**"Hard Choices: Japan's Post-Fukushima Energy Policy in the 21st Century"**
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Paul Scalise, a supporter of nuclear power, addresses the challenges facing Japanese energy policy following the Fukushima disaster. He begins by acknowledging the massive change in public opinion on nuclear power, even pointing out Son's solar belt as one of the most popular new proposals. However, he questions whether a shift away from nuclear power will put Japan on a sustainable path: "Can Japan achieve a nuclear-free society without risk of rolling blackouts? Are energy security and environmental sustainability fundamentally compatible or mutually exclusive? Is economic efficiency still possible in an energy market that also promotes and subsidizes renewable energy sources?" Scalise reminds us that public opinion should not always dictate policy. Instead, he urges, majority rule should be set aside for what is best for Japan, even if this option may be unpopular.

Scalise explains the current dynamics of Japanese politics regarding Japan's energy future. Given the massive loss of support for nuclear power, what is likely to happen? Are Japan's politicians responsive to the desires of the general population, or are they more receptive to the opposing opinion of Japan's business elite? Opponents of nuclear power maintain that Japan's major corporations have too long dominated Japanese politics, resulting in policies favorable to nuclear power at the expense of the environment and human health. Scalise argues, however, that corporations do not have as much power in the Japanese government as nuclear power opponents fear. He says that the influence of former bureaucrats now working in the private sector, often on a board of directors (*amakudari*) and politicians who lobby for a particular industry (*zoku*)—some of the main mechanisms by which firms influence policy—is not very large, particularly for energy.

Scalise frames the debate as one between "energy security and economic efficiency (nuclear power) [and] environmental sustainability (renewable energy)," addressing the safety of nuclear power on only a limited basis. To him, Japan's future is brighter if it chooses the path of reliable energy and the resultant stronger economy. How do his arguments in favor of nuclear power stack up against the anti-nuclear opinions presented above?

## Hard Choices: Japan's Post-Fukushima Energy Policy in the 21st Century

**Paul J. Scalise**[1]

The 'Great East Japan Earthquake' of 11 March 2011 inadvertently shook more than just infrastructure and private property; it threatened to create what some observers call a subsystem collapse (Baumgartner and Jones 1991). For most of the postwar era, a policy subsystem involving multiple actors evolved to meet Japan's market challenges and industrial development by offering energy diversification, energy efficiency, and finally greater reliance on nuclear power. These efforts risked sudden reversal in a matter of weeks following Japan's unprecedented magnitue-9 earthquake. The resulting 15-meter (49.2 feet) high tsunami flooded the back-up diesel generators cooling the Fukushima Dai-ichi Nuclear Power Station, owned and operated by Tokyo Electric Power Co. (TEPCO). Within hours, the exposed fuel rods overheated leading to a nuclear meltdown (Evans 2011).

Today, this tsunami-induced nuclear disaster has kindled renewed interest in renewable energy development at the expense of nuclear power. On 31 March 2011, Prime Minister Naoto Kan expressed his intention to reconsider Japan’s Basic Energy Plan (*Enerugi kihon keikaku* or BEP) and start discussions over from a clean slate (Fackler and Pollack 2011). Twenty-two days later, the entrepreneur, Masayoshi Son— Japan's richest man—presented his idea for an East Japan 'Solar Belt' in which billions of yen would be funneled away from nuclear power towards renewable energy. Speaking at a press conference on 10 May 2011, Kan acknowledged that the nuclear incident coupled with global warming led his cabinet to 'work to ensure an enhanced level of safety for nuclear power, while at the same time more vigorously promoting natural and reusable energy' ("Press conference by Prime Minister Naoto Kan" 2011). This idea not surprisingly morphed into the premier's desire for a 'nuclear-free society' in Diet hearings held on 13 July 2011 ('Kan says Japan should aim for nuclear-free society' 2011).

As Japan raucously debates the future of nuclear power and renewable energy in both the National Diet and the courtroom of public opinion, some observers have wondered in which direction Japan's once 'quiet politics' of national energy policy, in which highly organized interest groups dominated the policy process in arenas shielded from public view, would take the country now that energy has become a 'high salience issue' (Culpepper 2011). Can Japan achieve a nuclear-free society without risk of rolling blackouts? Are energy security and environmental sustainability fundamentally compatible or mutually exclusive? Is economic efficiency still possible in an energy market that also promotes and subsidizes renewable energy sources?

This chapter seeks answers to these fundamental questions. It begins by discussing the fundamental principles of Japan's national energy policy since BEP in broad strokes—what has changed and how. It then explores the origins and logic of this policy by analyzing the country's electricity sector in cross-national and longitudinal context.[2] The third section of the chapter analyzes the feasibility of BEP pre-and post-Fukushima. It finds that many of the policy goals and aspirations of its political actors to be sometimes vague, contradictory or logistically difficult given Japan's market structure. The final section discusses the political will and capacity actors have to change Japan's energy policy, concluding that no single actor dominates the process. If a subsystem collapse is imminent, to whom or what can this change be attributed and what lessons can be draw from it?

