electricity since April 2012, with Japanese residential and industrial electricity prices already considerably higher than most other G-20 economies prior to Fukushima (IEA 2011; *Financial Times*, January 17, 2012).

Itakura (2011) calculates that Japan's gross domestic product (GDP) will decline exponentially in line with any reduction in nuclear power, and already the higher fuel costs since Fukushima have partially effected a reduction in Japan's GDP (Vivoda 2012). The loss of nuclear energy has also resulted in the demise of domestic manufacturing industries, which is likely to escalate as manufacturers relocate production offshore, due to lower energy and operational costs (Hosoe 2012). Japan's major financial newspaper, the *Nikkei Shimbun*, has published a series of surveys showing that many Japanese corporations plan to relocate their manufacturing to countries offshore – including China, India and Malaysia – if the government fails to ensure electricity supply stability within the period 2013–2015 (Aldrich 2012).

There have also been notable consequences for Japan's environmental policy following the reduction in nuclear electricity generation. Japan's carbon dioxide (CO_2) emissions increased by 2.1% in 2011, and with most nuclear reactors offline in 2012, CO_2 emissions increased by a further 6.7% in that year (BP 2013). Had Japan's nuclear reactors been recommissioned in 2012, the Institute of Energy Economics, Japan (2012a) – a METI-funded pro-nuclear think tank – forecast that CO_2 emissions would have fallen 5.3%. Before Fukushima, nuclear power accounted for a 14% annual reduction in Japan's CO_2 emissions (EIA 2013). The increased emissions since Fukushima make it virtually impossible for Japan to reach the Kyoto Protocol 2020 target of reducing CO_2 emissions by 25% of 1990 levels, and Japanese leaders have been frank in dismissing any hopes of meeting these climate change targets (*World Nuclear News*, January 25, 2012). In November 2013, Japan announced significant downside revisions to its emissions reduction targets. It now aims to achieve a 3.8% cut in carbon dioxide emissions by 2020 against 2005 levels. The new target amounts to a 3.1% increase from 1990 levels; a sharp reversal from its previous 25% reduction target.

Fukushima and the ensuing nuclear shutdown have thus precipitated a profound national energy security crisis when viewed against the "3E" pillars of Japan's past energy policy. The proponents of nuclear power in Japan, including the electric utilities, nuclear industry and broader business interests, as well as government-related think tanks, have used the aforementioned economic and environmental data to argue in favour of reactor restarts. However, other stakeholders and observers assert that Japan's economic malaise has not been caused by the nuclear shutdown and can be transcended without a return to nuclear power. They further maintain that the costs of environmental remediation, social impacts and retrofitting to meet stricter nuclear safety standards are not properly accounted for in government and industry appraisals of the cost of nuclear electricity per kWh relative to other electricity sources and of the impact of the Fukushima disaster on Japan's economy and environment (DeWit 2013).

Japan's energy policy is tasked with addressing challenges related to the future availability of diverse energy sources, increasing cost of fuels, nuclear safety and the adverse effects of its energy and power demand trajectory on the economy and environment (Vivoda 2012). The Fukushima disaster and the nuclear power shutdown has exacerbated the tension regarding the future of Japan's nuclear policy, with many powerful interest groups calling for the immediate restart of the country's reactors, while others argue for

their permanent decommissioning. Given uncertainty surrounding the future direction of energy policy and regulation, as well as the ongoing energy security crisis as perceived by proponents of nuclear energy, the following section examines the theoretical literature on crises as mechanisms for institutional and policy change.

Exogenous Crises as Theoretical Mechanisms for Institutional and Policy Change

An established theoretical interpretation of policy change divides history into "normal periods" (institutional stasis) and "critical junctures" (crises), during which time major change is possible (Gorges 2001). Lengthy periods of institutional stasis can periodically be punctured by intense and cathartic bouts of crisis, leading to institutional and/or policy change (Krasner 1984). Crises, or exogenous shocks, are often cited as explanations for such change, as their existence highlights a failing within prevailing policies or systems due to their implication in, or inability to rectify, the emergent situation (Greener 2001; Levy 1994). Crises also expose decision-makers to criticism and demands for more effective action, with the possible end result being policy change (Walsh 2006). In addition, crises unleash short bouts of intense ideational contestation in which agents struggle to provide compelling and convincing diagnoses of the pathologies afflicting the old regime/policy paradigm and the reforms appropriate to the resolution of the crisis (Blyth 2002). Theoretically, Fukushima is one such exogenous shock, or critical juncture, after which major change is likely to occur.

