

# UPDATE ON THE RESTARTING OF NUCLEAR POWER PLANTS IN JAPAN



On August 11, 2015, reactor 1 was restarted at Kyushu Electric Power Company's Sendai\* nuclear power plant in Kagoshima Prefecture, marking the end of a nuclear-power-free era in Japan that had lasted nearly two years. It was the first facility to be restarted after complying with new regulatory requirements introduced by the Nuclear Regulation Authority (NRA). This issue of the JFS Newsletter focuses on the present situation of nuclear power plants in Japan. The NRA was established after the accident at Tokyo Electric Power Company's (TEPCO) Fukushima nuclear plant on March 11, 2011. Previously, it was the Nuclear and Industrial Safety Agency (NISA) that dealt with safety regulation of nuclear power, under the Ministry of Economy, Trade and Industry (METI), which promotes the utilization of nuclear power energy.

After the accident, the Japanese government recognized that one of the problems was that two functions -- the promotion of nuclear power and regulation of nuclear safety -- were handled by the same organization. Consequently, the government established a new and relatively independent body, removing the nuclear safety regulation from METI and giving it to the new Authority created under the Ministry of the Environment.

The NRA developed new regulatory requirements to examine the design of nuclear power plants, and they went into effect in July 2013. Based on the lessons from TEPCO's Fukushima No.1 nuclear accident and input from home and abroad, the requirements were formulated to solve the following issues about the previous requirements:

- The previous regulatory requirements did not offer enough measures against large-scale natural disasters like earthquakes or tsunamis, and did not cover major accidents, so accident-prevention measures were inadequate.
- Even if new requirements were adopted, there was no legal framework in place that required their retroactive application to existing nuclear power plants.

The new requirements made some safety measures compulsory, including filter-equipped vents to reduce the spread of radioactive substances, and the use of remote control rooms to cool down reactors in the event of an emergency. "These new regulatory requirements are to be used to decide for or against the

establishment or operation of nuclear facilities. However, satisfying these requirements does not always guarantee absolute safety." From this statement, one might sense an attitude that the lessons from belief in the so-called "safety myth" that led to the Fukushima nuclear accident should not be forgotten.

The restart of the Sendai nuclear power plant marks the plant to be restarted after meeting the New Regulatory Requirement for Commercial Nuclear Power Reactors, formulated by the NRA. After the Fukushima Daiichi nuclear accident in 2011, all nuclear reactors in Japan were gradually shut down and remained halted for a while. In 2012, to deal with a power shortage in the Kinki area, Kansai Electric Power Co. was given special permission to resume operations of reactors 3 and 4 at the Ohi nuclear plant in Fukui Prefecture, based on a political decision. But those two reactors were halted again for periodic checkups in September 2013, which meant that again, Japan had no nuclear plants in operation for a while. After submitting an application in July 2013, the Kyushu Electric Power Co. passed an NRA safety review in September 2014 for Sendai reactors 1 and 2. It took a long time, however, to develop detailed safety measures and procedures to deal with accidents and to test facilities and equipment prior to resuming operation, which took nearly a year after passing the safety review.

According to media reports, Kyushu Electric Power Co. plans to restart reactor 2 at the Sendai plant in the middle of October 2015, and is budgeting 300 billion yen

(about U.S.\$2.46 billion) for safety measures, including measures for the Genkai nuclear plant in Saga Prefecture.

Before discussing the current state of other nuclear plants in Japan, let's take a look at the history of nuclear plants in this country. In 1955, the Atomic Energy Basic Act was enacted to provide a framework for the use of nuclear power. The following year, the Atomic Energy Commission was established and the Japan Atomic Energy Research Institute (JAERI), currently the Japan Atomic Energy Agency, was established in Tokai Village, Naka District, Ibaraki Prefecture. The first commercial nuclear power plant built in Japan was the Tokai Power Station, which was constructed in 1966 in Tokai Village by the Japan Atomic Power Co. with investments from nine electric power companies and the Electric Power Development Co., known as J-POWER. In 1970, Tsuruga reactor 1, owned by the Japan Atomic Power Co., and Mihama reactor 1, owned by Kansai Electric Power Co., started operating in Fukui Prefecture.

