The Fukushima Nuclear Power Plant accident is the second largest nuclear disaster after Chernobyl. Currently, around 150,000 people still live in evacuation under government order or by their own choice. Although triggered by a large earthquake and tsunami, this accident is a human disaster for which an electric company and the national government are responsible due to a series of "underestimations," such as that of the height of a possible tsunami, the possibility of a "station blackout," and duration of power failures. In addition to confusing and misleading information, delays in disclosure and a deliberate concealment of information occurred. In the background of all of this is the "Atomic Village" or "Atomic Circle," a very closed relationship among politicians, government offices, academics, industrial leaders, and the media. Japan, has had no "true independent regulator" of nuclear issues. This disaster revealed that the "Nuclear Safety Commission" and "Nuclear and Industrial Safety Agency" are subsidiary to the electric companies and the Ministry of Economy, Trade and Industry.

Currently there are 64 nuclear reactors under construction worldwide, including 27 in China, 11 in Russia, 5 in both South Korea and India, and 2 reactors in Japan. Sixty-six percent of the reactors under construction are located in Asia, with 56% of the total in East Asia. The Lee administration in South Korea is seeking to export its nuclear technology, with a goal of exporting 80 nuclear reactors by 2030. In spite of the Fukushima accident, Japan and South Korea's pro-nuclear and nuclear technology export policy would escalate this very risky "death spiral." The final result of this nightmare would be a proliferation and race toward developing nuclear weapons.

We should embrace the example of the German government that changed its pro-nuclear policy and decided to shut down its entire 17 reactors by 2022 based on the report of its Ethics Commission for a Safe Energy Supply. This report stressed the role of socially responsible decision making prior to technological and economic estimations. We should try to turn around the current policy and build a post-nuclear Japan. March 11, 2011, the day of the Fukushima disaster, should become the turning point for Japanese society and the world to shift energy policies to a post-nuclear future. This would turn the tragic Fukushima disaster into the greatest message to East Asia, the world, and future generations.

1. Turning point to a real sustainable future

The earthquake of magnitude 9.0 and tsunami disaster on March 11, 2011 constitute the largest disaster in Japan since World War II. 19,009 people died or are still missing. This is the third largest disaster in modern Japanese history after the 1923 Great Kanto Earthquake, with 105,000 dead or missing and the 1896 Great Meiji Sanriku Tsunami with around 22,000 dead or missing.

Among six nuclear power units of Fukushima Daiichi nuclear power station operated by TEPCO, the Tokyo Electric Power Company, Units 1 to 3 were in operation, and Units 4 to 6 were out of operation for a regular maintenance at the time of the earthquake.
Units 1 to 3 automatically shut down by the earthquake, but external power supplies and almost all in-house AC power supplies were lost due to the earthquake and tsunami. Reactors and spent fuel pools lost their cooling capabilities. Explosions occurred at Units 1, 3 and 4. These were caused by the hydrogen released from the damaged core that filled the reactor buildings. The reactor core of Unit 2 also seems to have been seriously damaged. A large amount of radioactive materials have been released and spread through this accident.

The most tragic and painful cases are the refugees in evacuation who were living near the melted-down nuclear station. The zone of up to 20km from the site was designated as the Access Restricted Areas, and no entry is allowed unless authorized. Some areas like Iitate village outside the 20km zone from the site were also designated as the Deliberate Evacuation Areas. Even a year later, in March 2012, around 150,000 people, 7.5 percent of the whole population of Fukushima Prefecture (2,020,000), are still evacuated from their houses by a government order or by their own will, with hopes of returning to their homes as soon as possible or resigned to abandoning their homes because of fear of the high radiation exposure. In particular, more than 3,500 infants and small children under 4 years old, and their mothers left Fukushima Prefecture. Their fathers had to remain in Fukushima Prefecture for their jobs. Hence, many are forced to have split households. Their greatest hope is to return to their ordinary life prior to the nuclear accident. Evacuees long to return to their homes as soon as possible when it is safe, but no one can estimate exactly when that will be. The Chinese characters of “Fukushima” consist of “Fuku” literally meaning “happy” and “Shima” meaning “land” in this context. This area with the happy name suddenly turned to “the land of tragedy” like Hiroshima and Nagasaki where atomic bombs were dropped in 1945 by the US military.

