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Nuclear policy responses to Fukushima: Exit, voice, and loyalty

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Abstract

In the two years since the Fukushima Daiichi nuclear accidents, countries around the world have responded to the Japanese catastrophe in a variety of ways. Broadly speaking, these policy responses fall into three categories: Within one group, countries have decided to turn away from nuclear power, either through a gradual phase-out or by abandoning plans for programs that had not yet begun. In the second group of countries, government leaders who were otherwise inclined to continue pursuing nuclear power were forced by protests and public opinion to change their policies. And in the third group, countries have reiterated their commitment to nuclear power. The author describes examples of countries within each of these categories. He identifies several common elements that seem to be at play in countries that are staying the course on nuclear power, including: hasty dismissals by government officials of the Fukushima accident's applicability to their own countries, pronouncements about the safety of deployed or proposed reactor designs, propaganda campaigns, international financing for reactor construction, and an emphasis on projected growth in energy demand.

Keywords

energy policy, Fukushima, nuclear accidents, nuclear policy, nuclear power, nuclear safety, propaganda, public opinion

Two years after the multiple accidents at the Fukushima Daiichi reactors, the future of nuclear power is no longer what it used to be. Independent analysts argue that the global nuclear industry is in decline and that the nuclear share of the world's electricity production can only go down (Schneider and Froggatt, 2012). Even projections by agencies involved in promoting nuclear power, such as the International Atomic Energy Agency (IAEA), reflect, however inadequately, the decline in nuclear power's prospects. In 2010, for example, the IAEA projected that nuclear power would have a generating capacity of 546 to 803 gigawatts by 2030 (IAEA, 2010). Only two years later, the IAEA's lower projection had dropped by a whopping 90 gigawatts, to 456 gigawatts, and the upper projection had come down by 63 gigawatts to 740 gigawatts (IAEA, 2012).

The impact of the Fukushima accidents has varied from country to country, and in many cases is still being negotiated through domestic politics. In the explosion of literature on nuclear power since Fukushima, nuclear policies in individual countries have been widely discussed.[1] But an examination of the larger picture raises questions about why similar countries had very different responses to Fukushima, and points to underlying factors that shape nuclear policy within a country.

More than four decades ago, the economist Albert O. Hirschman categorized the ways in which people respond to deterioration in an organization or business as exit, voice, and loyalty (Hirschman, 1970). A dissatisfied customer or member of an organization may "exit" by stopping use of the product or quitting an organization, or may simply "voice" displeasure. "Loyalty," as in brand loyalty or patriotism, may reduce or delay exit or inhibit voice. Hirschman's analysis was extremely influential and has been applied to a range of systems, far beyond the field in which it was conceived.[2]

Similar to Hirschman's approach, national responses to Fukushima can also be characterized in three categorizations: an unambiguous reversal of nuclear commitment (exit), a change in nuclear policy resulting primarily from public pressure (voice), or a business-as-usual pursuit of nuclear power (loyalty). The parallel is not exact, because nuclear decision making involves two different parties: a government that sets nuclear policies and a public that expresses its opinions about nuclear power. The three categories provide an interesting prism through which to view the global response to Fukushima, but they are not watertight. Nuclear policies continue to evolve in response to complex dynamics.

The changing nuclear landscape in Japan, for example, illustrates how countries can move between categories. Faced with widespread protests over Japan's reliance on nuclear power, former Prime Ministers Naoto Kan and Yoshihiko Noda both proposed reducing the country's reliance on nuclear energy over the coming decades. But with the December 2012 electoral victory of the Liberal Democratic Party, which has historically supported the nuclear industry, the country might be reverting to a business-as-usual posture on nuclear policy—if that happens, it will represent a shift from voice to loyalty.[3]

Nuclear exit

The first, or "exit," group consists of countries that have turned away from nuclear power. In these countries, Fukushima either caused reversals or accelerated underlying trends away from nuclear power. The best-known examples of countries in this group are Germany and Switzerland.[4] But many other countries that were contemplating a nuclear power program have abandoned the idea, including Greece, Israel, Kuwait, Oman, Peru, Portugal, Singapore, and Venezuela.

