

## The future of nuclear security in Southeast Asia: commitments and actions

As is clearly stated in the International Atomic Energy Agency (IAEA) Nuclear Security Fundamentals, nuclear security is focused on the prevention and detection of, and response to, theft, sabotage, unauthorized access and other such criminal or intentional malicious acts involving nuclear material, radioactive material, and associated facilities or activities.<sup>1</sup> Even though each State carries full responsibility for nuclear security within its borders, nuclear security in a State might depend on the effectiveness of the nuclear security regime in other States,<sup>1</sup> particularly neighbouring states and states in the same geographical region. In the current global situation where nuclear security issues could potentially cross several borders, it is increasingly important that States continue to enhance national frameworks and cooperate and engage in collective commitments and action to strengthen nuclear security worldwide.<sup>1</sup>

Within Southeast Asia, nuclear energy currently has a limited role, with many states still in early stages of developing a nuclear power programme. Demand for electricity is increasing as the states in this region continue to develop and industrialize. Thus, the need for more electricity generating capacity could potentially drive the development of nuclear power programmes in some states. Sixteen nuclear energy reactors are planned for construction within the region; although plans and timelines may have changed following the 2011 accident at Fukushima.<sup>2</sup> Industrialization may also create increased demand for non-energy radiological materials including radioisotopes in medicine, agriculture and environmental protection. Indonesia and Viet Nam are two countries in the region with radioisotope production industries.<sup>2</sup>

Southeast Asia faces existing cross-border challenges as a region in the areas of terrorism, maritime piracy, insufficient border and export controls, and insufficient capacity building.<sup>2</sup> These concerns may be further exacerbated after the launch of nuclear power due to increased movement of nuclear and radiological materials in the region that may present opportunities to malicious

parties.<sup>2</sup> It is therefore important to ensure that nuclear security capabilities in Southeast Asia are robust and strengthened.

Viet Nam is the most active country in the region in expanding its nuclear power capabilities and is undertaking site preparation, work force training and the creation of a legal framework.<sup>3</sup> Furthermore, Viet Nam has signed a cooperative agreement with Russia as its vendor to build its first nuclear power plant, including financing of the nuclear plant.<sup>3</sup> An intergovernmental agreement with Japan was also signed for construction of a second nuclear power plant, including financing.<sup>4</sup> Taking the most recent delays into account, construction of the nuclear plant is due to start in 2019 and introduction of nuclear to Viet Nam's energy mix is forecast to take place in 2028.<sup>4</sup> Other Southeast Asian countries including Indonesia, Thailand, Malaysia and the Philippines are similarly exploring the potential for developing nuclear power programmes as part of their energy mix. As such, the variation in nuclear and non-nuclear producing countries in different stages of nuclear development in Southeast Asia in the near future will bring about important implications for nuclear security in the region in any global effort to manage risks in nuclear security.<sup>2</sup>

A sound nuclear security infrastructure is particularly important in a region that is just beginning to generate nuclear power capacity because there is a possibility for malicious parties to take advantage of any loopholes in a less established nuclear security infrastructure system and quickly smuggle nuclear material across a border to a non-nuclear country that may not possess a similarly high level of nuclear trained work force or nuclear security regime. The operation of seven nuclear research reactors in four countries in the region<sup>2</sup> has ensured that some nuclear security infrastructure is already in place; however, it is imperative that each country bordering any potential nuclear country in Southeast Asia has in place a strong nuclear security regime before the first nuclear power plant in the region is in operation. This can be facilitated by close collaborations and working relationships with the nuclear vendor country, other nuclear countries, the IAEA and within the Association of Southeast Asian Nations (ASEAN). ASEAN currently comprises Viet Nam, Malaysia, the

Philippines, Indonesia, Singapore, Brunei Darussalam, Cambodia, Laos, Myanmar, and Thailand. It should also be noted that although each State is wholly responsible for nuclear security within its borders, these recommendations on commitments and actions to strengthen nuclear security on a regional level are in no way binding, and the onus to implement any of these recommendations lies solely on each individual State.

