NUCLEAR SAFETY AND COOPERATION IN ASEAN

AN RSIS ROUNDTABLE AT THE SINGAPORE INTERNATIONAL ENERGY WEEK 2016

Event Report

28 October 2016

RSiS Nanyang Technological University | S. RAJARATNAM SCHOOL OF INTERNATIONAL STUDIES

EVENT REPORT

NUCLEAR SAFETY AND COOPERATION IN ASEAN

AN RSIS ROUNDTABLE AT THE SINGAPORE INTERNATIONAL ENERGY WEEK 2016

Organised by
The Centre for Non-Traditional Security Studies,
S. Rajaratnam School of International Studies (RSIS),
Nanyang Technological University (NTU)
Singapore

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Editor: Mely Caballero-Anthony

28 October 2016
Marina Bay Sands Expo and Convention Centre
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This report summarises the proceedings of the RSIS Roundtable as interpreted by the rapporteur and editor. This report does not necessarily reflect the views of RSIS.

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EXECUTIVE SUMMARY

The S Rajaratnam School of International Studies, in collaboration with the Energy Market Authority of Singapore, organised a roundtable on "Nuclear Safety and Cooperation in ASEAN" at the Singapore International Energy Week (SIEW) on 28 October 2016.

(From left) Assoc Prof Mely Anthony, Dr Hoang Sy Than, Mr Sabar Mohd Hashim, Ambassador Ong Keng Yong, Dr Tatsujiro Suzuki, Dr Olli Heinonen, Mr Shah Nawaz Ahmad, Ms Siriratana Biramontri, and Mr Julius Trajano. Photo Credit: Singapore International Energy Week/Energy Market Authority

The two-panel roundtable facilitated policy discussions and constructive debates among nuclear experts on post-Fukushima nuclear safety and security issues in the Asia-Pacific. Roundtable panellists include Dr Olli Heinonen, RSIS S Rajaratnam Professor of Strategic Studies and Senior Associate at Belfer Centre for Science and International Affairs of Harvard University; Dr Tatsujiro Suzuki, Vice Director and Professor, Research Centre for Nuclear Weapons Abolition, Nagasaki University (RECNA); Mr Shah Nawaz Ahmad, Senior Adviser, World Nuclear Association; Dr Hoang Sy Than, Deputy Director of the Department of R&D Management, Vietnam Atomic Energy Institute (VINATOM); Mr Sabar Md Hashim, Special Officer, Economic Planning Unit, Prime Minister's Department of Malaysia; and Ms Siriratana Biramontri, Special Consultant, Office of Atoms for Peace, Thailand and former chair of the ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM).

The roundtable discussed the post-Fukushima nuclear safety and emergency preparedness in the Asia-Pacific and also examined the growing regional cooperation on nuclear energy governance in Southeast Asia. While 30 countries currently use nuclear power worldwide, about the equivalent number of newcomer states are considering, planning, or actively working to include it in their energy mix. Asia has recently been driving the growth of the nuclear power industry with China, India, Pakistan, and South Korea building new nuclear reactors. In Southeast Asia, Vietnam was scheduled to open its first nuclear power plant (NPP) by 2028 but recently scrapped such plans, while Thailand, the Philippines, Malaysia, and Indonesia are carefully considering the nuclear option. In this regard, regional issues and cooperation on nuclear safety and security as well as nuclear emergency preparedness and response need to be examined.

Post-Fukushima nuclear safety issues

The lessons of the Fukushima nuclear accident were revisited with special focus on new measures to enhance nuclear safety and emergency preparedness and response. Panellists reiterated that each state operating nuclear power is responsible for nuclear safety, and hence they need to be prepared for radiological accidents and emergencies. However, due to transboundary consequences–radiological and beyond–of nuclear accidents , all states have a role to play in planning and preparation for contingency, as well as the development of a cooperative approach to a chain of radiological emergency, response, and recovery activities. It was emphasised that the Fukushima accident still lingers and entails not only technical dimensions, but also environmental and socio-political implications for the Japanese public. For instance, the Japanese government still needs to negotiate with the Japanese public, especially affected local communities, regarding disposal of decontaminated soil and water. The evacuation of Fukushima residents also involves long-term social and psychological impact on them, with implications on local politics, highlighting the need to analyse the nuclear accident from the social science perspective.

But from the point of view of the nuclear industry, nuclear safety has vastly improved since the Fukushima accident. Nuclear power is now the most regulated energy industry in the world—with more stringent post-Fukushima safety standards. Serious nuclear accidents are rare and nuclear energy caused fewer deaths than any other major form of electricity generation. The panellist from the nuclear industry further claimed that the Fukushima accident is not expected to have any radiation-related public health impact. Even clean-up workers are unlikely to suffer any long-term health effects of exposure to radiation.