Some did so almost immediately after the Fukushima accidents started, without waiting for public polls or referenda. In Venezuela, President Hugo Chávez called nuclear power "something extremely risky and dangerous for the whole world" (BBC, 2011b). Just five months earlier, Chávez had signed a deal with Russia for two 1,200-megawatt reactors. Israel has had plans since the 1960s to

build a nuclear power plant, but days after Fukushima, Prime Minister Benjamin Netanyahu told the television network CNN that the accident "certainly caused me to reconsider a project of building several nuclear power plants . . . I think we'll skip the nuclear" (CNN, 2011).

In other countries, the move away from nuclear power was less conspicuous and often shaped by complex domestic political forces. The distribution of political power among parliamentarians and ministers appears to have played a role in Kuwait's decision to stop its plans for constructing nuclear reactors and, in July 2011, to quietly dismantle its national nuclear energy committee (Meredith, 2011). Less than a year prior to that, in September 2010, the committee had announced that Kuwait was considering building four 1,000-megawatt reactors (Inajima and Okada, 2010).

Countries with large energy demands and even larger ambitions have also moved away from nuclear power. About two months before Fukushima, the energy minister of Brazil announced plans to approve the construction of four additional reactors "this year" (Nuclear Engineering International, 2011). But the following year, Brazilian officials shifted positions to argue that the country did not envisage any new nuclear power stations because there was no need for them (AFP, 2012).

In some cases, these decisions have caused further changes within the domestic energy sector, making it less likely that nuclear power will make a comeback in these countries. For example, the German company Siemens has decided to quit the nuclear industry, while the country has experienced strong growth in its solar power industry.

Public voice

In the second group are countries where officials might be inclined to continue with, expand, or enter into nuclear power, but are being held back, or even forced to reverse course, by public opinion. The clearest example in this category is Italy, which made a complete nuclear exit after Chernobyl, but recently was considering a re-entry. About a year and a half before Fukushima, in a study of a number of countries considering nuclear power, Italy was described as "the most likely nuclear aspirant to succeed in Europe" (Gourley and Stulberg, 2009: 26). Prime Minister Silvio Berlusconi had made restarting nuclear energy one of his government's priorities. But in June 2011 Italian citizens voted overwhelmingly in a referendum to reject the proposal (Zampano and Zevi, 2011). The Italian utility company Enel subsequently pulled out of an agreement to build reactors in France, because Italy's referendum had "diminished the strategic relevance of the overall partnership framework" (Enel, 2012).

Lithuania is another country where public opinion appears to be in the process of forcing a policy change. In a referendum on October 14, 2012, citizens overwhelmingly rejected plans to construct the Visaginas nuclear plant (Peach, 2012b). Construction of the plant hasn't so far been ruled out; however, the prime minister has set up a working group to recommend an energy strategy for the country that may or may not include the nuclear option.

One expression of this divergence between public opinion and government policy has been the adoption of election platforms advocating a phase-out or reduced reliance on nuclear power by opposition parties in countries such as France, South Korea, and Taiwan (Jacobs, 2012; Lee, 2012; Schneider, 2012). In the Philippines, which historically has been interested in building nuclear reactors, Fukushima reportedly has led to concern among policy makers that any proposal now would spark protests.[5] As a result, the government has not initiated any nuclear activities (SciDevNet, 2011; Xinhua, 2010).

An excellent, if underreported, example of how public opposition has played a role in changing a country's nuclear policy is Jordan. More than a year after Fukushima, the country seemed to be well on the way to constructing its first nuclear reactor. Jordan had signed a dozen nuclear cooperation agreements,[6] and the country's Atomic Energy Commission had started the process of selecting a reactor vendor. But on May 30, 2012, the Jordanian parliament voted to shelve the program, saying it "will drive the country into a dark tunnel and will bring about an adverse and irreversible environmental impact" (Omari, 2012). At an IAEA meeting in June 2012, an official from Jordan's Atomic Energy Commission admitted that nuclear policy had been challenged after Fukushima and that the increased visibility of opponents in the media had affected all levels of government, including the parliament. Among the specific concerns he mentioned were safety, water scarcity, siting of reactors, and waste management (Haddad, 2012).