### **Sustained capacity building and training in nuclear capabilities**

In the initial stages of launching nuclear power in a new country and region, capacity building and training of the work force in nuclear engineering, nuclear safety and nuclear security must be prioritized. Technical skills and best practices can be learned from nuclear vendor countries to ensure that there are sufficient capabilities to respond to any nuclear security threats to the newcomer nuclear country and within the region. Cooperation and collaboration with other countries that have established nuclear security infrastructure may also be a route to gain nuclear security expertise. A recommended action to secure the future of nuclear security in a geographical region that is newly launching nuclear power is sustained capacity building and training in nuclear for all states within the region, regardless of whether the state itself is a nuclear country.

Although Singapore is currently not planning to build nuclear power plants in the near future, the country has begun preparing for the launch of nuclear power in the Southeast Asian region by “developing its own pool of local nuclear experts” within the next decade.<sup>5</sup> A key area of expertise that Singapore is keen to develop related to nuclear security is nuclear forensics, which is defined as the detection and tracing of radioactive materials to determine the material’s origin and history.<sup>6</sup> Thus, if nuclear security issues in an ASEAN country were to cross borders, Singapore could potentially have the nuclear knowledge and capabilities to assist in responding to the issue. However, Singapore is facing challenges in building capacity in nuclear expertise. The difficulty in attracting local talent to nuclear is likely due to the absence of nuclear facilities and nuclear industry in the country.<sup>5</sup> Singapore may form new partnerships and

collaborations with nuclear institutes to stay firm to its commitment to develop expertise in nuclear safety and security.

### **Capacity building and training in investigative and response capabilities**

In addition to nuclear capabilities, investigative and response capabilities including traditional law enforcement and local authorities need to be developed in the region, and officials need to be trained on nuclear security culture and issues.<sup>7</sup> Increased capacity building and training are key areas for cooperation with regional and international partners such as ASEAN and the IAEA. With sufficient resources, officials would be better placed to detect, prevent and respond to nuclear security threats including terrorism and trafficking.

The Philippines has conducted radiological security incidence response training for the Philippine National Police in 2015 to “train the trainers” and sustainably build capacity in law enforcement towards nuclear security.<sup>8</sup> In order to enhance nuclear security culture, Viet Nam has organized seminars on nuclear security culture specifically for local authorities, radiation facilities and research facilities in 2015 and early 2016.<sup>9</sup> Such seminars and training can also be held on a regional basis or in bilateral cooperation to ensure that all countries in the region are knowledgeable on nuclear security culture. Regional, bilateral and international collaborations may also be helpful in fostering cooperation and sharing of information among countries to address terrorist or trafficking threats and increase nuclear security in the region.

### **Benefiting from regional and international conferences**

As explained by the IAEA Deputy Director General Mr. Mikhail Chudakov, the decision to embark on a nuclear power programme should be based upon “a well-informed national position, comprehensive analysis of the current and required national infrastructure, energy planning and commitment to safe, secure, peaceful use of nuclear power”.<sup>10</sup> Representatives of ASEAN member states would be able to evaluate their options and learn from best practices in nuclear security through attending, organizing or hosting international or regional conferences that are focused on establishing nuclear infrastructure or

discussing nuclear security strategies. Gaps and knowledge gaps in nuclear security of a State, especially a new nuclear power State, can be identified and filled on a national, regional and global level. One such recent regional conference is the *Prospects for Nuclear Power in the Asia Pacific Region* that was organized by the IAEA in collaboration with the International Framework for Nuclear Energy Cooperation, and hosted by the Philippines Department of Energy.<sup>10</sup>

Regional nuclear security summits may also be proposed in order to discuss unique nuclear security concerns within the ASEAN region. Alternatively, nuclear security can be included as a usual item on the agenda of semiannual ASEAN Summits or Ministerial Meetings. Regional seminars on export controls and non-proliferation of nuclear and radioactive materials are also already present<sup>11</sup> but opportunities to expand the scope of these seminars and conferences should not be overlooked when nuclear is high on the agenda of some countries in ASEAN.

