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The dynamics of nuclear energy among ASEAN member states

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Abstract

As of 2017, none of the Southeast Asian (SEA) states has committed to a political decision on the use of nuclear power energy. Of the ten SEA states, Vietnam, Indonesia and Malaysia appear to have made the most progress in their nuclear power infrastructure development. Among these three states, Vietnam came closest to constructing its first nuclear power plant. Between Indonesia and Malaysia, Indonesia has the higher public acceptance in nuclear power while Malaysia appears to be struggling to win over public support. Against this background, this paper will highlight the dynamics of nuclear power in SEA by identifying the progress and the most recent updates in the region with special emphasis on Thailand, Vietnam, the Philippines, Indonesia and Malaysia given that these are the only countries in SEA, which have the experience of operating research reactors and the more developed nuclear power development programmes.

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1. Introduction

Southeast Asia (SEA) comprise eleven states, which includes Vietnam, Indonesia, Malaysia, the Philippines, Singapore, Thailand, Brunei, Laos, Cambodia, Myanmar, and East Timor. Except for East Timor, the rest of the SEA

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states are members of the Association of Southeast Asian Nations. Of the ten ASEAN member states, Thailand, Vietnam, the Philippines, Indonesia and Malaysia have the experience of operating nuclear research reactors. Due to the Fukushima nuclear power accident in 2011, most of the ASEAN states who have previously expressed their ambitious nuclear plans decided to reevaluate their nuclear power preparations. Vietnam, however, decided to continue with its plans to build its nuclear power plants by 2020 but decided in 2016 to halt its progress due to cheaper energy alternatives.

2. Overview of nuclear power development in Southeast Asia

1.1 Thailand

Thailand [1] is the first SEA state to operate a nuclear research reactor. The first and only Thai nuclear research reactor, the TRR-1, began operations as a 1 MW reactor in 1962. The research reactor, which is operated by the Thailand Institute of Nuclear Technology (TINT) is located in Bangkok and can now produce up to 2 MW of power after modifications in 1977 Thailand Institute of Nuclear Technology [2]. TINT is supervised by the Ministry of Science and Technology and is an offshoot of the Office of Atoms for Peace (OAP) since 2006. TINT's objectives are to promote nuclear and undertake research and development as well as to provide technical support and services. The OAP is the nuclear energy regulator and reports and comes under the purview of the Nuclear Energy Agency for Peace Commission [3]. There were plans to build a second reactor but its status remains uncertain for now. Nevertheless, Thailand has recently signed a memorandum of understanding (MoU) with Russia [4] in 2016 and with China [5] in 2017 for greater collaboration in technical cooperation on nuclear energy research and on public education on nuclear. In its long-term energy plans, Thailand indicated in its Power Development Plan 2015-2036 [6] that it intends to add 2,000 MW of nuclear power, which is about 5 per cent of its total energy mix by 2036.

In 2016, the Thai government passed the “Nuclear Energy for Peace Act, B.E. 2559 (2016)”, which replaced the “Atomic Energy for Peace Act, B.E. 2504 (1961)” and the “Atomic Energy for Peace Act (No. 2), B.E. 2508 (1965). The new law establishes a new body, the Nuclear Energy Agency for Peace Commission, which replaces the Atomic Energy for Peace Commission, and will oversee matters on nuclear policies, nuclear and radiation safety, compliance to the terms of licensing as specified in the new Act, develop standards on nuclear energy, and to determine the Nuclear and Radiation Emergency Plan. The 16-man member commission will be chaired by the Prime Minister and will include officials and experts from the public and private sectors. Additionally, the updates to the law enables Thailand to sign up the other international conventions [7] on nuclear power safety and security such as the Convention on Nuclear Safety (CNS), the Convention on the Physical Protection of Nuclear Material (CPPNM), IAEA's Joint Conventions on safety of spent fuel management and the safety of radioactive waste management. No official reports on the country's public acceptance for nuclear power have been released but narratives from government officials suggest that the government must increase its efforts in public education, outreach and awareness.

1.2 Vietnam

Vietnam [8] is the second SEA state to operate a research reactor. The Da Lat Nuclear Research Reactor (DNRR) began operation in March 1963 [1] with a production capacity of 250 kW. This reactor was subsequently reconstructed and upgraded between 1979 and 1982 to produce 500 kW. The DNRR remains as Vietnam's only research reactor to date. The DNRR is operated by the Da Lat Nuclear Research Institute, which is a part of the Vietnam Atomic Energy Institute (VINATOM). There are several regulatory bodies in the country as determined by the legislation but most of the safety, security, and safeguards functions are undertaken by the Vietnam Agency for Radiation and Nuclear Safety (VARANS), which is under the Ministry of Science and Technology. VARANS is tasked with drafting legal documents, licensing, inspection, emergency response, training, and maintaining a national information system and participate in international cooperation activities in radioactive safety and nuclear security. Other than VARANS and VINATOM, the Vietnam Atomic Energy Agency is tasked with promoting the use of nuclear energy in the country.

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