However, exogenous crises do not always result in institutional or policy change. Constituents, such as policy and political entrepreneurs, generate and institutionalise emergent policy ideas (Orren and Skowronek 1994). The introduction of new ideas into the policy environment, and their transformation into policy, often takes place because of the activities of networks of policy entrepreneurs, with political entrepreneurs at their head. Walsh (2006) argues that policy change can most likely occur when an alternative policy proposal can explain past failures and secure the support of powerful constituents. However, in order for policy entrepreneurs to challenge existing arrangements, a crisis and policy failure must be identified and widely perceived (Hay 1999). Agents must diagnose, and impose on others, their notion of a crisis before collective, transformative action can be taken (Blyth 2002). Agents shape "the terms of political debate: they frame issues, define problems and influence agendas" (Sheingate 2003, 188); they also ultimately initiate a debate about extant ideational orthodoxy. Consequently, exclusive reliance on exogenous shocks to account for policy change is overly simplistic and fails to explain the absence of change in the wake of a crisis. During a time of crisis, therefore, it is important to consider both exogenous explanations and endogenous explanations, such as institutional sources of policy change in terms of idea generation and idea advocacy, to explain the potential for change (Hogan and Feeney 2012).

The success of attempts to enact policy and institutional change strongly depends on the strength of the blocking (veto) powers of the opponents of change (defenders of the status quo). Mahoney and Thelen (2010) examine defenders' veto possibilities as possible impediments to change: the stronger the veto possibilities of those defending the status quo, the fewer opportunities change agents have to effect major changes. In Mahoney and Thelen's work, the political context is defined by strong and weak veto possibilities. However, regardless of the veto possibilities, they argue that institutions

often evolve gradually and organically, through the accumulation of seemingly small adjustments.

Several key questions thus emerge from this discussion: First, does the political context in Japan afford defenders of the status quo strong or weak veto possibilities? Second, to what extent can the defenders of the status quo in the governance of Japan's nuclear policy resist institutional and policy change? Third, can other actors exert sufficient power over the nuclear village such that regulatory and policy change can be achieved? Fourth, based on the answers to the first three questions, what degree of change are we likely to witness in Japan's nuclear institutions and policy over time?

The Policy-Making Process, Vested Interests and Regulatory Capture

The Policy-Making Process

Hall and Soskice (2001) draw a distinction between two ideal types of political economies: liberal market economies and coordinated market economies. In liberal market economies, firms vie for competitive market advantage, with relationships characterised by the exchange of goods or services without interference from the machinery of the state. Underlying this framework is the classic economic theory of supply and demand. In contrast, in coordinated market economies, firms depend more heavily on non-market relationships with other actors to build their core competencies. These non-market modes of coordination generally entail extensive relational or incomplete contracting and reliance on collaborative, as opposed to competitive, relationships in order to develop firm competencies. The equilibria on which firms interact in coordinated market economies more often are the result of strategic interaction among firms and other actors than the outcomes of demand and supply conditions (Hall and Soskice 2001).

Arguably, Japan fits this latter description, due to the fact that it fosters long-term cooperative relationships between firms and labour, firms and banks, and between different firms, in order to produce relatively stable networks of business relationships (*keiretsu*). In this system, the bureaucracy plays a critical role in protecting industrial sectors from international competition, promoting industry through industrial policy, managing competition in sectoral markets, and establishing and maintaining the framework for private sector coordination. In addition, industry associations have historically served as important conduits between the government and industry (Samuels 1987).

This specific "variant of capitalism" has produced a unique set of institutional arrangements and policy-making practices in Japan (Vogel 2006). *Institutions* commonly are defined as the rules of the game, or the humanly devised constraints that structure human interaction (North 1990). They comprise formal constraints (such as rules, laws and constitutions), informal constraints (such as norms of behaviour, conventions and self-imposed codes of conduct) and their enforcement characteristics. In contrast, *organisations* comprise a group of individuals bound by a purpose to achieve common objectives. Examples of organisations include political bodies (political parties and regulatory agencies) and economic bodies (firms or trade unions) (North 1990). Japan's energy policy and its future direction are embedded in the country's institutional and organisational structures, with METI serving as the energy policy-making hub, with the nuclear industry and the regional utility monopolies at the centre.

More specifically, the Japanese policy-making process has been based on a slow, mid-level-bureaucratic, group-consensus process, which has emphasised continuity and the priority of maximising Japanese economic interests. Japanese policy-makers have applied a passive/adaptive process to new situations; a strategy that has been viewed as pragmatic and not overly reactive. A close, but informal, consultative mechanism between industry and government, which has sought to maximise market forces, has also been involved. There have been three major stakeholder groups involved in this process, although, as we show below, there are other organisations and actors that have influenced and continue to influence the energy policy-making process and the regulation and viability of the industry (Vivoda 2014).