Continued loyalty

The third group includes those countries that have reiterated a commitment to their nuclear plans with little change—in other words, business as usual. Several of these countries rushed to sign agreements with nuclear vendors or announced construction plans within months, if not weeks, of the onset of the Fukushima accidents. Prominent examples are the United States, China, Iran, Russia, and India. Less familiar examples are Algeria, Bangladesh, Belarus, Finland, Indonesia, Poland, Saudi Arabia, Turkey, the United Arab Emirates, the United Kingdom, and Vietnam. Some of these countries already have significant amounts of nuclear generating capacity, and some have little or no capacity but are interested. Although their commitment hasn't wavered, these countries have, in many cases, experienced delays in starting new projects or continuing construction of older ones, in part because of post-Fukushima safety reviews.

A good example of a country that might have been expected to stop considering nuclear power is Indonesia. The country is susceptible to natural disasters, including earthquakes, tsunamis, volcanic eruptions, and flooding. Indonesia has a long-standing opposition movement against nuclear power (Amir, 2010), which has grown stronger after Fukushima (Fauzan and Schiller, 2011). The majority of Indonesians do not favor nuclear power; according to an Ipsos poll in June 2011, 67 percent of Indonesians were somewhat or strongly opposed to nuclear power, and 72 percent wanted to stop future nuclear builds (Ipsos, 2011). And because

Indonesia has not yet built its first nuclear power plant, bureaucratic interest might be expected to be low. But Indonesia's leadership continued supporting nuclear power (Rochmyaningsih, 2012).

Even in countries that have disregarded protests in their decision making, though, many have had to lower projections or delay commissioning of reactors. For example, commissioning of the reactors at Koodankulam in southern India has been delayed, in part as a result of intense protests by local citizens who have continued their opposition even in the face of a vicious police crackdown (Kaur, 2012; Ramdas and Ramdas, 2011). Even after a series of failures to meet nuclear development targets (Ramana, 2012), the Prime Minister's Office announced that the installed capacity of nuclear power would go up from 4,780 megawatts (as of December 2012) to "27,480 MW by the year 2023–24" (Press Information Bureau, 2012).

India is not alone in cracking down on opposition to nuclear power. In Belarus, a group of activists who tried to deliver a petition to the Russian embassy in July 2012 were arrested and jailed (Peach, 2012a). In the United Kingdom, protesters at the Hinkley Point site were arrested as they blockaded the site (ITV, 2012).

Common elements

Despite this diversity of responses to Fukushima, there are some common elements that seem to be at play in many countries that have opted to pursue business as usual. Among the most frequent arguments that have been made in these countries:

It can't happen here

In many, if not all, of the countries that have continued supporting nuclear power, government or nuclear officials were quick to dismiss the possibility of a Fukushima-scale nuclear accident in their own countries. For example, on March 16, 2011—before there was a clear understanding of what was happening in the Japanese reactors—a Polish government official hurried to reassure citizens that nothing of that sort would happen there, due to the country's location and the advanced design of the nuclear power plants Poland plans to build (Kruk, 2011). The haste with which countries rushed to make assertions about the impossibility of accidents and the inapplicability of the lessons of Fukushima does not bode well for safety. It points to the capacity for self-deception and an unjustified confidence in a hazardous technology.[7]

Our plants are "safest"

For obvious reasons, one strategy that many countries used to justify their actions was to claim that their reactors are, or would be, the "safest." Hamad Al Kaabi, the United Arab Emirates' ambassador to the International Atomic Energy Agency, for example, said that his country was "committed to . . . adopt the safest design, safest plant, but also to focus on developing a culture of safety among workers, among entities, among all the relevant stakeholders" (Chaffee, 2012). A Russian nuclear manager

involved in the Akkuyu project in Turkey proclaimed that he and his colleagues were going to build the "world's safest reactor" (Anatolia News Agency, 2011). And while preparing a bid to build a reactor in Finland, GE Hitachi announced that its Economic Simplified Boiling Water Reactor design is "the world's safest available reactor design as measured by industry standards" (GE, 2012).