The participation of country representatives highlights their commitments to nuclear security objectives, thus contributing to global nuclear security infrastructure. The actions to strengthen the security of nuclear and radioactive materials can be carried out with the assistance of other States with nuclear power, the cooperation of regional partners, and/or the IAEA.

### **Enforcing border and export controls**

ASEAN countries have made progress in enforcing border and export controls for nuclear security implementation. To counter smuggling, Malaysia and Thailand have conducted joint exercises to detect nuclear materials at their shared borders, with the cooperation of the IAEA and have also shared those experiences with other ASEAN countries.<sup>12</sup> More such joint exercises are encouraged at other shared borders, particularly along the shared borders around Viet Nam, where a nuclear power programme is probably the closest to launching in the region.

To prevent illicit nuclear trafficking, ASEAN countries have taken steps to share information on missing radioactive sources on the IAEA Incident and Trafficking Database and to establish mobile expert support teams (MEST). Radiological Portal Monitors have also been installed in greater numbers to monitor and detect movement of nuclear materials in the ports of Indonesia, Singapore, Malaysia and the Philippines, among others.<sup>8,11-13</sup> National and regional emergency preparedness and response capability measures with regard to nuclear and radiological materials can also be carried out to ensure nuclear security. Importantly, corruption in the region must be tackled for an effective nuclear security framework and culture. As nuclear smuggling may potentially cross borders, the risk of regulatory agencies and customs officials allowing nuclear material to be illegally exported must be minimized.

### **Establishing cybersecurity initiatives**

On top of physical nuclear security, it is clear that cybersecurity risks and threats are emerging as we continue to be further reliant on advanced technology infrastructure. It is possible that nuclear power plants may be targets of cyberattacks or cyber-physical attacks. Thus capacity building in nuclear cybersecurity is recommended to protect national systems. For example, Indonesia is establishing a nuclear cyber security doctoral programme<sup>13</sup> and Singapore has set up a Cyber Security Agency.<sup>11</sup> Given the trans boundary nature of nuclear cybersecurity, extensive cooperation with other countries and international partners on cybersecurity initiatives is also highly encouraged for data sharing and joint training exercises. Other ASEAN countries may benefit from considering such initiatives in their national computer security systems.

### **ASEAN regulatory framework**

A future option for nuclear energy in Southeast Asia is regional collaboration, similar to nuclear energy generation and distribution in Europe.<sup>14</sup> Resources could be pooled among ASEAN states, sharing expertise, costs and benefits to build a nuclear power plant in the region and supply electricity to member countries through an electrical grid.<sup>5</sup> To achieve this, ASEAN requires a regulatory framework to address trans boundary issues including nuclear fuel

management, nuclear waste and risk management.<sup>14</sup> Nuclear security concerns would also have to be addressed under this framework.

### **Conclusions**

The IAEA supports Member States' efforts to establish and improve nuclear security, and has provided assistance to States upon request. The role of the IAEA in organizing international conferences on nuclear security every three years is vital in bringing States together to participate in high-level policy discussions and serves as a focal point for enhancing international cooperation.<sup>15</sup> Several countries in Southeast Asia have plans to develop nuclear power programmes in the near future, which will require strengthening of nuclear security regimes throughout the Southeast Asian region.

These commitments and actions include enhancing capacity building and training in nuclear, law enforcement, and nuclear cybersecurity for all countries in Southeast Asia, even those with no plans to develop nuclear power, because nuclear security in a State might depend on the effectiveness of the nuclear security regime in other States. Many ASEAN countries have taken steps to address border and export controls, but further work is needed to ensure nuclear security of the region. Cooperation and collaboration between ASEAN member states as well as international partners, and high-level participation in nuclear security conferences, seminars and workshops are highly encouraged to build towards global nuclear security infrastructure and a safer, more secure region when nuclear power is then established.

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