Government agencies are the main actors in energy policy-making. The key administrative oversight organisation is METI, which has central responsibility for the development of energy policy. The Agency of Natural Resources and Environment (ANRE), which sits within METI, was created in the 1970s and determines the core direction of the country's energy policy agenda. By the time a policy paper reaches the cabinet, a government- and industry-wide consultative process has taken place, which aims to ensure the adoption of policy proposals. In the consultative process, the Ministry of Education, the Ministry of Environment (MoE), the Ministry of Finance, the Ministry of Foreign Affairs and several other agencies have significant input. The Japan Atomic Energy Commission (JAEC) and, since late 2012, the NRA, decide on matters related to research, development, utilisation and safety of nuclear energy, including regulatory and licensing matters. In addition, the Japanese parliament (*Diet*) has special committees on energy policy in both Lower and Upper Houses. This bureaucratic structure has remained remarkably stable for almost four decades (Moe 2012).

The second major group is composed of a loose alliance of business and industry leaders. Energy industry members have input into national energy policy through their participation in government advisory bodies and industrial federations or specific industrial lobbying groups, such as the Federation of Electric Power Companies (*Denjiren*). The *Denjiren* has opposed the entrance into the market of any rival power-generating actors, seeking to preserve members' monopoly control and ownership of both nuclear and thermal facilities (Duffield and Woodall 2011). The electric utilities are METI's main client and, consequently, there is a strong convergence of interests between the two. However, in recent years, the MoE has competed with METI for the upper hand in exercising regulatory control over the sector (Peng Er 2010). Yet, while the MoE's fundamental role is to further environmental protection and preservation, the political necessity of maintaining a stable electricity supply sometimes has forced the ministry to overlook environmental regulation in favour of economic efficiency and stability (Duffield and Woodall 2011).

Even though the Japanese government is responsible for the development of energy policy and strategy, it is not a participant in the market. This role is the preserve of various private and semi-private actors, which, besides the electric utilities, include oil and gas companies and trading houses. The large Japanese trading companies, such as Mitsubishi, Mitsui, Marubeni and Sumitomo, handle a great share of Japan's energy imports. Steel companies and financial institutions also have strong interests in the development of the energy sector. Such companies are internationally distinctive in their ability to profit from diverse export, import and investment transactions, and are especially important as project catalysts for energy developments (Calder 2012). Their views are reflected through a wide

range of industrial and corporate affiliations, such as the *Nippon Keidanren* (Japan Business Federation).

Third, the bureaucracy has had a strong relationship with the LDP party apparatus. The LDP traditionally has consisted of multiple rival factions, which have been described as exchanging "votes for money, money for favours, favours for positions, positions for patronage, then patronage for votes" (Castells 2000, 232). The LDP has been a strong supporter of nuclear power and, perhaps as a consequence, the party has received sizeable donations from Japan's major nuclear plant makers: Toshiba, Hitachi and Mitsubishi Heavy Industries. More broadly, the regional utility monopolies and plant manufacturers have cultivated relationships with influential politicians through generous campaign contributions (Duffield and Woodall 2011).

Finally, prefectural governors, civil society organisations, citizen associations and the fourth estate also participate in the energy policy-making process. While these actors have a limited degree of influence over the formal energy policy-making process, governors and environmental and other grass-roots associations opposed to nuclear power have had considerable success in delaying or stopping a number of projects (Lesbirel 1998; Aldrich 2008). For example, even if the NRA were to permit reactor restarts or if the government were to licence new reactor developments, prefectural governors have a veto power over their siting, which can effectively prevent their recommissioning or development, thereby affecting the execution of national nuclear policy (Pickett 2002; *Reuters*, October 29, 2013). While this power is likely to be utilised more effectively post-Fukushima, as Pickett (2002) and Aldrich (2008) point out, this is in fact a long-held source of leverage.

