

The Sustainability of Nuclear Energy in Southeast Asia: Opportunities and Challenges

Executive Summary

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Executive Summary and Recommendations

ASEAN member states are moving towards diversifying their energy mix, reducing their over-dependence on fossil fuels, and exploring alternative energy sources such as nuclear energy to ensure that their energy supplies are secure, affordable and environmentally sustainable. Vietnam, Indonesia and Malaysia are the three ASEAN member states that are exploring the nuclear energy option. Although not all ASEAN member states presently have plans to build nuclear reactors, there are crucial reasons why the region has a vested interest in ensuring nuclear security, safety and safeguards (3S) in the region. First, any nuclear accident in the region would threaten public health and the environment through water and soil contamination as well as a radioactive plume which knows no borders. Second, the region's fast-growing economies can be easily jeopardised by a nuclear accident as the operations of key economic sectors, including the supply chain, would be disrupted. Third, the region's vital sea lanes, where radioactive materials will likely pass through, are not tightly guarded by maritime security forces. There is no guarantee that ASEAN member states will be able to fully secure all the radioactive materials and waste from their future NPPs and prevent terrorist threats. Hence, there is a need for ASEAN member states to start discussing possible regional mechanisms on the prevention of the trafficking of weapons of mass destruction and their means of delivery. Lastly, the region is home to the world's major food producers and exporters. A nuclear accident can result in the radioactive contamination of farmlands and marine resources, disrupting the food supply chain. It is therefore in ASEAN member states' interest if the region has collectively institutionalised nuclear safety and security, including the safe and secured transport of radioactive materials.

Currently, Vietnam has the most developed nuclear power roadmap in the region with its first nuclear power plant (NPP) due to be completed by 2023. But a number of challenges need to be addressed first by its government to ensure nuclear safety and security. There are structural concerns of government oversight of the nuclear power plant (NPP) programme in Vietnam. Its regulatory body does not have effective independence which may compromise safety in the future once its NPP starts operating. Vietnam's emergency protocol is still not yet in conformance with the IAEA's emergency preparedness and response standards. In addition, Vietnam has yet to come up with a comprehensive NPP security plan as well as a management plan for spent fuel. To address these issues, the Atomic Energy Law is now being revised and expected to be passed by the National Assembly by 2016. Vietnam works closely with IAEA to meet international safety standards and regulatory practices. To address the shortage of manpower, Vietnam is sending students overseas to take up practical courses and training on nuclear power.

Meanwhile, Indonesia shows increasing confidence in its capacity and capability to build its first NPP. IAEA's 2009 Integrated Nuclear Infrastructure Review (INIR) in Indonesia confirms that Indonesia carried out extensive preparatory work on infrastructure and is ready to begin nuclear power plant construction. Indonesia's commitment for nuclear safety, security and safeguards is reflected in a number of regulations and initiatives that drew guidance from the IAEA standards. Indonesia's NPP programme has thus far stalled largely due to high political costs resulting from strong public opposition.

Indonesia does not have an entity acting as a Nuclear Energy Implementing Organisation (NEPIO). Various ministries and government agencies carry out separate functions in preparing for the establishment of NPPs, and each of them reports directly to the President. The President will make or break the decision for Indonesia to go nuclear, and as public acceptance is a key factor, he is unlikely to make an unpopular decision. The change of leadership from Susilo Bambang Yudhoyono to Joko Widodo therefore does not provide an immediate indicator of the future of NPP plan in Indonesia.

To prepare for nuclear emergency situations, Indonesia has established the Organisation for National Nuclear Emergency Preparedness and Response System (OTDNN). Recently in August 2014, Indonesia established

the Indonesian Center of Excellence on Nuclear Security and Emergency Preparedness (I-CoNSEP), a special platform where BAPETEN, BATAN, police, customs, the Ministry of Foreign Affairs, and intelligence communicate and coordinate their efforts for nuclear security and emergency responses. However, their effectiveness remains untested. In terms of human resources, Indonesia has an aging pool of nuclear experts at the National Nuclear Energy Agency and other nuclear facilities. Various government initiatives and programmes are in place to boost the country's human resource development in the nuclear field, but specific competence needed for nuclear power applications will still need to be developed in co-operation with future NPP investor(s).

While Indonesia has gone a long way in its plans for NPP, in Malaysia the development of NPPs is still at an initial stage as site selection was made based on digital mapping and no fieldwork has been carried out to date. The plan has not moved forward due to concerns over the Fukushima disaster in Japan. Civil society also actively opposes the NPP plan. In addition, there are serious concerns over the safe disposal of nuclear waste and the independence and impartiality of the Malaysian regulatory body, Atomic Energy Licensing Board (AELB).

Malaysia's progressive commitment for nuclear safety, security, and safeguards is evidenced, among others, in the recent incorporation of the IAEA Convention on Physical Protection of Nuclear Material (CPPNM), the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT), and the Additional Protocol to the IAEA Comprehensive Safeguards Agreements in Malaysia's Atomic Energy Licensing Act (Act 304) and its involvement in the Global Initiative to Combat Nuclear Terrorism. Regardless of such measures, Malaysia has not succeeded in convincing its public of its capacity and capability in dealing with nuclear power. To respond to nuclear emergencies, Malaysia has established dedicated mechanisms and resources although the effectiveness of inter-agency coordination, communication, and response times remains unknown. With regard to human resources, Malaysia does not have a dedicated human development programme for NPPs nor experienced personnel to teach nuclear engineering courses needed for NPPs.

As Vietnam comes closer to completing its first NPP, and with Indonesia and Malaysia both considering the prospects for a nuclear energy future, there is significant interest for ASEAN to strengthen nuclear governance in the region and strictly uphold nuclear security, safety and safeguards (3S). It is imperative for ASEAN member states to work together to ensure effective governance of nuclear facilities, materials, and wastes and to adopt a regional disaster preparedness mechanism. ASEAN can facilitate regional cooperation on capacity-building, information dissemination, and emergency preparedness and response frameworks. Finding the right balance between national sovereignty and regional cooperation is often challenging since nuclear security always entails confidentiality as it is considered a national security issue. As such, this report recommends nuclear-aspiring countries in the region to consider the following policy options:

- Strengthen national legislation on nuclear safety, security and safeguards;
- Develop a comprehensive nuclear literacy campaign and human resources training programme;
- Conduct radiation risk computer modelling;
- Increase vigilance on food exports and imports;
- Explore the potential of establishing a regional/multilateral nuclear enrichment centre;
- Establish a regional nuclear crisis centre;
- Pursue joint nuclear emergency drills in region and train medical contingent for nuclear accident relief;
- Organise regular meetings among the ASEAN's academic institutions, think tanks and government agencies on nuclear power, security and safety;
- Establish Centres of Excellence on Nuclear Safety, Security and Safeguards (3S); and
- Explore an ASEAN Management of Spent Fuel Regional Framework.