Chapter 4

Policy Recommendations

July 2020

This chapter should be cited as

ERIA (2020), 'Policy Recommendations', in Murakami, T. and V. Anbumozhi (eds.), *Securing the Resilience of Nuclear Infrastructure against Natural Disasters.* ERIA Research Project Report FY2020 no. 06, Jakarta: ERIA, pp.52-55.

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The literature survey and hearing survey in the US, the UK, France and Japan have shown that each country has its own nuclear resilience law structures and measures. Each country has its own history of developing legal structures and measures based on the discussions on resilience triggered by natural disasters that occurred in that country. For ASEAN countries considering the introduction of nuclear power stations, the history of these countries is informative for developing legal structures and measures for securing the resilience of nuclear infrastructure against severe natural disasters.

The following section outlines findings and recommendations based on the characteristics of each country.

4.1. US

Independence. One of the characteristics of the US nuclear sector is the independence of the NRC as the nuclear regulator. Fair arguments are ensured because each sector agency is completely independent, e.g. the court has the right to express an objection to a decision by the NRC. Independence is also ensured inside the NRC, e.g. the chair of the NRC has the right to oppose a topic which almost all members agreed in the NRC.

Cost–benefit analysis. Another characteristic is the prevailing concept of a positive cost–benefit relationship – from the regulator to researchers and citizens. For nuclear resilience, based on a consideration of the break-even point at which the maximum benefit is obtained for the cost, discussion is concentrated on the optimum level which nuclear resilience against natural disasters should reach. In other words, a rational system has been built in which no extra measure is prepared when it is judged that no improvement of resilience worth the cost is obtained.

Communication. The NRC conducts regular communication with operators and local people at every level of its organisation and has built a system that enables all stakeholders to gain access to the latest information in a timely manner. Such constant efforts to ensure transparency, e.g. posting timely information on its Home Page, are the major factors in instilling confidence in operators and the public.

These three points are highly informative not only for ASEAN countries but also for Japan. Especially Japan could learn more from the experience of the U.S. when communicating with local people living near NPPs regarding restart of nuclear power stations after long-term out-of-service due to prolonged new safety requirements.

4.2. UK

Emergency preparedness. The discussion on electricity resilience started after the 2009 flu pandemic in the UK. Nuclear resilience was discussed comprehensively after Fukushima Daiichi NPS Accident. When a severe accident occurs and scientific insights are required, the Prime Minister calls the COBR, and the COBR asks the chief scientific adviser assigned by each ministry and agency for advice. The chief scientific adviser gathers scientists and experts to launch an urgent SAGE and conduct information collection and analysis to develop response measures.

Technical adaptation. The UK has used Magnox reactors in addition to light-water reactors until 2015. The UK imported nuclear resilience from the US; however, the UK has operated Magnox reactors as well as light water reactors. Thus, the UK modified nuclear resilience from the US to fit for the UK. For ASEAN countries considering the introduction of NPPs, modifying nuclear resilience of the US to fit own country is informative enough for developing law structures and measures.

Preparation of probable future natural disasters. Another characteristic of the UK is that it regards resilience as not only early recovery after a natural disaster but also preparedness for natural disasters in the future. Researches of natural disasters occurred in neighbouring countries are also incorporated since several nearby countries (e.g. the Netherlands and several areas in Europe) are located below sea level, and the expected sea level rise due to climate change is an imminent issue, although the UK has fewer natural disasters than other areas.

ASEAN countries have the opportunity to advance research and development for considering emergency response to probable future natural disasters on the assumption that the incidence of natural disasters increases due to climate change. Some researchers in the UK assumes that natural disasters will be stronger in the future, although these countries have had relatively few natural disasters so far. In addition, there is a lot of useful information that provides research subjects, e.g. studying measures to avoid the risk of renewable energy technologies such as solar and wind power generation becoming unavailable in the future due to climate change.

4.3. France

Possibly reviewing overseas incidents. Since France usually experiences a small number of natural disasters, before the accident at the Blayais nuclear power plant caused by a flood in 1999, no full-scale examination had been conducted on its preparedness against natural disasters. Research equipment and tools had been prepared for expected disasters at that time, but they had not been used. Since the flood, France has conducted extensive efforts to develop laws pertaining to nuclear resilience and to establish mature organisations, reflecting lessons learned from flood at the Blayais nuclear power plant and Fukushima Daiichi NPS Accident in Japan. France positively incorporates the experience of international events into emergency preparedness since it has experienced a small number of natural disasters. This offers lessons to ASEAN countries, which are facing various natural disasters.