The Power of Vested Interests

The power of vested interests in influencing Japan's (nuclear) energy policy is entrenched, with some observers referring to the phenomenon of the "nuclear village." The village comprises a vested interest structure of electric utilities, nuclear plant manufacturers, sympathetic bureaucrats, LDP members of the *Diet* and other sympathetic business interests, largely organised through the *Nippon Keidanren*, with the fundamental aim being the promotion of nuclear power (Kingston 2012a; Shadrina 2012). "Insiders" are systematically locked in and protected at the expense of "outsiders." Flaws in administrative and regulatory routines have emerged, which reproduce themselves in new rounds of staff rotation among and between various "districts" of the nuclear village through the practise of *amakudari* (Shadrina 2012, 74). In addition, the boundary between policy-makers and regulators has been blurred, with regulatory agencies such as the former Nuclear and Industrial Safety Agency (NISA) situated within, and staffed and oversighted by, policy-makers (METI). Commentators (for example, DeWit, Iida, and Kaneko 2012) have argued that the exercise of such power and influence has contributed to institutional weakness in the regulatory architecture, while other observers (Kingston 2012a) have suggested that the vested interests may–and should–lose their power in a post-Fukushima environment in line with the established theory on crises serving as catalysts for change.

Historically, nowhere has the power of the vested interests been more pronounced than in the regulatory governance of the nuclear power industry. The regulatory apparatus has operated within a highly legalistic framework, which permitted substantial latitude for bureaucratic discretion in policy-making and implementation. Everything from research and development to safety, to commercial applications, was regulated through specific

legal frameworks and institutional structures derived from the Atomic Energy Basic Law, with powers allocated to various government agencies that had codified legal powers to regulate, *inter alia*, safety, licencing, liability and compensation (Donnelly 1993).

Until 2012, government institutions (most notably METI and its precursor, the Ministry of International Trade and Industry (MITI), the JAEC and the Science and Technology Agency (STA)) formed the hub of the nuclear village. The JAEC, under the authority of the Prime Minister's Office, was tasked with setting nuclear policy, promoting research and development, and implementing nuclear energy. The Nuclear Safety Commission (NSC), a more senior government body established in 1978 under the Atomic Energy Basic Law, was responsible for formulating policy in collaboration with the JAEC until it was dissolved in 2012. Gradually, MITI expanded its influence on matters of nuclear safety, leaving the NSC only to review MITI's actions. MITI also gained control over a portion of the research and development of nuclear power, which previously had fallen under the purview of the STA. MITI (reorganised into METI in 2001) focused on the promotion of nuclear policy, and worked with the nuclear power industry to implement the JAEC's nuclear policy. NISA, situated within MITI/METI, was responsible for nuclear power regulation, licencing and safety, and conducted regular safety inspections of nuclear power plants until it too was disbanded in 2012.

Regulatory Capture

Despite the existence of an overarching legal framework in the form of the Atomic Energy Basic Law, arguably, the aforementioned regulatory institutions have been subject to capture. According to Laffont and Tirole (1991, 1089), "'capture' or 'interest group' theory emphasises the role of interest groups in the formation of public policy." In another interpretation, regulatory capture is the process through which regulated monopolies end up manipulating the state agencies that are supposed to control them (Bó 2006). In the case of Japan, institutional weaknesses including a lack of bureaucratic turnover and the failure to incorporate new ideas and ways of thinking, a lack of innovation and dynamism, and a lack of transparency and accountability to both the fourth estate and the public, left the nuclear regulatory agencies open to capture.

Relationships between regulators, policy-makers and electric utilities have been reinforced by the practices of *amakudari* and *amaagari* (Lesbirel 1990; Dauvergne 1993; Cohen, McCubbin, and Rosenbluth 1995). *Amakudari* (descent from heaven) is a practice that sees retiring senior bureaucrats secure advantageous positions in the private or public sector (Johnson 1974; Blumenthal 1985; Colignon and Usui 2003; Mizoguchi and Van Quyen 2012). In contrast, *amaagari* (ascent to heaven) sees industry members successfully gain employment in the regulatory agencies (Schaede 1995; Horiuchi and Shimizu 2001). *Amakudari* and *amaagari* have been omnipresent phenomena in the electric power sector, with all major listed utilities having at least one former career bureaucrat sitting on the board of directors or serving in another role (Scalise 2012). The practices particularly have been prevalent in the nuclear power industry. For example, four former senior officials from nuclear regulatory agencies served as vice presidents of TEPCO between 1959 and 2010. Moreover, since 2000, electric utilities have supplied at least 100 employees to the NSC and other nuclear safety regulatory agencies. In addition, 68 former industry ministry officials with extensive nuclear industry oversight roles have transitioned to post-retirement positions as executive board members or advisers at the ten

major electric utilities over the past five decades. As of May 2, 2011, there were still 13 former ministry officials employed at TEPCO, with a further ten ensconced at other utilities (Shadrina 2012). In the most recent case, Toru Ishida became a senior adviser at TEPCO in January 2011, less than six months after retiring as the head of ANRE (*The New York Times*, April 26, 2011; Wang and Chen 2012).