**Basic energy plan: background, structure and targets**

Japan's national energy policy, like its electric power regulations, can be described best as reactionary. For much of its post-Meiji history, decision-makers lacked a comprehensive energy strategy choosing to rely on an assortment of ad hoc rules, regulations, and laws that were generally wielded in times of national uncertainty and economic crisis (Scalise 2009: 73-106, 148-192). In the postwar era, these measures were adopted often in response to the oil shocks of the 1970s, the 'lost decade' of the 1990s, and the global warming initiatives of the new millennium.

Current national energy policy is broadly outlined in the Basic Act on Energy Policy (*Enerugi seisaku kihon hō*, Act No. 71) of 14 June 2002.[3] It generally sets out to improve what is known as the 3 E's: energy security (Article 2), environmental sustainability (Article 3); and economic efficiency (Article 4). Like most Japanese laws, the Act does not offer much by way of detail and numerical targets. However, under Article 12 of the Act, the BEP diverges from previous policies by authorizing the government to 'formulate a basic plan...in order to promote measures on energy supply and demand on a long-term, comprehensive and systematic basis'. It is reviewed every three years, and revised when needed.

Revisions proved necessary in May 2006. Along with growing resource competition with China and India, the price of imported crude oil rose by almost 400 per cent from 1998 ($12.8/barrel) to 2006 ($63.5/barrel) precipitating a re-evaluation of policy (Figure 1). The Ministry of Economy, Trade, and Industry (METI) drafted The New National Energy Strategy (*Shin-kokkai enerugii senryaku* or NNES), which established a target for the proportion of nuclear energy in total power generation of 3040 per cent or higher by 2030 (OECD/IEA 2008: 30). In June 2010, this target was raised to 50 per cent or higher. Other revisions in 2010 included:

- doubling Japan's "energy independence ratio" from 38 per cent to 70 per cent;
- increasing the proportion of renewable energy in total power generation to 20 per cent or higher by 2030;
- doubling the zero-emission power source ratio from 34 per cent to 70 per cent;
- cutting the CO2 emissions from the residential sector by half; and
- maintaining and enhancing the energy efficiency in the industrial sector at the highest levels of the world.

The energy independence ratio is defined as the sum of its energy self-sufficiency (sources that can be produced domestically) and the purchase of fossil fuels under independent development. Because Japan is resource poor and dependent on 96 per cent of its primary energy supply, especially as it imports virtually 90 per cent of its imported oil from the politically volatile Middle East, finding alternatives that shield the country's vulnerability to severe fossil fuel price fluctuations and potential shortages on the world market have become the priority (ANRE 2006, Scalise 2004). In order to reach these new targets, Japan would have been required to increase its share of nuclear power in the generation of electric power from 29 per cent to 50 per cent while simultaneously raising its share of renewables from 9 per cent (of which 8 per cent is hydro) to 20 per cent. Concurrently, fossil fuels would have to have decreased in both absolute and relative terms. According to the Strategic Energy Plan, liquefied natural gas (LNG) would have to fall from 28 per cent to approximately 10 per cent; coal would fall from 25 per cent to 10 per cent; and petroleum-based sources would fall from 13 per cent to less than 1 per cent (METI 2010:

10).

The second broad target, which is related to the first, concerns Japan's zero-emission power source ratio in terms of greenhouse gas (GHG) emissions. The world scientific consensus sees a strong linkage between fossil fuel burning, climate change, and environmental impacts (Houghton and Intergovernmental Panel on Climate Change. Working Group I. 2001). Because approximately 63 per cent of Japan's electric power continues to be generated from fossil fuels, expanding the generation technologies of renewables and nuclear power would help dramatically to reduce GHG emissions (Hoffert *et al.* 2002, Service 2005). Consequently, Japan's energy independence ratio would need to correspond to its zero-emission power source ratio in order to achieve success. One of the greatest obstacles is economic.

**Japan's energy economics in the 21st century**

Japan's capital expenditures (*setsubi tōshi*) in the electric power sector have been propelled by cost-benefit considerations, including resource availability, application technology, the useful life expectancy of the generation asset, its utilization rate (how much capacity is used in a given period relative to potential output) and political will. Table 1 below provides Japan's current energy economics at a glance. As mentioned above, Japan’s energy portfolio for electric power generation still predominantly consists of fossil fuels (63 per cent), followed by nuclear (28 per cent), hydro (8 per cent), and other renewables (0. 3 per cent).

Historically, Japanese electric power companies have shifted from one power source to another based on cost and value (Figure 1). Abundant and inexpensive hydroelectric power gave way to domestic coal production after most appropriate hydroelectric sites were captured, thus slowly increasing political and economic costs to further building large-scale dams in remote locations. Domestically-mined coal gave way to inexpensive and abundant supplies of imported oil following import liberalization in 1961 (Culter 1999). Oil then gave way to a diversified energy portfolio including imported liquefied natural gas (LNG), imported coal, and inexpensive nuclear power in equal measure following the 1973 oil shock. A major shift towards nuclear power was set to become the next phase.