The Fukushima nuclear disaster is the second largest nuclear accident after the Chernobyl disaster in 1986. The severity of both accidents was rated Level 7 on the INES (International Nuclear Event Scale). The Fukushima nuclear accident is a significant historical incident that has several characteristics. First, it is the first severe accident of a nuclear power station triggered by a large earthquake and tsunami. It is the first example of “Quake and Nuke Disaster Complex” or “complex disaster” which the seismologist, Dr. Katsuhiko Ishibashi had warned of since 1997. Second, it is the first severe accident where four reactors became dangerously unstable simultaneously. A small number of workers had to operate while being exposed to strong radiation in a very unstable situation, without light and AC power, and with repeated aftershocks. Third, it took four months to achieve a somewhat more stable cooling state. Yet, the condition of the melted-down reactors remained unstable more than one year later. The 1978 crisis of the Three Mile Island (TMI) nuclear accident in the US was over after the first 6 days. Even in the case of the Chernobyl accident, the large release of radiation stopped after the first 10 days. Fourth, it is the first severe accident of nuclear power plant on the coast. The TMI and the Chernobyl stations were located inland. Highly contaminated water overflowed to the ocean from April 2 to 6. A large amount of contaminated water was released to the ocean from April 4 to 10 without notification to the fishing industry and the neighboring countries. The fishing industry and Korean, Chinese and Russian governments criticized this release triggering their mistrust in Japan’s nuclear disaster response. Scientists worry about serious contamination of seawater and damage to ecosystem.

Not only evacuees, but also all residents of Japan are facing risks of exposure to radiation. The Japanese government announced the start of decontamination work in more than 100 municipalities of eight prefectures that had an estimated level of additional radiation per annum of more than 1 milli-Sievert. Innocent smiles disappeared. Mothers are worrying about their children’s safety and the level of contamination in foods, school lunches, water, at homes and schools, in swimming pools, on the way to the school, and on playgrounds. Everywhere we are, whatever we do and whatever we eat, we have to be aware always of the
level of radiation. We cannot trust official reports of “safety” by the government and the media anymore.

Whenever I visited and stood on the most severely devastated area swept by the tsunami in Miyagi Prefecture, I imagined that “this is just like a ruin after World War II” and realized “we are at the turning point to rebirth, rebuild and reconstruct Japanese society.” I also realized we are living in the “world risk society” (Beck 1998). The question is in which direction should we move. Should we continue on the way to an affluent industrial society by using any energy resources available and producing large amounts of wastes, or move to a real sustainable future by promoting renewable energy resources and energy efficiency? Facing real nuclear risks, what can we learn from the Fukushima nuclear disaster?

First, we should admit that an absolute safety never exists relating to nuclear power stations, and we are constantly living with some risk of nuclear disaster. Second, we can move in the direction of decreasing the number of nuclear power plants and replacing them with thermal plants, renewable energy resources, saving electricity and so on.

2. Reasons and background of the Fukushima nuclear accident

The trigger of the Fukushima nuclear accident was the huge earthquake and tsunami. But the investigation by a committee of the cabinet proved that this accident is a human disaster and TEPCO and the national government are very responsible for the incident. The executive members of TEPCO often explained the incident as a series of “unexpected situations,” but these should more precisely be called a series of “underestimations” by the company and the government.

First, TEPCO and Japanese Nuclear Safety Commission (JNSC) underestimated the height of tsunami. Although some researchers gave a scientific warning of a 15.7m tsunami in May 2008, both TEPCO and JNSC ignored this warning. So, the plant design remained only to withstand a 5.7m tsunami following the 2002 estimation. On March 11, the tsunami of the maximum wave of 14 to 15m arrived and flooded over the 10m elevation from the basement by 5m.

Second, Japanese power companies and government agencies had not anticipated any possibility of long hours of “station blackout (SBO)” or the total loss of AC power to the station caused by a large scale natural disaster, earthquake, tsunami, and flood. But the SBO did happen, causing the nuclear plants to lose all cooling functions. Without sufficient basis, they expected external power would be recovered within thirty minutes and saw no need to prepare for the long hours without AC power. So there were no manuals for the case of the SBO or for the case of severe natural disaster beyond expectation. In the US, officials are preparing for the SBO as a counter-terrorism measure, ready to use a large amount of water to cool down the nuclear plants. After the Fukushima nuclear disaster, the Israeli government which is afraid of terrorist attacks immediately decided to abandon its plan to construct a nuclear power plant. One reason the German government decided to shift its nuclear energy policy is due to the possibility of the SBO by the crash of an airplane or other means.