In a further demonstration of regulatory capture, *Associated Press* examined the business and institutional ties of 95 employees at NISA, JAEC and the NSC. It was revealed that 26 employees in the sample were affiliated either with the industry or with taxpayer-funded organisations that promote nuclear power. The media agency also identified 24 employees who previously had held positions at the three regulatory agencies, one-third of whom had connections to industry or pro-nuclear groups (*Associated Press*, May 1, 2011). However, perhaps no person better illustrates the movement and impact of *amakudari* and *amaagari* than Tokio Kano. Kano joined TEPCO in 1957, became a leader in the utility's nuclear unit in 1989, and in 1998 was elected to Japan's House of Councillors as one of the LDP's handpicked members of the *Keidanren* (*The New York Times*, August 8, 2011). In the *Diet*, Kano participated in redrafting the policy that enshrined nuclear power as Japan's best hope for an energy secure future. After two six-year terms, he returned to TEPCO as an adviser in July 2010 (Scalise 2012; Wang and Chen 2012).

With such incestuous relationships between nuclear regulators and utilities, it is little wonder that inspections of nuclear power plants lacked rigorous regulatory oversight. For example, despite Japan's regulatory documents listing the Fukushima Dai-ichi plant as one of the country's most trouble-prone reactors during the previous decade, NISA permitted its continued operation and, in February 2011 – one month before the earthquake and tsunami – approved Unit 1 for a ten-year extension (Kaufmann 2011; *The New York Times*, March 21, 2011). Moreover, after TEPCO was found to have falsified repair reports at the Fukushima nuclear power plant in 2002, the maximum fine that companies could receive for fraudulent reporting was raised to ¥100 million. However, TEPCO did not incur any sanctions as a result of its behaviour. Instead, the company sacked four top executives; ironically, three of these executives subsequently gained employment at companies with close ties to the utility (Wang and Chen 2011).

In response to the string of nuclear accidents in Japan in the 1990s, experts called for a more adversarial regulatory culture and for the development of more appropriate laws and institutions (Pickett 2002). They also called for an effective nuclear safety and regulatory commission, which would be independent, transparent and encourage public participation (Kral 2000). Despite these calls, NISA remained responsible for nuclear power regulation, licencing and safety until 2012 (World Nuclear Association 2013). NISA, JAEC and the STA were not independent regulators, given their susceptibility to outside influence (Shadrina 2012). Having established this historical pattern of policy-making and regulatory failure, below we evaluate whether the crisis has led and may lead to further change in Japan's nuclear energy policy and regulatory structure.

Drivers of Change in Nuclear Energy Policy and Regulatory Structure

Following Fukushima, the prevailing public sentiment in Japan has been that a move away from nuclear power towards other energy sources is desirable. However, as noted in the introduction, community opposition to nuclear energy is not new. Indeed, in the immediate aftermath of the Three Mile Island and Chernobyl disasters, Japanese public

opinion polls registered voter opposition to nuclear power (Dauvergne 1993); and this opposition grew following the series of domestic nuclear accidents in the 1990s (Fesharaki and Hosoe 2011; Sovacool and Valentine 2012). Historical data on Japanese public opinion towards nuclear energy indicates that opinion has been quick to return from opposition to a state of general ambivalence following past incidents. Following Fukushima, the government's aim has been to silence the nuclear power debate, while also hoping that the public will return to its normal state of ambivalence during the course of the next few years.

This is not a new tactic. Japanese government communication in the past has been successful in shaping public perceptions regarding the country's energy policy challenges and in achieving alignment between public perceptions and policy goals (Valentine, Sovacool, and Matsuura 2011). Rather than amending policy settings when opposition has arisen, the state and industry groups have responded by launching expensive public acceptance campaigns (Sovacool and Valentine 2012). In the past this has enabled the central government to proceed with plans to commission new nuclear reactors, despite opposition from the public, some sections of the media and local governments.

In addition, the Japanese government persists in utilising exclusive reporters' clubs (*kisha kurabu*) in order to ensure that media coverage reflects government policy. However, the continued existence of *kisha kurabu*, which restrict access to information to club members, is only one of the factors in Japan's media freedom ranking falling from 22nd to 53rd since Fukushima (Reporters without Borders 2013). According to the 2013 World Press Freedom Index, Japan's ranking also dropped because of censorship of nuclear industry coverage, the ban imposed by authorities on independent coverage of any topic related directly or indirectly to the accident at the Fukushima Dai-ichi nuclear plant, and the government's failure to reform the *kisha kurabu* system. Several freelance journalists who complained that public debate was being stifled were also subjected to censorship, police intimidation and judicial harassment (Reporters without Borders 2013), and some foreign journalists were detained upon arrival at Narita Airport (*Asia Times*, February 4, 2012). In addition, in early December 2013, the Japanese parliament passed a state secrets protection law that may curtail future public access to information on a wide range of issues, including Fukushima, which has been condemned by critics of the Abe administration (*Reuters*, October 24, 2013; *Asahi Shimbun*, December 11, 2013). Public officials and private citizens who leak "special state secrets" face prison terms of up to ten years, while journalists who seek to obtain classified information could be imprisoned for five years (*The Guardian*, December 6, 2013). These developments demonstrate the government's continued push to silence anti-nuclear dissent in the face of rising public opposition to the technology.