**Table 1: Energy mix (2010)**

| Fuel | Power generation | Current Generation cost | Useful life | Avg. construction cost | Maximum utilization rate | $CO_2$ Emission |
|---|---|---|---|---|---|---|
| Unit | (TWh) | (Yen/kWh) | (Years) | (Yen/kW) | (%) | ($CO_2$-eq./kWh) |
| Coal | 237.9 (24%) | 6~7.6 | 30-40 | 336 | 85 | 975.2 |
| LNG | 282.4 (28%) | 8.4~10.1 | 30-40 | 222 | 68 | 607.6 |
| Nuclear | 279.8 (28%) | 5.1~7.4 | 40-60 | 368 | 90 | 22.1 |
| Oil | 101.9 (10%) | 9~15 | 30-40 | 387 | 55 | 742.1 |
| Hydro | 79.3 (8%) | 8~13 | 80+ | 690 | 85 | 11.3 |
| Geothermal | 2.6 (0.3%) | 8~22 | 20-30 | 340 | 85 | 15 |
| Wind | (Intermittent) | 10~15 | 20 | 300 | 30 | 29.5 |
| Solar | (Intermittent) | 30~58.7 | 20 | 300 | 15 | 53.4 |

Notes: a kilowatt-hour, or kWh, is the amount of electricity required to power 10 100-watt light bulbs for one hour. A terawatt-hour, or TWh, is one billion kilowatt hours. Sources: For generation cost per kWh estimates by fuel type, see: Federation of Electric Power Companies of Japan interview (June 2011), based on data from University of Tokyo. For power generation, utilization rates, and useful life, see: *Denki jigyō rengōkai tōkei iinkai, ed. Denki jigyō binran* [Handbook of Electric Power Industry] (2010). Tokyo: *Nihon denki kyōkai*. For average construction cost per kW, see: *Denryoku shinsetsubi yōran* [Survey of new electric power facilities] (2006). Tokyo: Ministry of Economy, Trade and Industry. For $CO_2$-equivalent per kWh by fuel type, see: Communications Office (2003). "Nuclear Power Generation and the Nuclear Fuel Cycle." In *Energy in Japan*, edited by Agency for Natural Resources and Energy. Tokyo: Ministry of Economy, Trade, and Industry.

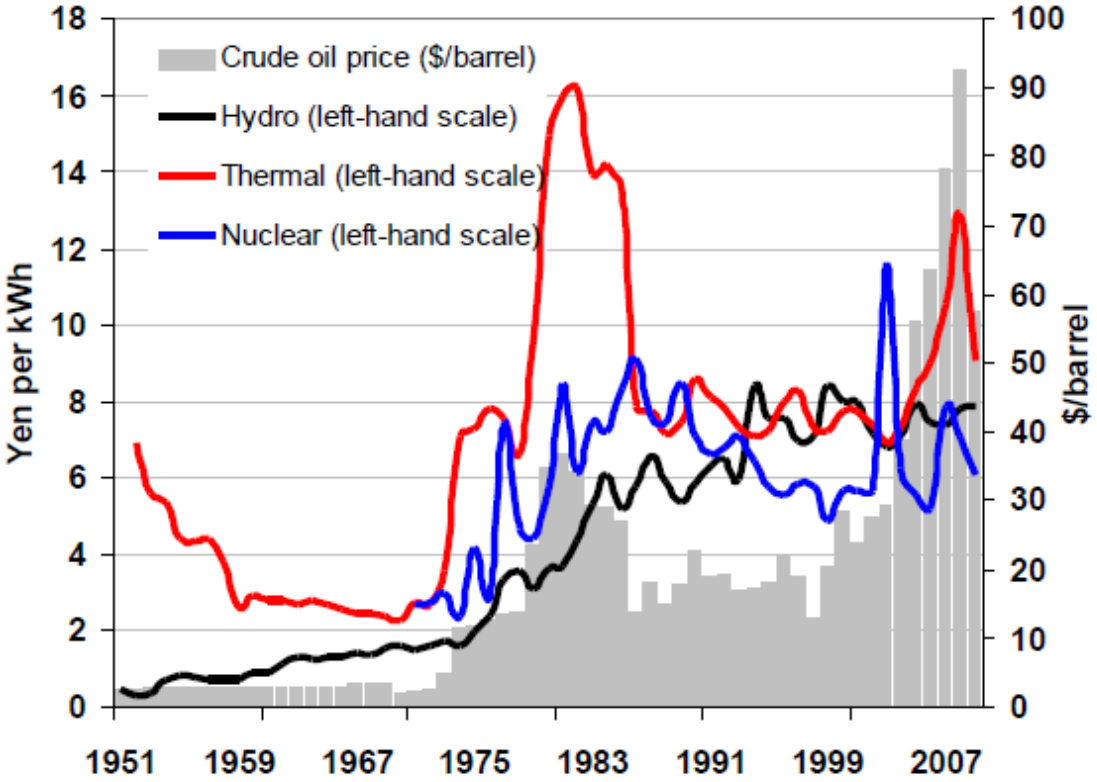
Japan's policymakers originally chose nuclear power as a strategic necessity in order to enhance national energy security, buffer the economy from energy shocks, and perhaps even serve as an important export product (Kim and Byrne 1996). Japan's unique lack of natural resources justified not only nuclear power, but also a commitment to plutonium fueled fast breeder reactors (Byrne and Hoffman 1996). This extensive support was tacitly based on a 'lesser of two evils' rationale in which the risks posed by fossil fuels outweighed the risks posed by nuclear power. In his chapter, Daniel Aldrich discusses the ways in which authorities mapped out locations and used policy instruments to induce public support in order to complete this technocratic vision—a task that became increasingly difficult over time.