Third, the national government had required local governments to make plans to evacuate within only a 10 km zone and for only 24 hours. “A nuclear emergency” was declared by the government at 19:03 on March 11. Initially a 2 km, then 10 km evacuation zone was ordered. But later Prime Minister Kan issued instructions that people within a 20 km zone around the plant must evacuate, and urged that those living between 20 km and 30 km from the site to stay indoors. Those in the zone between 20 km and 30 km from the facility were subject to voluntary evacuation. On 22 April 41 days after the incident, the Japanese government announced that the evacuation zone would be the 20 km "circular" zone plus an irregular zone extending northwest of the Fukushima site, including the village of
Iitate where high levels of radiation had been repeatedly measured. Farmers in this area are prohibited from growing crops and fishermen are prohibited from catching fish. They can only cry and resent the fumbling electric company and the national government. Even now one year after the accident, radioactive materials continue to leak from the reactors.

A lot of confusing, misleading, hiding and delaying of information happened. For example, the Investigation Committee revealed in the executive summary of the interim report:

“in the initial stage of responses to the accident, there were confusions over utilization of monitoring data. In particular, the government lacked an attitude of making the monitoring data promptly available to the public. Even when some data were made available to the public, not all the data were disclosed.”

Especially the System for Prediction of Environmental Emergency Dose Information (SPEEDI), which the government spent more than 11 billion yen to establish, was expected to play an important role in planning prevention of radiation exposure and evacuation of local population. However, the system was not utilized at the time of issuing instructions to evacuate. Even though the system performed actual calculations, the results were not provided to the public. “If the information were provided timely, it could have helped local governments and population to choose more appropriate route and direction of evacuation”

Why did we fail to prevent this nuclear disaster? Why did we fail to change a very risky pro-nuclear energy policy prior to this disaster? It was caused by the closed policy-making group known as the “Atomic Circle,” also named “atomic village.” This group suffered from the kind of “groupthink” described by Janis (1972). Groupthink causes a deterioration of reality testing. This occurs when the members of a group are similar in background, insulated from outside opinions, and have no clear rules for decision making. This groupthink led to misconduct, malfunctioning and delay of emergency actions. It created a “normal accident” as Perrow (1984, revised 1999) described, and brought about this human disaster in the Fukushima nuclear station.

In Japan, there has been no “real independent regulator” of nuclear issues. This disaster revealed that the “Nuclear Safety Commission” and “Nuclear and Industrial Safety
Agency” have not been working to regulate at all. In fact, in this accident the role of both organizations was insufficient and followed the lead of TEPCO and the cabinet. They are essentially puppets of the electric company and METI. Scholars have noted the role of the “iron triangle” or “triple control machine” in Japanese conservative politics (Broadbent 1998). For example, the triangle operating in the construction of dams consists of the construction company, conservative politicians and government officers (Woodall 1996). But the “Atomic Circle” is much more tightly closed and the power of the monopoly electric company is much stronger than what is found in the typical iron triangle. Social movements opposing nuclear energy started in the mid-1950s right after the beginning of governmental nuclear energy policy, but their influences have been very limited. Such movements have rarely been successful in forcing the abandonment of a planned nuclear construction project (See Hasegawa 2004 Ch8 and Ch9; Hasegawa 2011a).