Three laws related to power generation were passed in 1974: the Electric Power Development Taxation Law, the Special Budget Law for the Development of Electric Power, and the Law for the Adjustment of Areas Adjacent to Power Generating Facilities. These laws enabled subsidies for construction of nuclear power plants, creating a powerful incentive to build more. The Japanese economy kept growing at an annual rate of over 10 percent during the period of high

economic growth, from 1955 to 1973. At that time, a stable and inexpensive power source was required for industrial and commercial use. Following the oil crisis in 1973, the Japanese economy halted its rapid growth, but new construction of nuclear plants continued due to the subsidies. By 2011, just before the Fukushima Daiichi accident, there were 54 nuclear reactors in Japan.

In the wake of the 2011 Fukushima Daiichi nuclear accident, it was decided that its six reactors would be decommissioned, thus reducing the number of reactors in Japan to 48 at that point. Before the accident, METI intended to approve a longer service life of nuclear reactors, such as 60 years, but the Nuclear Reactor Regulation Law was revised in 2012 to require power utilities to shut down any reactors that have operated for over 40 years, as a general rule. In exceptional cases, this can be extended operation to 60 years if the reactor and reactor buildings pass "special inspections" with more rigorous safety inspections. Extending the operational life of any nuclear power plant is expected to entail a large amount of safety and maintenance costs.

For reactors reaching 40 years of operation, power companies must decide whether they will continue using them. In April 2015, decisions were made to decommission the following five: reactors 1 and 2 at Kansai Electric Co.'s Mihama nuclear power plant (Fukui Prefecture), reactor 1 at Kyushu Electric Power Co.'s Genkai nuclear power plant (Saga Prefecture), reactor 1 at Chugoku Electric Power Co.'s Shimane

nuclear power plant (Shimane Prefecture), and reactor 1 at the Japan Atomic Power Co.'s Tsuruga power plant (Fukui Prefecture). Considering the low output of these reactors, the power companies decided that they could not recover the large investment for safety measures. Thus, the total number of nuclear reactors in Japan stands at 43 at present.

Meanwhile, one reactor is now under construction, at J-POWER's Oma nuclear power plant (Aomori Prefecture), and construction preparations have been suspended for two reactors at the Kaminoseki nuclear power plant (Yamaguchi Prefecture), owned by Chugoku Electric Power Co..

As of August 2015, there were applications for NRA safety inspections of 25 reactors at 15 nuclear plants, including the reactor under construction at the Oma plant. At present, only five reactors at three plants have passed the NRA inspections: two at the Sendai plant (one of which has restarted), reactors 3 and 4 at Kansai Electric Power Co.'s Takahama nuclear power plant (Fukui Prefecture), and reactor 3 at Shikoku Electric Power Co.'s Ikata nuclear power plant (Ehime Prefecture). Although the two reactors at the Takahama nuclear power plant passed the NRA inspections, the Fukui District Court issued a temporary injunction to prevent their restart. To resume operation of reactor 3 at the Ikata nuclear power plant, on the other hand, Shikoku Electric Power Co. must obtain the consent of the relevant local governments.

At the time of this article, still only one reactor has been restarted in Japan (at the Sendai nuclear power plant in Kagoshima Prefecture), but many issues remain with nuclear power and the restarting of nuclear plants. Below is a summary of five major issues.

The first is about the definition of "relevant local governments." This is because, to restart reactors, power companies must first obtain their consent. For the Sendai plant, only the city of Satsuma Sendai (where the plant is located) and Kagoshima Prefecture, were considered to be the relevant local governments. Having obtained their consent, Kyushu Electric Power Co. restarted the operation of the reactor.

Some people, however, strongly insist that any neighboring municipality that could be severely affected in the event of a nuclear plant accident should also be counted as a "relevant local government." This opinion is quite reasonable.