The need for public communication and acceptance

Despite the improvements made on nuclear safety, there are still major issues that remain unresolved for nuclear energy. The compensation scheme for affected communities would definitely boost the cost of nuclear power generation; the disposal of high-level waste remains unaddressed; and more importantly, governments still need to develop and implement effective public consultation and communication strategies in order to address public opinion against nuclear power and concerns over the safety and security of nuclear power. In Japan for instance, 70.8 percent of the public opposed the re-opening of the country's NPPs and 52.3 percent believed that NPPs are not safe, according to a 2015 public opinion poll. Meanwhile, in Southeast Asia, panellists claimed that public acceptance is extremely needed before making a national decision on NPP construction. In this regard, ASEAN countries interested in using nuclear power are using various public communication strategies such as information centres, public seminars, and community engagements to allay the fears of the local communities.

Regional cooperation in ASEAN

Panellists also deliberated the importance of regional cooperation and the role of regional networks, such as ASEANTOM in enhancing nuclear safety cooperation as well as emergency preparedness and response in Southeast Asia. As stipulated in the ASEAN Political-Security Community Blueprint 2025, the development of the ASEAN regional approach to nuclear safety, security and safeguards (3S) can be achieved through strengthening the ASEANTOM and building relationships with "regulatory bodies of other regions and relevant international organisations in order to contribute to nuclear non-proliferation, maintaining international standards of nuclear safety and security, preventing nuclear-related accidents and protecting against nuclear terrorism." Nuclear safety and radiological emergency are indeed regional issues that entail regional responses. Nuclear incidents can range from accidents with localised radiological impact to large-scale nuclear terrorist attacks or nuclear disasters with transnational spillovers.

There are vehicles to share best practices, know-how and resources through the IAEA and, in particular, within the ASEAN framework. The ASEANTOM was recently given political recognition when it was designated as an ASEAN body under the ASEAN Political-Security Community Pillar in Annex 1 of the ASEAN Charter. ASEANTOM has been conducting nuclear security border exercises, co-hosted by Thailand and Malaysia, and has been implementing projects on joint emergency preparedness and response with the assistance of the IAEA and the European Commission. Vietnam also proposed the creation of the ASEAN Network on Nuclear Power Safety Research that will promote research collaboration in addition to sharing of knowledge and best practices on nuclear safety among nuclear research institutions, universities, and think-tanks of ASEAN Member-States. With the increasing interest in nuclear power in the region, panellists stressed the importance of building capacity in the region to allow Member-States to make use of technologies that will facilitate the implementation of nuclear projects in a safe and sustainable manner.

SESSION 1
POST-FUKUSHIMA NUCLEAR SAFETY AND EMERGENCY PREPAREDNESS IN THE ASIA PACIFIC

This session tackled the current status of nuclear power industry in the Asia-Pacific more than five years after the Fukushima nuclear accident. Panellists revisited the lessons of the Fukushima accident with special focus on new measures to enhance nuclear safety and emergency preparedness and response as well as the importance of effective public communication and regional cooperation.

(From left) Dr Olli Heinonen, Dr Tatsujiro Suzuki, Mr Shah Nawaz Ahmad, Ambassador Ong Keng Yong. Photo Credit: Singapore International Energy Week/Energy Market Authority

Nuclear power in the Asia-Pacific

There are 30 countries worldwide currently utilising nuclear power, while about the equivalent number of newcomer states are considering, planning, or actively working on its inclusion in their energy mix. Most of the new nuclear projects are now taking place in Asia. The growth of the nuclear power industry since the Fukushima nuclear accident has been pivoting from Europe towards Asia—with China, South Korea, India, and Pakistan building additional new reactors. Meanwhile, Japan has recently re-opened three out of its 54 nuclear reactors while 26 reactors are being considered to be re-opened within the next 20 years. Despite strong domestic opposition, Japan will continue to use nuclear energy as a base-load energy source. However, the country will reduce dependence on nuclear energy as much as possible by expanding renewable energy, energy efficiency and more efficient fossil power plants. In Southeast Asia, the governments of Thailand, Malaysia, the Philippines, and Indonesia are carefully studying the nuclear option. Vietnam was scheduled to open its first nuclear power plant by 2028 but recently scrapped such plans primarily due to rising project costs. On 22 November 2016, Vietnam's National Assembly approved the government's decision on the cancellation of the Ninh Thuan NPP construction project. According to the Vietnamese government, the decision was influenced by the country's economic condition, as it continues to grapple with its rising public debt and mounting budget deficit. The cost of the project since 2011 has doubled to US$18 billion, as the government sought more advanced but costlier nuclear technology to strengthen the safety of Ninh Thuan NPP, following the 2011 Fukushima nuclear disaster. The government now believes that using nuclear power as an alternative energy source

is no longer necessary as annual energy demand growth is also projected to slacken. Instead, Vietnam plans to rely mostly on coal and hydropower and increase renewable energy production in the next 15 years. It is also likely that its government will purchase additional hydropower from its neighbour Laos, which aims to be the "Battery of Mainland Southeast Asia". Some Vietnamese officials remain uneasy with the NPP project in their country. They expressed their long-term concerns over safety of the NPPs and the environmental threat posed by a radiological accident and nuclear waste leaks.