3. Toward a post-nuclear society: the way to build a post-nuclear East Asia

Comparing the total number of operating nuclear reactors worldwide in 1995 and 2010, the total number only grew by 6 reactors (increasing from 437 to 443 according to the IAEA). However, the actual situation was very imbalanced. The number of reactors in Asian countries increased by 40: 10 each in Korea, China and India, 8 in Japan and two reactors in Pakistan. But the number of reactors in Europe went down by 21 reactors, with 16 shut down in the UK and 3 closed in Germany. Reactors decreased by 8 in North America. Currently there are 64 reactors under construction worldwide, including 27 in China, 11 in Russia, 5 both in South Korea and India and 2 reactors in Japan. 66% of the reactors under construction are located in Asia, with 36 of them, 56% of the total under construction in East Asia. The Lee administration in South Korea is seeking to export its nuclear technology, with a goal of exporting 80 nuclear reactors by 2030. As of 2010, South Korean companies have reached agreements to build four reactors in the United Arab Emirates. The defeat of Japanese companies in the competition with Korea to export nuclear technology gave a heavy shock to the Cabinet of the Democratic Party of Japan. Prime Minister Kan urged their export and succeeded in reaching an agreement to build two reactors in Vietnam in 2010 November. The Korean government is also seeking to revise the “U.S.-Korea Civil Nuclear Agreement” and get approval from the US government to build a commercial nuclear fuel reprocessing factory. It plans to catch up to the Japanese nuclear technology using “nuclear fuel cycle facilities” in Rokkasho village, Aomori Prefecture.

I am afraid that this very risky “death spiral” of Japan and South Korea’s pro-nuclear policy will be escalated in spite of the Fukushima accident. The final result of this nightmare would be a proliferation and race toward more nuclear weapons among developing countries.

We should propose abandoning such a nightmare. We should try to turn this policy around and build a post-nuclear East Asia. This would be the greatest lesson from the tragic Fukushima disaster and the greatest message to East Asia, the world and future generations.

We should learn from the example of the German government that changed its pro-nuclear policy and decided to shut down its entire 17 reactors by 2022 based on the report of its Ethics Commission for a Safe Energy Supply (2011). Under the strong leadership of Chancellor Angela D. Merkel, 17 members were selected for this commission including Ulrich Beck, Miranda Schreurs and two other social scientists. The commission intensively discussed the issues over two months including public debate of more than 11 hours. This report stressed the role of socially responsible decision making prior to technological and economic estimations. The whole voice was very democratic as well as ethical. “Sustainability,” “human responsibility for nature” and “responsibility for future generations”
are the key concepts. The role and the result of this commission could be regarded as the good practice of “taming risks through dialogue” (Eder 2000). Political and social consensus was finally reached after long years of battle between pro and con sides of the nuclear energy debate triggered by the Fukushima accident. Merkel changed her position from the one she held in September 2010, when she had decided to add an additional 12 years to the permitted length of operation of nuclear plants in Germany.

I am proposing that Japanese government should announce a shift away from the pro-nuclear energy policy based on the public dialogue. Concretely speaking,

1) All nuclear plants operating or temporarily closing will be permanently shut down by a fixed year for example, 2020. The priority for shut down should be given according to the estimated scale of the earthquake, the distance to a risky active fault, the size of population within 30 km evacuation zones, the length and the record of plant operating and the history of incidents and troubles at the plant.

2) All nuclear plants in planning or under construction will be immediately abandoned.

3) Efficient use of energy and utilizing renewable energy will be strongly promoted.

4) The reactors of the Hamaoka nuclear plant, which has been temporarily closed since May, 2011 by the direction of Prime Minister Kan, will be abandoned because they are standing right on the source zone of the Tokai earthquake.

5) The nuclear fuel recycling project including nuclear spent fuel reprocessing in Rokkasho village, Aomori Prefecture will be abandoned. Nuclear spent fuel will be safely managed on site of or near each nuclear power plant as in Germany.

6) Monju, a fast breeder reactor temporarily closed by an accident, will be abandoned.

7) Plutonium-thermal project to burn a mixed oxide form of plutonium and uranium will be abandoned.

The Japan Federation of Bar Associations is also proposing a similar energy policy. To accomplish this policy will require the reform of the Japanese nuclear policy-making process. It will require breaking up this Atomic Circle and replacing it with open decision-making processes, transparency, and in short, an institutional reform. The reform process must start with an autonomous planning commission like that in Germany composed of independent scholars, scientists and public advocates. This direction is the way to survive as a leading techno state in the 21st century. Threatening with the false choices of “cutting electricity or keeping nuclear” or “global warming or using nuclear” leads us in the wrong direction. I have demonstrated elsewhere three realistic, step-by-step scenarios to replace the total amount of electricity from nuclear reactors by increasing operating ratio of thermal plants from 44.8% (2010) to 68.1%, saving electricity and promoting renewable energy resources (see Hasegawa 2011b).

March 11, 2011, the day of the Fukushima disaster, should be the turning point for Japanese society and the world to shift its energy policies to a post-nuclear future.

Notes

References