By late 2012, it seemed unlikely that public opposition to the resumption of nuclear power would trump the voices of the vested interests in the nuclear village (Kingston 2012b). The attempt to marginalise public opinion had been evident in several policy developments during that year. On September 14, 2012, the former Noda Cabinet appeared to endorse a gradual phase-out of nuclear power by the late 2030s (METI 2011; *Financial Times*, September 16, 2012). However, within days, the government disavowed its plan under heavy pressure from business lobby groups. Indeed, the Cabinet capitulated just one day after the nation's three largest business groups – the *Keidanren, Keizai Doyukai* (Japan Association of Corporate Executives) and the Japan Chamber of Commerce and Industry – issued a joint statement in which the organisations

raised concerns about the government's intentions to phase-out nuclear power. *Keidanren* Chairman Hiromasa Yonekura inveighed, "We object to the abolition of nuclear power from the standpoint of protecting jobs and people's livelihoods. It is highly regrettable that our argument was comprehensively dismissed" (cited in *Asahi Shimbun*, September 19, 2012). The government's acquiescence was a major victory for the nuclear village, and its statement of "no decision" provided village members with a new opportunity to lobby politicians and shape public opinion (Kingston 2012b).

Given the unpopularity of the former Noda administration, and overwhelming public support for the abandonment of nuclear power, it is revealing that the Democratic Party of Japan (DPJ) did not invoke or express anti-nuclear sentiment in order to court electoral support during the 2012 election campaign (Interview, Dr Paul Scalise, Visiting Research Scholar at the University of Tokyo, Tokyo, January 16, 2013). While the DPJ nominally takes an anti-nuclear stance, its actions in government effectively served to bolster the nuclear power industry. This may demonstrate that political leaders are more willing to risk public ire than defy the nuclear village (Kingston 2012b). With the return of the LDP to power, this trend continued. Following the December 2012 Lower House election, the Abe government distanced itself from a nuclear phase-out, arguing that such an option would be "irresponsible" (*ABC News*, December 17, 2012).

As we saw above, Japan's business community remains adamantly opposed to the abandonment of nuclear power, believing that such a course of action would result in a further increase in electricity prices and, *ipso facto*, manufacturing costs, which would in turn lead to industry closure and/or the relocation of companies offshore. In an example of business concern about the future of nuclear power, Institute of Energy Economics, Japan (IEEJ) Chairman and CEO Masakazu Toyoda commented: "the zero nuclear policy could cause the hollowing-out and collapse of the Japanese economy" (IEEJ 2012b, 3). In addition, eminent business leader Akio Mimura argued in September 2012 that: "nuclear energy should not be abandoned. Abandoning what we have now while the future remains uncertain will greatly threaten our energy security and energy diplomacy. The irreversible consequences of pursuing the zero nuclear policy should be explained thoroughly to the public" (IEEJ 2012b, 3). The IEEJ (2013) also claims that it is important to steadily restart reactors that are found to be safe by the NRA. The organisation has calculated that restarting 26 nuclear power stations in 2014, subject to the results of stress tests, would lower electricity costs by ¥1.8 trillion and the electricity generation cost by approximately ¥2/kWh.

All of Japan's electric utility monopolies, with the exception of Okinawa Electric Power Company, own nuclear power plants and, prior to Fukushima, nuclear power was a key plank in their electricity supply portfolios. The rising energy costs due to the nuclear shutdown and increased cost of fossil fuel imports have hurt utilities' profitability, especially as they have been unable to increase service prices. In Japan, the government must approve electricity price rises and, following Fukushima, it has been reluctant to allow such rises, as it would be viewed unfavourably in the electorate and in key industry sectors. The government also expects utilities to cut costs before proposing rate rises. As a result, electric utilities incurred losses amounting to US$15 billion for fiscal year 2011–12, with similar losses reported for fiscal year 2012–13 (Hosoe 2012; *IEEE Spectrum*, May 6, 2013). Moreover, with nuclear reactors idle, they have become "stranded assets," which require costly maintenance, compounding the financial pressure on the utilities (Interview, Dr Scott Valentine, Associate Professor, Graduate School of Public Policy, University of Tokyo, Tokyo, January 17, 2013).