Previously, the evacuation zone in the event of a nuclear accident was set at an eight-kilometer (km) radius from a nuclear power plant. When the Fukushima Daiichi accident occurred, however, the designated evacuation zone included areas more than 30-km from the plant. With this in mind, the NRA's Nuclear Emergency Response Guidelines adopted on October 31, 2012 designated two kinds of zone: the Precautionary Action Zone (PAZ), within a five-km radius, and the Urgent Protective Action Zone (UPZ), with a 30-km radius. The NRA also requires municipalities within the 30-km radius to formulate disaster prevention plans

reflecting the UPZ status, and in the case of the Sendai nuclear plant, some municipalities besides Satsuma Sendai City are within that zone.

Second, the Sendai reactor operation was resumed before a local evacuation plan was in place. In the Fukushima accident, hospital patients and the elderly died in the midst of the confusion during the disaster evacuation. The national government, therefore, calls for municipalities to set out plans covering evacuation sites and routes as well as means for transportation for social welfare facilities, including medical institutions and nursing homes within a 30-km radius of a nuclear power plant, in guidelines for municipalities, in accordance with the Disaster Countermeasures Basic Act.

Related to this, an August 3, 2015, article in the Asahi Shimbun stated: "Only two facilities out of 85 hospitals within a 30-km radius of the Sendai plant and 15 facilities out of 159 social welfare facilities have adopted an evacuation plan." It goes on to say: "Since it is not realistic to make a plan covering a 30-km radius, says prefectural governor Yuichiro Ito, the Prefecture decided in March 2015 to set 10-km as the radius for requiring an evacuation plan. Every facility within that 10-km radius has made a plan. For facilities outside the 10-km radius, after an accident, the prefecture will determine evacuation sites based on conditions such as wind direction. The Prefecture's Nuclear Power Safety Section says it made this decision with the approval of the national government."

The third issue is that the body responsible for deciding on restarting a nuclear plant is not clearly specified. The NRA insists that it is responsible only for checking safety issues and is not involved in the decision of a restart. Conversely, the government explained its position on any restart like this: Once the safety conditions of a restart are approved by the NRA, each nuclear power plant will sequentially resume its operation under the consent of local municipalities where the plant is located. The Minister of Economy, Trade and Industry, Yoichi Miyazawa, said at a press conference on August 4, 2015, "Under the legal system framework regarding the restart of nuclear power plants, the NRA judges if a nuclear power plant meets strict safety standards, and then the power company will make the final decision to restart." He emphasized the government's view that the responsibility of making the decision to restart rests with the power company adding, "Therefore, there is no need for political judgment."

Under this situation, however, local government's content is the most critical factor which will determine whether a power plant should be restarted or not. Local municipalities at stake insist that the national government should take the leading role in promoting nuclear power as a national energy policy.

Yuichiro Ito, prefectural governor of Kagoshima where the Sendai plant is located, requested that the national government clearly state its responsibility in writing before local consent could be reached. The National Governor's Association also

submitted a proposal to the national government about measures of securing safety at nuclear plants and disaster prevention stating the range of the national government's responsibilities and its procedures to take. Also, Tokihiro Nakamura, the governor of Ehime Prefecture has said that it is necessary to specify who will take the final responsibility in case of nuclear accident. Ehime Prefecture is home of the Ikata nuclear power plant, which has passed the NRA's safety inspection. In the worst-case scenario, if any nuclear accidents occur again, the three parties -- the NRA, the power companies, and the national government -- might try to thrust their own responsibilities onto the others. Looking at this situation, it seems no lessons were learned from the Fukushima accident.

The fourth issue is about the restart of a plant amid growing opposition from local residents and citizens. In front of the gate to the Sendai plant, for instance, residents were conducting protests daily. There were also many people demonstrating against the plant's restart in front of the prime minister's office in Tokyo.

In May 2014, while the safety review of the Sendai plant was ongoing, a telephone opinion poll was conducted in the prefecture by Minami-Nippon Shimbun in Kagoshima. The poll found 59.5% "opposed" or "somewhat opposed," and 36.8% "in favor" or "somewhat in favor" of a restart. With a nationwide telephone opinion poll regarding the restart of the Sendai plant by Asahi Shimbun on August 2015,

30% said it was a good decision and 49% said it wasn't. The restart, despite much opposition, fueled distrust of the government over the issues of nuclear policy and approaches.