Activists, students, and policy entrepreneurs have long debated the political economy of competing energy sources to replace nuclear power since the events of Three Mile Island in 1979. Nuclear power's positive media image characterized as 'atoms for peace' (jobs, economic growth, and abundantly cheap and clean power) slowly shifted towards a negative image consisting of mushroom clouds, radioactive waste, nuclear fallout, and the like. Yet despite this negative image, clear trade-offs have prevented decision-makers from placing all of Japan's eggs into another energy basket. Fossil fuel-powered generation (coal, natural gas, and oil) continues to be among the most cost competitive and reliable electric power sources in Japan, but rising imported fuel prices coupled with a high carbon footprint and death toll linked to its extraction, operation and maintenance make it politically and environmentally unattractive.[4] By contrast, solar power is quiet and clean, but its prohibitive cost per kWh and low utilization rate ensure its marginalization for energy-intensive industries requiring stable 'baseloads' to operate efficiently during business hours. Wind power is far less costly per kWh, and offers a slightly higher utilization rate, but its unreliability requires increasing fossil-fuel back-up sources while the

windmills pose a danger to avian wildlife. Hydroelectric and geothermal power—both called 'mature' renewable energy sources—show strong promise on economic and environmental grounds, but face political opposition from activists and small business owners alike who disapprove of flooded valleys, alterations to the ecosystem, and unpredictable exploration prospects in environmentally fragile locations (sometimes national parks) where, for example, it is hot enough to produce geothermal steam close to the surface.

Because new renewables are relatively high-cost and intermittent (Table 1), support mechanisms such as feed-in tariffs, green certificates, premiums, and production tax credits are still needed to induce residential and industrial support. The *political* support for and the inducement policies towards increasing renewable energy, however, began long before the events of March 11. One such example is the Special Measures Law Concerning the Use of New Energy by Electric Utilities (*Denki jigyōsha ni yoru shin-enerugii nado no riyō ni kansuru tokubetsu sochi hō*, Act No. 62), which the National Diet passed in 2002 and implemented in 2003 reinforcing renewable energy promotion measures. The eponymously named 'Fukuda Vision' announced by the former premier in response to growing concern in Japan about Climate Change is another such example. Following a speech entitled 'Action Plan for Achieving a Low-carbon Society' on 29 July 2008 (GWPH 2008), a series of policy measures were implemented by the government to counter GHG emissions. On the residential front, starting in January 2009 METI provided subsidies and tax credits for the installation and renovation of solar panels on residential homes. On the industrial front, METI encouraged the beginnings of a feed-in tariff that required electric power companies to buy surplus solar power from residential homes at 50 yen per kWh until at least 2020.

**Figure 1: Generation cost per kWh by fuel type and crude oil prices, 1951-2010.**




*Sources*: For generation cost per kWh by fuel type, 1951-2000, see: *Kantō no denki jigyō to tōkyō denryoku* (Electric Power Industry and TEPCO in the Kanto Region), CD-ROM (2000). Tokyo: Tōkyō Denkryoku. For generation cost per kWh by fuel type, 2001-2010, see: *Yūka shōken hōkokusho* [Annual Report] (various years). For historical crude oil prices, see *Nihon enerugi keizai kenkyū sho* **(**Energy Data and Modeling Center), author's calculations based on these sources. Notes: actual power generation costs fluctuate depending not only on the operating period but also on the load factor, imported fuel costs, weighted average cost of capital, and other fixed costs. Decommissioning and reprocessing of irradiated fuel are included in nuclear power's generation cost per kWh, pre-Fukushima.

## Feasibility and performance: whither Japan?

Speaking at an energy symposium in Chino, Nagano Prefecture, on 31 July 2011, Prime Minister Kan argued that Japan 'cannot take a risk [with nuclear power] that could destroy the Earth even if it is a one in a hundred million chance...Renewable energy will lead to Japan's new industrial revolution' (Kyodo 2011). Such rhetoric aside, one of the most important questions to analyze is the feasibility of Japan's national energy policy in a post-Fukushima Japan. Notwithstanding the technological constraints and innovations of new renewables versus nuclear power, one should consider underlying supply and demand for electric power in cross-national context—two sides of the same political and economic coin.