Measures against natural disasters. Another characteristic of France is that it regards the measures against natural disasters and those against internal and external events as the same. Hence, the measures against natural disasters are examined and implemented together with internal and external events.

Training. France continues to review the preparedness in terms of equipment and is making a concerted effort regarding the education, training, and fostering of the human resources available in emergency situations. It also plans to enhance such efforts in the future.

4.4. Japan

The new safety requirements. Since Fukushima Daiichi NPS Accident, Japan has improved its safety awareness, ability to promote dialogue, and technological capability. The new safety requirements began to be implemented in July 2013, based on Defence in Depth – significantly raising the assumption level of natural disasters and reinforcing the measures for events which could result in the loss of safety functions through common factors in addition to natural disasters. Public utilities have started in-house discussions for improving safety. In addition, the government, local governments and utilities have tried to improve reliability through more frequent communication with local people as well as sharing information in a timely manner.

Investigation Committee and the Working Group on Electricity Resilience. Although Japan has experienced more natural disasters than Europe or the US, full-scale examination on electricity resilience began after a major blackout due to a series of disasters including heavy rains, typhoons, and the Hokkaido Eastern Iburi earthquake that occurred in 2018. In response to these events, in September 2018, the Ministerial Meeting on Emergency Inspection of Critical Infrastructure launched the Investigation Committee on the Major Blackout by the 2018 Hokkaido Eastern Iburi Earthquake and the Working Group on Electricity Resilience to conduct 132 issues inspections on the electric infrastructure and propose or develop countermeasures and policies. In addition, it decided to implement a 3-year emergency response plan for disaster prevention, disaster mitigation, and building national resilience from 2018 to 2020.

The Fifth Strategic Energy Plan (METI, 2018a)[10], revised and approved in the ministerial meeting, firmly maintains the necessity of the policy system that is extracted from '3E+S' (energy security, efficiency, environment, and safety) with an appropriate balance as the idea for a basic energy policy. While the importance of resilience is recognised through a series of disasters, the reduction of the public burden for safety and consideration of the environment continue to be important. Therefore, it is important to study comprehensive policies that include the above points in the future.

[10] In the Fifth Strategic Energy Plan, nuclear power is described as "Lower dependency on nuclear power generation to the extent possible" and "Restart of nuclear power plants and continuous improvement of safety" by 2030, and "One of the options for decarbonisation" and "Pursuit of safe reactors, development of back end technologies" by 2050.

Now the IEEJ would like to propose policy recommendations on how to proceed with nuclear resilience against natural disasters based on the progress in advanced countries.

In ASEAN and Asian countries, consideration of introducing nuclear power widely varies by country. While some countries consider introducing nuclear power as a future option, no country has concrete construction plans for nuclear facilities in the near future. However, some ASEAN and Asian countries have rules and guidelines for improving resilience, emergency plans, and preparedness against natural disasters.

As described above, each country has started to comprehensively examine the importance of nuclear resilience in response to large-scale natural disasters that occurred in their countries. On the other hand, both the frequency and type of natural disasters are low, especially in Europe. In the US, since the type of natural disasters that has occurred varies greatly depending on the location, various efforts have been implemented in each area. Japan has experienced various types of natural disasters so far, and their scale has been growing recently. ASEAN countries can select and incorporate laws and measures appropriate to each country from various efforts to mitigate the effects of natural disasters. It is appropriate to build a country-specific model to each country based on the activities and histories of the advanced countries and incorporate applicable lessons based on their own predictions in the future. In addition, enhancing nuclear resilience by preparing an academic field to conduct discussions about nuclear resilience amongst advanced counties and ASEAN countries is strongly recommended for all countries that are considering the introduction of nuclear power or where experimental nuclear facilities are already in operation.

Issues regarding the enhancement of nuclear safety and emergency preparedness and response are addressed in the Asian Nuclear Safety Network (Asian Nuclear Safety Network, n.d.), an international organisation in Asia under the umbrella of the IAEA. Issues related to the resilience against natural disasters should be included in the Asian Nuclear Safety Network (Asian Nuclear Safety Network, n.d.) as one of the high priority issues to achieve better communication and collaboration amongst Asian countries.