The fifth issue, related to the fourth, is the significance of nuclear power within the national energy policies and how nuclear power's role is determined. Japan's METI released the national energy mix target for 2030 on July 16, 2015, in which nuclear power accounts for 20% to 22% of the total energy supply, with renewable energy accounting for 22% to 24%.

The percentage of nuclear power generation among the total energy sources in Japan was 28.6% in FY2010, a year before the nuclear accident. When complying with the general rule of decommissioning nuclear power plants after 40 years, it is estimated that the percentage of nuclear power will drop to around 15% of the total. Considering public opinion and the backlash from local people, it appears it will be difficult to construct and/or increase the number of nuclear power plants.

Under these circumstances, what is the meaning of a 20% to 22% target for nuclear power in the energy mix?

All in all, the committee that decided the target ratio of Japan's energy mix toward 2030 had a problem with its member structure, because pro-nuclear members were dominant. It was the Fundamental Issues Subcommittee established by the government, at that time led by the Democratic Party of Japan, to discuss the

nation's energy policy for 2030 after the Fukushima nuclear power plant accidents. Out of 25 committee members, about one-third had an anti-nuclear stance. At the time, through national discussions on options for energy and the environment, the ministerial-level Energy and Environment Council formulated the Innovative Strategy for Energy and the Environment, stating that Japan should mobilize all policy resources to make it possible to reduce nuclear power plant operation to zero in the 2030s.

However, due to strong opposition, mainly by the industrial sector, which wants to maintain and further promote nuclear power, Cabinet was unable to approve the Strategy and decided to treat it only as a reference document. The Strategy, therefore, was not able to have a major impact on national policy. After the Liberal Democratic Party returned to power in the December 2012 election, most of the anti-nuclear members were eliminated from the reorganized subcommittee.

According to Asahi Shimbun's national poll described above, 28% of respondents supported the restart of nuclear plants (not counting the Sendai plant), while 55% were opposed. In response to the question, "What should Japan do with nuclear power plants in the future?" 16% said "reduce them to zero immediately" and 58% said "reduce them to zero in the near future." In total, 74% (i.e., three-quarters) said "zero." The percentage of respondents who said "don't reduce them to zero" was 22%.

The Sendai plant was allowed to restart even though most Japanese want zero nuclear power, as this poll shows. Japan has not yet decided on solutions to deal with nuclear waste, such as location of final disposal sites and means of disposal. But with reactors restarting, Japan will have a growing amount of nuclear waste that has to be treated in the future.

Lester R. Brown, director of Japan for Sustainability and former president of the Earth Policy Institute, wrote in his book, "The Great Transition," that nine U.S. states -- including California, Connecticut, and Illinois -- have banned the construction of new nuclear plants until an acceptable means is developed to deal with the waste. I strongly hope that Japan will also show such true wisdom.

According to an October 2013 report by the Electricity Supply-Demand Verification Subcommittee, annual fuel costs from the increased use of thermal power plants made necessary by the shutdown of nuclear plants rose by an estimated 3.6 trillion yen (about \$29.5 billion). The Long-Term of Energy Supply and Demand Outlook by 2030, released in July 2015, states that electricity supply from nuclear power should be maintained in order to "meet all the policy targets such as improving self-sufficiency in energy supply, decreasing electricity cost, and setting a reduction target of greenhouse gases ambitious enough compared to standards in Europe and the United States."

The Japan Business Federation (Keidanren) released a statement on July 1, 2015, regarding the nation's draft long-term energy supply and demand outlook.

According to the statement, "Since the Great East Japan Earthquake, electricity prices for industry have increased by about 30%, which seriously undermines the global competitiveness of Japanese industries." It prescribes detailed measures, including increased operation and longer service life of existing nuclear plants, as well as plant replacement and new construction, saying, "It is necessary to work on efforts to promote nuclear power in order to decrease electricity costs."

It looks like the decision to restart the Sendai Nuclear Power Plant and the government's approval of the energy mix still featuring a large role for nuclear were responses to the demands of industry to decrease electricity costs. They were certainly not responses to the public will. Have the authorities not learned enough from the Fukushima nuclear accident? A major lesson should have been that decisions and directions must not be based only on short-term economic profit, that it is extremely important to make them based on dialogue with society about what really needs to be protected in the long term.

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