In fiscal year 2010 (ending March 2011), almost 1,112 terawatt-hours of electricity were generated in Japan, a 4 per cent increase from 2000. The Japan Center for Economic Research forecasts 1.1 per cent growth in GDP in 2000-2025 for its positive case. If GDP growth leads to increased consumption of electricity in Japan as econometric studies have suggested (Cheng

1998, Lee 2006), new renewables would need to increase by seven to eight times to achieve the 20 per cent generation target and the 70 per cent targets for energy independence ratio and zero-emission generation sources, respectively. Yet, this increase of seven or eight times assumes no growth in conventional fossil-fuel generated sources or nuclear power. Moreover, should Japan's 54 nuclear power plants gradually be decommissioned without further nuclear build—as Kan and others have suggested should happen—these targets will be extremely difficult to reach.

About 18.8 gigawatts (GW) of generating capacity are currently under construction with most being gas-fired and coal-fired power plants. A further 30.8 GW is planned, including 42 megawatts (0.1 per cent) of new renewables, by 2015. If Japan hopes to achieve its GHG emission target reductions, it will depend greatly on the amount of renewable energy and nuclear power it can commercially introduce over the next 20 years. As of August 2011, these prospects appear dim; only 19 of Japan's 54 nuclear reactors (35 per cent) are on-line with political pressure to maintain the status quo until safety assurances are met (JAIF 2011a).

**Table 2: International comparison, 1990 v. 2010**

| | Industrial tariff (¢/kWh) | | Residential tariff (¢/kWh) | | Reserve Margin | New Renewables (%) | | |
|---|---|---|---|---|---|---|---|---|
| | 1990 | 2010 | 1990 | 2010 | (%) | 1990 | 2000 | 2010 |
| Denmark | 7 | 12.6 | 20.9 | 36.6 | 120 | 3.1 | 15.5 | 27.5 |
| Germany | 4.9 | 10.9 | 13.6 | 16.7 | 85 | 0.3 | 2.4 | 13.2 |
| Iceland | n/a | n/a | n/a | n/a | 100 | 6.7 | 17.2 | 27.1 |
| Japan | 11.5 | 16.8 | 17.4 | 24.8 | 10 | 1.4 | 1.6 | 2.2 |
| Spain | 4.8 | 10.3 | 11.4 | 21.2 | 20 | 0.4 | 2.8 | 15.8 |

Notes: "New renewables" excludes hydroelectric and includes geothermal, solar photovoltaic, solar thermal, biomass, liquid biomass, biogas, wind, tide, wave, ocean, and municipal waste. The reserve margin is the percentage of installed capacity in excess of peak demand. Tariff data for Iceland are unavailable.
Sources: (OECD/IEA 2003, OECD/IEA 2006, OECD/IEA 2007, OECD/IEA 2008, OECD/IEA 2009, OECD/IEA 2011)

Virtually all OECD countries provide 'new renewable' generation at some level. However, geography, market structure, and government policy determine the quantity. Denmark (wind), Germany (solar), Iceland (geothermal), and Spain (wind/solar) provide 15~30 per cent of their total generated electricity from new renewables. In contrast with Japan, however, all four leading countries in renewable energy had relatively low electricity prices in 1990 *before* the introduction of feed-in tariffs. In addition, electricity capacity reserve margins—a common metric for surplus capacity—indicated percentages well above 20 per cent (Table 2). This pre-existing oversupply prevented the intermittent supplies generated by new renewables from risking blackouts as surplus back-up power existed in the event that solar, wind, and other renewables were unable to meet peak demand.

With Japan's national reserve margin in the low 10 per cent range and falling year-on-year (Scalise 2011a, Scalise 2011b), rolling blackout risk places renewed emphasis on rapid investment from stable sources with relatively quick lead times in the siting, licensing, and construction of new generation capacity. The Ministry of Environment (MOE) has already granted TEPCO a special exemption from conducting environment impact studies before expanding and building fossil-fuel power plants in the Kanto region, thus highlighting how economic realities continue to trump environmental concerns (Nikkei 2011). This economic

reality militates against strong support for new renewables among industry and the incumbent suppliers in the short-to medium-term as TEPCO and Tohoku EPCO struggle to bring capacity back online.

On the demand side of the equation, Japanese industry continues to be the largest consumer of energy as well as the largest producer of CO2 emissions by sector at 46 per cent and 34 per cent, respectively. Yet from 1990-2008, they also made the strongest improvements in both energy efficiency and reduced CO2 emissions by sector, thus creating further challenges as *setsuden* (energy conservation) becomes more important in Japan (EDMC 2010: 38, 47). With *Keidanren*, the principal industrial peak association for virtually all big businesses and companies in Japan, quite vocal in its opposition to higher electricity prices from the introduction of feed-in tariffs and other austerity measures sacrificing business productivity, a larger share of the burden will need to be carried by the largely inefficient residential and commercial sectors if the goals of the BEP and NNES are to be met.

**Is a subsystem collapse imminent?**

A fundamental move away from nuclear power towards renewable energy sources would require more than just technical blueprints and economic incentives to surpass Japan's structural challenges analyzed in previous sections of this chapter; it would require a shift in actor perceptions and policy images that form what some observers call 'policy whirlpools,' 'iron triangles,' or 'subsystem politics' (Griffith 1939, Heclo 1978, Redford 1969). This phenomenon characterizes several actor interests that come together in certain political venues for the purpose of compromise and coordination. Consequently, success or failure of Japan's national energy policy partially rests with the level of support from Japan's decision-makers at local, prefectural, and national levels in these policy venues.