The failures in the nuclear regulatory system, including capture by industry and the government's attendant negligence in effectively exercising regulatory authority over the industry were arguably partly to blame for the Fukushima nuclear disaster (Wang and Chen 2012). Indeed, a probe by an independent parliamentary panel found that collusion between regulators and the nuclear power industry was a key factor in the failure to prevent the meltdowns at Fukushima, leaving the government and the utility the focus of criticism for their handling of the crisis (*Reuters*, October 24, 2013). As a consequence, and in response to public pressure, NISA and the NSC were disbanded in September 2012; replaced by the NRA.

Unlike its predecessors, the NRA is modelled on the independent American Nuclear Regulatory Commission. Crucially, the power to make decisions on reactor recommissioning rests with the NRA. According to Kingston (2012b), the NRA is more a reorganisation than a significant reform, as 460 of its 480 staff were transferred from NISA and the NSC. NRA Chairman Shunichi Tanaka is a former vice-chairman of the JAEC; he also formerly served as president of the Atomic Energy Society, an academic association that advocates nuclear energy. Because of his background, observers expressed concerns about whether Tanaka would play a more robust monitoring role and whether regulatory capture would persist (Kingston 2012b). Compounding the concern about the effectiveness of the NRA, Tanaka initially stated that the role of the agency merely was to assess operational safety and that it did not have responsibility for reactor recommissioning.

Given the level of past regulatory capture in Japan, there were justifiable reasons to doubt whether stricter regulatory guidelines would be developed and enforced. Reinforcing this view, chairman Tanaka announced in July 2013 that safety inspections would take approximately six months, compounding expectations that approved reactors would be restarted from January 2014. However, surprising proponents and critics alike, the NRA has showcased politically independent and scientifically unbiased decision-making, thus not bowing to industry and Abe government pressure to permit reactor restarts. Although the NRA has come under political pressure to speed up the publication of new safety standards – these were completed in July 2013 – it has acted with caution with regard to reactors located on active fault lines (*The Economist*, September 21, 2013). Moreover, in November 2013, the NRA announced that it had no fixed schedule to complete safety audits at idle nuclear power stations, possibly triggering a further delay in reactor restarts and thus the supply of cheaper energy desired by government and business interests. At the time of writing, five utilities had applied to restart 14 reactors (*Bloomberg*, November 19, 2013).

Besides the NRA, local governments also hold an effective veto power over reactor restarts. After the NRA has made a determination on reactor safety, the electric utilities are obliged to secure the support of local communities before reactors can be recommissioned. However, according to a January 2013 survey, only 54% of Japan's 135 mayors of communities located near nuclear plants said they would accept the restart of the reactors (*Japan Daily Press*, January 7, 2013). The governor of Niigata prefecture is one such local level official opposed to the recommissioning of reactors within his jurisdiction (*The Japan Times*, August 29, 2013). Besides the veto powers over reactor restarts held by the NRA and local governments, public opinion surveys continue to show support in favour of a permanent nuclear phase-out. It is clear that despite the importance of nuclear reactors for local economies, many local governments cannot ignore overwhelming anti-nuclear public sentiment.

This discussion leads us to question whether Fukushima has indeed been a game-changing event as the theory on crises and institutional change suggests it could be. To be sure, the institutions of Japan's nuclear village (principally the utilities, bureaucracy and *Diet*) continue to enjoy considerable advantages in terms of energy policy-making. They also have large investments at stake and the financial resources to persuade and/or exclude recalcitrant lawmakers, and members of the public and civil society (Aldrich 2008). The village openly has lobbied the government and actively promoted its case in the media, while also working the corridors of power and backrooms where energy policy is decided.

However, the scale of Fukushima is such that dissenting voices have not been so easily sidelined. Indeed, public opposition to nuclear power has already affected the Japanese political landscape, dampening nuclear power expansion ambitions in the short-term and inevitably hindering the future development of nuclear power in the country (Sawa 2012). While the pre-Fukushima national energy strategy forecast the construction of up to 15 new nuclear power plants over the next few decades, future prospects for nuclear power in Japan now are uncertain. Even the pro-nuclear think tank, IEEJ, only forecasts the recommissioning of 16 reactors by March 2015, and this may yet prove to be an overly optimistic assessment (*Japan Daily Press*, August 6, 2013). To be sure, even if the NRA were to approve all applications, no more than 14 reactors would resume operation during the course of the next year.