We can build it

After Fukushima, nuclear suppliers engaged in massive lobbying efforts to obtain contracts to construct nuclear reactors. In Poland, Areva, Westinghouse, and GE Hitachi promised enormous sums of subcontracting work to local firms and scrambled to sign the appropriate agreements before an anticipated tender (Peach, 2011). Areva, for instance, signed a memorandum of understanding with Polimex-Mostostal, an engineering and construction firm, in April 2011 (Areva, 2011). And at a time when practically no nuclear reactors were operating in Japan, its three nuclear vendors—Hitachi, Toshiba, and Mitsubishi Heavy Industries—were all pushing hard for new sales (Dawson et al., 2012; Tabuchi, 2011).

We'll loan you the money

Despite the economic crisis that grips many parts of the world, countries that have large nuclear industries have proffered financial inducements to facilitate reactor construction. Russia, in particular, has extended cheap loans to several countries. In Belarus, which signed a $10 billion contract to build two VVER-1200 reactors (RIA Novosti, 2012), Russia is reportedly allocating a loan to finance the entire project (Xinhua, 2012). Likewise, in Vietnam, Russia agreed to loan up to $9 billion to construct the Ninh Thuan Nuclear Power Plant (Bloomberg, 2011). Other countries where Russia has offered to finance reactor construction include Bangladesh and Turkey.

Nuclear power is good

A few governments of countries loyal to nuclear power have resorted to propaganda. Emails from British government officials to nuclear companies—including EDF Energy, Areva, and Westinghouse—show that they tried to come up with a coordinated public relations strategy to play down the Fukushima nuclear accident so as to minimize the loss of public support for nuclear power (Edwards, 2011; *Guardian*, 2011). A year ago, the Polish government started a 22 million zloty (approximately $7 million) "Meet the Atom" campaign aimed at building support for nuclear power, which is low in areas being considered for nuclear reactors (Ministry of Science and Higher Education, 2012). The campaign's goal is to present nuclear energy as a safe and efficient technology, which, despite the high initial cost of investment, will provide inexpensive energy in the future.

We need the energy

Several countries have emphasized current energy shortfalls and projections of rapid growth in energy demands as reasons for turning to nuclear power. When Bangladesh signed a deal with Russia to import two 1-gigawatt reactors, its Science and Technology Minister

Yeafesh Osman reportedly said, "We have signed the deal . . . to ease the power crisis that hampers our economic activities" (BBC, 2011a).

The only way to justify nuclear power as a solution to rapidly growing energy demands is to envision a rapid deployment of reactors—and to ignore a history of failed nuclear power projections worldwide. Perhaps the most dramatic illustration of this is Turkey. Speaking in June 2012 at the World Economic Forum, Turkey's Minister of Energy and Natural Resources Taner Yildiz declared: "We are a country without a nuclear power plant. However, we are determined to have nuclear power plants. We want to meet our increasing energy needs by erecting at least 23 nuclear units by the year 2023. . . . We can see that accidents, as in Fukushima, do not [negatively] affect decisions to have and operate nuclear power plants" (*Hürriyet Daily News*, 2012).

Japan was in an odd situation when trying to export its nuclear reactors abroad in the midst of a domestic nuclear crisis, and many worried about the wisdom of selling reactors to countries that may be ill prepared to deal with emergencies. But Japanese bureaucrats used the argument that nuclear power was needed to meet energy demands to dismiss such concerns; in the words of a Japanese trade ministry official, "As long as there are countries that want nuclear technology, Japan has a responsibility to help meet that global demand" (Dawson et al., 2012).