Since the Fukushima disaster, public opinion polls indicate a gradual souring towards nuclear power in the 13 prefectures that host nuclear plants. Telephone surveys conducted by The *Asahi Shimbun* in the months of April, May, and June 2011 suggest diminishing support for nuclear power in Japan. In its April 2011 survey, the newspaper found that 32 per cent disapproved of nuclear power while 50 per cent were in support. One month later, the same newspaper recorded a slight increase in disapproval while support levels dropped to 43 per cent. By June 2011, the situation reversed: disapproval was almost half of respondents while approval for nuclear power fell to only 37 per cent (JAIF 2011b). This political souring has forced most prefectural governors to refuse permission to restart those that are offline until they have convincing assurances of their safety.

It remains to be seen if this gradual shift in voter perceptions will materially impact the political arena. The Democratic Party of Japan-led government, once a vocal supporter of lowering Japan's GHG emissions by 25 per cent from 1990 levels by 2020 under the Hatoyama Cabinet, began to backtrack on renewable energy development and their emission targets as soon as the party encountered industry opposition and conflicting budget priorities in 2009-2010 (Hughes 2009, Scalise 2010). If the Kan Cabinet, and successors, hopes to promote a shift towards new renewables, it will need to take stock of the political landscape.

There are 10 major electric power corporations (EPCOs, *ippan denki jigyōsha*) in Japan: TEPCO, Kansai (KEPCO), Chubu (CEPCO), Tohoku, Chugoku, Kyushu, Hokuriku, Shikoku, Hokkaido, and Okinawa. All nine EPCOs except Okinawa own and operate nuclear power

plants. Organizing their common interest via The Federation of Electric Power Companies of Japan (*Denki jigyō rengōkai*, hereafter FEPC), they are the most obvious of the agenda setters though not necessarily the most powerful. Their relative size, de facto monopoly status, relationship with wholesale suppliers, privately owned assets, and control of pricing information is stronger than that of almost any other developed nation, yet evidence of direct linkages with the political process is circumstantial, at best. Despite the roughly 70 known electricity suppliers in Japan's nationwide market that range from joint-ventured electric power utilities (JVs, *kyōdō karyoku hatsuden denki jigyōsha*) to municipal utilities (*kōei denki jigyōsha*) to larger wholesale electric-power suppliers (*oroshi denki jigyōsha*), none of the 10 major EPCOs have made (reported) cash contributions to any of the major political parties since 1977 (Scalise 2009: 57-62, Tatsuru 1983: 81-84). Only an occasional donation from one of the JVs or regional municipals can be seen over time, and such donations are relatively small.

There are several reasons for this lack of overt political maneuvering. One is size. The Japanese companies are among the largest in the world, measured in terms of kilowatt-hours and installed capacity. TEPCO, for example, remains the largest privately owned electric power company in Japan, and is surpassed worldwide only by The State Power Corporation of China, EDF, and E.ON. We should stress the word *private* in this context. The sheer size of such electricity sales and installed capacity suggests a lucrative market for potential new entrants should full liberalization occur. Moreover, because of the size of the industry, we should consider the various corporate linkages and political aspects of employment—areas of concern that directly and indirectly affect more than just the EPCOs.

Leaving aside the political and economic question of new entrants into the electricity market, there is a stable number of suppliers and growing number of generators in postwar Japan. Based on these initial figures, one could easily mistake this seemingly fragmented market as conducive to greater price competition under more liberalized market conditions. However, appearances can be deceiving. Since their 1951 postwar reorganization into the nine regionally independent vertically integrated utilities, the incumbent suppliers have predominantly controlled the means of electricity generation as well as its transmission and distribution to the vast majority of end users. This "vertically integrated" structure has led to nine regional de facto monopolies on power.[5]

Their regulator, METI (formerly MITI), takes a decisively pro-business approach in their dealings with the electric power companies and their competitors. In recent years, the MOE has competed with METI for upper-hand in the regulatory control of the sector (Peng Er 2010). While the MOE takes an actively pro-environment approach for obvious reasons of self-interest and preservation, the political necessity (mentioned above) of maintaining a stable supply of power in Japan sometimes forces the MOE to turn a blind eye to certain environmental regulations in the name of economic efficiency and stability. Some observers argue that the government-business relationship is theoretically strengthened via *amakudari* (literal translation: 'descent from heaven'). If ministerial career advancement seems unlikely between the ages of forty-five and fifty-five, ministry officials usually "descend" into either a private sector position or politics. *Amakudari* is an omnipresent phenomenon in the electric power sector; all major listed utilities have at least one former career bureaucrat sitting on the board of directors (*yakuinkai*) and elsewhere, though their exact purpose, connections, and usefulness is debatable.[6]