Conclusion and Future Developments

While the Fukushima disaster is a clear example of an exogenous shock, in the immediate aftermath of the disaster, commentators argued that there remained a lack of agency to institute change in the regulation of the nuclear power industry in Japan (Sovacool and Valentine 2012). Observers suggested that the vested interests endured, perhaps even more so with the return to power of the LDP, and they pointed to the recent revision of the Atomic Energy Basic Law, which saw nuclear power affirmed as being essential to the maintenance of Japan's national security (*Asahi Shimbun*, June 22, 2012). Moreover, they believed that certain sections of the bureaucracy continued to be beholden to the nuclear village (Shadrina 2012).

Since Fukushima, there has been a consensus among energy policy-makers that a greater level of oversight is required to ensure that the country's nuclear power operators are held to higher standards of accountability. Constituents of the nuclear village argued that restarting reactors deemed safe by the NRA under new safety standards was the only option available to Japan. Their cause, they believed, was strengthened by Japan's precarious energy security situation in the aftermath of the disaster, which served as justification for continued reliance on nuclear power. These constituents may be surprised at the slow pace of regulatory approval and reactor commissioning. At the same time, the Japanese economy has not collapsed without nuclear power and there have been no large-scale power outages despite the delicate energy security challenge.

This article has questioned whether Fukushima has provided an opportunity for structural change in the governance of the nuclear industry in Japan. While the evidence presented here suggests that, hitherto, reform has largely been piecemeal, the emergence of an independent regulator in the form of the NRA, despite initial widespread concern about the chairman's past roles, is cause for temperate optimism. Moreover, there are signs that political and regulatory entrepreneurs are emerging, who aim to challenge the

view that Japan ought to return to the pre-Fukushima status quo. Arguably, though, it remains to be seen whether the embedded interests will prevail in the longer term.

Although there has been considerable change in the shape of the Japanese nuclear policy-making arena over the past 50 years, such change overwhelmingly has been in the direction of the further strengthening and augmentation of the number of veto players, such as METI and the electric utilities, making it ever more difficult to bring about a radical break from the state's traditional nuclear policies (Hymans 2011). Historically, the existence of strong veto players implied that Japan could not make a radical nuclear policy shift. Yet, civil society and local government opposition to the siting of nuclear power plants have in some cases prevented the government from moving ahead with its ambitious targets in the past. In the wake of Fukushima, this opposition has become increasingly robust, with civil society not only opposed to siting, but also to the continued presence of nuclear power in some regions of the country. Moreover, the emergence of a new veto player – the NRA – has implied that the nuclear village no longer has carte blanche to act with unfettered power. In line with Mahoney and Thelen (2010), the emergence of the NRA, in tandem with increased local government opposition, has led to a weakening in the ability of the nuclear village to defend the status quo. Nevertheless, we have not witnessed broad-scale structural change in Japan's nuclear policy or political economy that would suggest that Fukushima will be a critical juncture that will lead to the wholesale abandonment of nuclear power and the breakdown of the old vestiges of power. Our findings thus appear to reinforce Mahoney and Thelen's (2010) thesis that institutional change occurs gradually and through the accumulation of seemingly small adjustments.

What *may* cause a more substantive change in Japan's embedded structures of power and nuclear policy? While such a scenario remains unlikely for the foreseeable future, three developments could result in increased impetus for change. First, Japan may move away from nuclear power if the country were to be affected by another nuclear disaster similar in scale to Fukushima. Such a disaster may result in mass public protests, much larger than that seen after Fukushima, which could provide additional impetus for policy change. Second, a demographic and generational shift, together with continued economic malaise over the next decade, may result in increased pressure for change in the structure of Japan's political economy, where a new generation of politicians, business leaders and other public figures, with alternative views regarding Japan's future, may hold sufficient agency to affect energy policy. Samuels (2013) notes that such agency for change already has gathered momentum at the local government level since Fukushima. Finally, if renewable energy were to gain a larger share of the electricity market and if it could achieve economies of scale that make it cost-competitive with nuclear power, Japan's energy policy-makers and electric utilities might recognise that the energy security rationale for continued reliance on nuclear power were no longer there.

Acknowledgements

We are appreciative of the research funding provided by the Australian Research Council (DE120101090) and the National Research Foundation of Korea (NRF 2012S1A3A2033350), which have supported elements of this work. We would also like to thank the anonymous reviewers, as well as the discussants and attendees of our panel at the 2013 International Studies Association Annual Convention in San Francisco for constructive and very helpful feedback on an earlier draft.

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