This argument obscures the fact that nuclear power is a choice, and other choices could be made to meet energy demands. Germany, for example, has chosen to meet its rising energy demands through a transformation, or *Energiewende*, of the energy sector that will include phasing out nuclear power, expanding renewable energy production, improving energy efficiency, and for a transition period, constructing new and more efficient coal- and gas-fired power plants (Mez, 2012).

An uncertain future

Researchers have devoted a lot of attention to the question of why some countries choose to pursue nuclear weapons and others do not, but have not adequately explored the corresponding question for the Janus-twin of nuclear weapons: nuclear energy. The literature on the latter subject, especially regarding countries outside Western Europe and the United States, is sparse, or focused on individual countries or specific aspects of the nuclear fuel cycle.[8] The Fukushima crisis, unfortunate as it is, offers a rare opportunity to observe the shifts in nuclear policies of multiple countries in response to a common event. The question that Fukushima poses is why political leaders in some countries decide to pursue nuclear technology even after being confronted with unambiguous evidence that it comes with the risk of catastrophic accidents—a risk that is essentially incalculable (Perrow, 1999; Ramana, 2011).

There is no simple answer to this question. The policy responses span an enormous range, and the threefold categorization laid out here does not capture all of the complexities. Countries that differ on a number of metrics (for example, Israel and Venezuela) responded in somewhat similar fashion to Fukushima. Simple theories—for

example, countries expecting to see a rapid increase in energy demand will stay committed to nuclear power—do not adequately explain the post-Fukushima policy responses that have been observed.

Of course, decisions about nuclear power are seldom based on a single consideration. The accident at Fukushima coincided with an economic recession in many parts of the world, and also with lower market prices for natural gas, both of which have affected nuclear plans. In northern Africa, governments that were previously interested in developing nuclear power—such as Algeria and Egypt—have been too preoccupied with pressing social and political issues to do much about their nuclear plans.

Although there are no definitive answers yet to the question of how nuclear policies are shaped, grappling with the question has revealed several common elements at play in multiple countries—including the role of propaganda, domestic politics, international finance, and public protest. These forces will continue to influence the growth or decline of nuclear energy nationally and globally, and to make its future very uncertain.

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Notes

1. These countries include Japan; Western European nations such as Germany and France; large developing countries with rapidly expanding nuclear programs such as China and India; and countries with large nuclear capacities such as the United States and Russia. For entirely different reasons, Iran has also been the subject of intense media focus.
2. According to Google Scholar, the book has received 12,638 citations.
3. Whether the Liberal Democratic Party (LDP) government will succeed in resuming nuclear operations and constructing new reactors will depend on the power of the state to quash public opinion. Even though the LDP won in what has been described as a landslide, a poll conducted by the *Asahi Shimbun* newspaper found that 78 percent of voters, including sizable numbers of people who voted for the LDP, wanted to "scrap nuclear power immediately" or "gradually phase out nuclear power altogether" (*Asahi Shimbun*, 2012).
4. In the case of Germany, the phase-out has been planned for two decades and serious efforts to increase reliance on efficiency and renewable energy generation have a long pedigree (Glaser, 2012).
5. The Bataan Nuclear Power Plant in the Philippines was completed at a cost of over $2 billion, but was never fueled. The reactor was constructed under President Ferdinand Marcos; however, after the Chernobyl disaster in 1986 and just months after she came to power, President Corazon Aquino canceled plans to operate the plant.
6. The agreements are with Argentina, Canada, China, France, Italy, Japan, Romania, Russia, South Korea, Spain, Turkey, and the United Kingdom.
7. Hirschman also recognized that an organization, member, or customer "may have a considerable stake in self-deception, that is, in fighting the realization that . . . the product he has bought [is] defective. He will particularly tend to repress this sort of awareness if he has invested a great deal in his purchase or membership" (Hirschman, 1970: 93).

8. Some examples are Jasper, 1990; Ramana, 2012; Sovacool and Valentine, 2012; Walker, 1999; and Xu, 2010.

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