It remains to be seen if politicians will adopt a similar 'pro-stability' tact in the coming years. All

draft bills concerning the economic development of the electricity industry and regulatory matters related therein fall under the purview of the Commerce and Industry Committee (*Shōkō i'inkai*, hereafter CIC) in the postwar period, later renamed the Economy, Trade and Industry Committee (*Keizai sangyō i'inkai*) in 2000.[7] The Lower House's CIC is comprised of 40 members, and the Upper House's CIC is comprised of 20 members; it is one of the larger standing committees in the Diet and one of the most active. Historically, the LDP occupied the majority of seats on both CIC with a smattering of opposition parties thrown into the fray. In 1999, for example, LDP members held 23 out of 40 or 58 per cent of the Lower House's CIC seats versus 10 out of 21 or 48 per cent of the Upper House's CIC. The number of bills brought before a given committee range widely in any given year. The figure can be as low as one to as a high as sixteen.

Some observers have argued that the Diet is a mere rubber-stamping organ of the bureaucracy (Johnson 1982: 48-49, van Wolferen 1990: 44). Yet, politicians have the legal authority either to reject or revise draft bills at their discretion.[8] In the case of energy, postwar politicians have been known to attack bills drafted by the METI bureaucracy when they either failed to support political expectations or did not stand up to scrutiny during standard question-and-answer periods. One appropriate example in recent years dealt with partial revisions to the laws regulating the electric power industry and nuclear waste from reactors (*Denki jigyō hō oyobi genryō busshi, kakunenryō busshi, oyobi genshiro no kisei ni kansuru hōritsu no ichibu o kaisei suru hōritsu).* In November 2002, the Lower House CIC voted to revise the bill (and again in the plenary session) after several tense questioning bouts revealed serious safety flaws in the proposed bills overlooked by both the *shingikai (advisory councils)* and the bureaucracy. Such an occurrence has been commonplace in the postwar period. One scholar found that of the 9,135 draft bills presented to the Diet in 1947–2001, 1,811 (or 20 per cent) were revised significantly before passage at the instruction of the standing committees (Masuyama 2003: 35).

The extent to which *zoku* ('policy tribes') set the agenda in Japan's government-business relationship surrounding energy policy is debatable, of course. These *zoku* are politicians who are actively involved in the jurisdictional activities of one particular ministry, acquire a level of expert knowledge in that area, and then represent (i.e., lobby for) the interests of that industry in the Diet (Curtis 1999: 53-55, Inoguchi and Iwai 1987, Ishikawa 1990) As a result, area specific *zoku* tend to build close relationships with the bureaucracy.

There is no specific electricity industry *zoku*. The closest equivalent is either the energy *zoku*, which oversees the activities of METI regarding basic energy policy and strategy, or the commerce and industry *zoku*, which by definition covers a much broader range of industries. These two groups have never publicly championed the interests of the EPCO as a business. Indeed, the energy *zoku* under the leadership of Toshizuku Kanei in the Research Commission on Oil, Resources and Energy (*Sekiyutō shigen enerugī chōsakai*) are primarily concerned with the problems associated with electricity supply and demand. In particular, these energy *zoku* concern themselves with long-term strategies not only to meet the demand, but also to secure its supply through the further implementation of nuclear power. Electric power restructuring is not considered relevant.

Individual politicians might have a special interest. Tokio Kanō (LDP) is a former TEPCO vice president, serving his second six-year term as a member of the House of Councilors. As of 2003, he sits as vice chairman of the influential House of Councilors' Economy, Trade and Industry

Committee (*Keizai sangyō i'inkai*). Mr. Kanō makes thinly veiled pro-EPCO statements by advocating the importance of energy security and stability over greater competition and has the full support of the incumbent EPCOs ('Chū, in tono kankei hatten ga jūyō [it is important for Japan to develop relations with China and India]' 2006). Kiyoshi Hasegawa (DPJ) is a former TEPCO employee and Vice President of the Electric Power Labor Federation (*Denryoku roren*). Like Mr. Kanō, he served two six-year terms in the House of Councilors' Economy, Trade and Industry Committee before retiring from politics in 2004. Mr. Hasegawa's interests rest firmly with those of organized labor, as evinced by his induction into the SDPJ in 1992—a party that received large cash contributions from organized labor and held clear pro-labor platforms. Finally, Masashi Fujiwara (DPJ) might also have a special interest. A former KEPCO employee and active labor union leader for over thirty years—first for KEPCO and later for *Denryoku Sōren* as vice president—Mr. Fujiwara was elected to the House of Councilors in 2001. It is possible that all three of these politicians received funding from the electricity industry, though nothing in this investigation was conclusive in that respect.

To be sure, the presence of such an ambiguous force may present another obstacle to the implementation of a new and successful energy policy as '[T]he active presence of *zoku* [makes] it more difficult' for politicians to coordinate policies (Schoppa 1991).

## Conclusions

This chapter has sought to elucidate the broad evolution of energy policy in postwar Japan, how it has changed and why; to explain the nature of policy change more generally, in particular the role of framing; to analyze the economic and technical realities of Japan's energy market in cross-national context as decision-makers apply foreign roadmaps to their country's policies; and finally to learn about the capacities of various interest groups in Japanese democracy, who can create policy changes and who cannot.

To be sure, Japan's national energy policy is at a crossroads. In the short span of four months, public opinion has soured towards Japan's nuclear power program as TEPCO failed to contain the nuclear crisis at Fukushima Dai-ichi Nuclear Power Station. What was once the domain of consummate insiders has now spread to a public increasingly apprehensive about nuclear safety. Re-election minded politicians, career-minded bureaucrats, energy-intensive industries concerned about high prices, eco entrepreneurs and beleaguered power companies now jockey for position in the courtroom of public opinion.

How did all of this occur and what does it teach us about the future? This chapter argues that Japanese national energy policy is a fragile consensus that unravels once the underlying assumptions surrounding the policy's purpose change; that external shocks tend to provoke crises that force decision-makers to import workable blueprints of sector reorganization. The energy diversification and demand management programs that emphasized nuclear power set in place following the 660 per cent rise in imported oil prices in 1973-1981 continued uninterrupted for two decades despite eroding power company profit margins, high electricity prices, and declining shareholder value. Following the relative failure of electricity liberalization and the neo-liberal ideas that propelled it in the 1990s, Japan embarked on the next great wave of sectoral re-organization in the midst of resource nationalism, the meteoric rise of China, global warming initiatives and the Kyoto Protocol, and final the *coup de grâce*: renewed oil price spikes in 1998-2008. 'Energy security,' not 'energy efficiency,' became the political mantra that produced the 2002 BEP and the 2006 NNES.

If the latest shock to the system provokes a increasingly anti-nuclear backlash, the lack of nuclear power to meet demand will certainly place further risk on electric power companies struggling to maintain a secure, stable supply of electricity. Such a political environment would almost certainly force decision-makers to abandon their ambitious GHG emission targets by increasingly resorting to conventional thermal fossil fuel generation. *Setsuden* (energy conservation) might be one of the policy tools needed in curbing future blackout risk in Japan, but the more conventional power used to replace nuclear power opens renewed threats to volatile imported fossil fuel prices.

Today, the question of which paradigm will dominate public discourse—energy security and economic efficiency (nuclear power) or environmental sustainability (renewable energy)—plays out in the National Diet and the media. Japan struggles to implement public policies once again to counter recurring external shocks reinforced by the latest incident at Fukushima, but faces technological uncertainties and economic risks. As overseas renewable energy policies—feed-in tariffs for all new renewables in particular—are the latest subject of interest, many observers wonder if Japan's democracy will produce suitable answers. High cost and unreliability could make new renewables a hard sell to a country that values stability and certainty. The manufacturing sector and electric power utilities, which prioritize stability in energy prices and supply, will oppose pro-renewable energy proposals that risk even higher electricity prices. Yet politicians will come under growing anti-nuclear pressure as the full costs of the Fukushima disaster, and the real costs and risk of nuclear energy, emerge and many businesses seek new opportunities in renewable business opportunities.

**Notes**

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[2] This chapter focuses exclusively on the issue of electric power generation and its spillover effects. It will not discuss energy policy as it pertains to upstream fossil fuel exploration and its downstream distribution businesses.

[3] An English-language translation of this bill is available at: http://www.japaneselawtranslation.go.jp

[4] According to a study commissioned by the Swiss Federal Office of Energy, there were a recorded 4,290 energy accidents worldwide, 1,943 defined as severe, between 1969 and 1996. The number of corresponding energy-related fatalities were 19,650 (coal), 12,638 (hydro-electric), 15,257 (oil), 3,236 (LPG), 1,375 (natural gas), and 33 (nuclear). See Hirschberg, S., Spiekerman, G. & Dones, R. (1998). Severe accidents in the energy sector (first edition). Comprehensive Assessment of Energy Systems Villigen: Aul Scherrer Institut.

[5] Okinawa EPCO was established with full government funding on 15 May 1972. The company was privatized after 16 years of public control on 1 October 1988 becoming the tenth privately owned EPCO. In this chapter, any general reference to “EPCOs” alludes to all ten companies unless stated otherwise.

[6] The exact definition of amakudari varies from author to author. For a thorough empirical analysis of amakudari and its various theories and hypotheses in English, see: Colignon, R. A. & Usui, C. (2003). Amakudari: The hidden fabric of Japan's economy, Ithaca: ILR Press.

[7] *Rules of the House of Representatives 1947, Section 5, Article 92, Clause 9.* Tokyo: EHS Law Bulletin Series; *Rules of the House of Councilors 1947, Section 4, Article 74, Clause 9, subparagraph 7*. Tokyo: EHS Law Bulletin Series.

[8] *The Diet Law (Law No. 79, 1947), Ch. 6, Article 56, paragraphs 3 and 4.* Tokyo: EHS Law Bulletin Series; *Rules of the House of Representatives 1947, Section 5, Article 143.* Tokyo: EHS Law Bulletin Series; *Rules of the House of Councilors 1947, Section 5, Article 125.* Tokyo: EHS Law Bulletin Series.

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