New developments in nuclear power development in the Asia-Pacific may have relevance to post-Fukushima nuclear safety. One important development is the "Build-Operate-Transfer" (BOT) scheme for the construction and operation of NPPs. This is the modality being adopted in Bangladesh by Russian-owned state nuclear company ROSATOM, which will likely build, own, and then operate Bangladesh's first NPP. This may raise the question on the extent of regulatory oversight power of the country's nuclear regulatory agency over the nuclear facility owned by a foreign company. Another rising development is the possible utilisation of small modular reactors and floating nuclear reactors that can be used by energy-hungry small states and isolated islands in the region. China also announced plans to deploy floating reactors to energise its artificial islands and oil rigs in the South China Sea. Floating reactors are still being developed primarily by Russia and China, and it remains to be seen whether these will be completely safe or not. In addition, the commercialisation of floating reactors will entail amending the Convention on Nuclear Safety since it only presently covers land-based NPPs.

Enhancing nuclear safety and emergency preparedness

Each country is responsible for nuclear safety. The IAEA helps its Member-States improve their capacities to faithfully adhere to various international conventions and standards on nuclear safety, namely, the Convention on Nuclear Safety; Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management; Convention on the Physical Protection of Nuclear Material; Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency; Convention on Early Notification of Nuclear Accident or Radiological Emergency; Code of Conduct on the Safety and Security of Radioactive Sources; and the Code of Conduct on the Safety of Research Reactors.

The nuclear industry strongly asserts that nuclear safety has been bolstered since the Fukushima accident in 2011. Nuclear energy is claimed to be an essential part of the solution to climate change since it is rendered as clean, low-carbon energy. The industry further claims that NPPs are the safest source of electricity, capable of generating power 24/7, and are the foundation of a reliable, modern electrical system. However, one panellist pointed out that the competitiveness of the nuclear industry, in Japan for instance, may be weakened due to the rising cost of nuclear power generation. Compensation for nuclear accident victims coupled with costs borne from the accident itself can be a huge burden for the nuclear industry. Expenses for decommissioning Fukushima reactors can reach up to US$10-20 billion while compensation for victims can amount to as much as US$60 billion.

The industry claims that serious nuclear accidents rarely occur and nuclear energy resulted in fewer casualties than any other major form of electricity generation. The global nuclear industry maintains a strong safety culture and is subject to one of the toughest regulatory regimes in the world. NPPs can neither be constructed nor operated without the approval of the regulator.

With regard to nuclear waste, the industry asserts that radioactive wastes produced by the industry remain miniscule, and are stored for treatment and eventual disposal. Civil nuclear wastes have been managed without any significant environmental leakage for six decades. Both Sweden and Finland have highly advanced plans for a deep geological repository for high-level nuclear waste with a selected final site and facility currently being built.

Upholding nuclear safety is extremely important to minimise the possibility of mishaps. In this regard, crucial lessons on nuclear safety and emergency preparedness can be derived from the Fukushima nuclear accident and other previous accidents in Chernobyl in the former USSR as well as in Three Mile Island in the US. Such accidents could have been avoided by changing, inter alia, working practices and designs. Nuclear safety is indeed a regional issue, particularly because nuclear incidents can range from accidents with localised radiological impact to large-scale nuclear terrorist attacks or even nuclear disasters that can cause transnational spillovers.

One important lesson from the Fukushima accident is the need to have broad perspectives on (and

preparedness for) "unthinkable" events and unforeseen circumstances. In this regard, nuclear emergency preparedness is extremely important. The goal of emergency preparedness is to ensure that an adequate capability is in place within the operating organisation as well as in local, national, and the international levels. Such is necessary for an effective response in a nuclear emergency. Response should also consider crises related to transportation of nuclear and radioactive materials through (or near) the territories and possible terrorist acts. It is crucial to be adequately prepared to prevent and quickly respond to new types of events, for instance, cyber-attacks.

Another important lesson from the Fukushima accident is the need to establish clear responsibility in crisis management. As observed, vague or overlapping responsibilities among stakeholders (operators, local governments, national government, regulators, among others) are ineffective in crisis management. Regular nuclear emergency drills would help improve cooperation and coordination during an emergency response. Drills should involve the nuclear industry, the regulatory bodies, local and national emergency teams, police, military, customs, the coast guard, local governments, communities, NGOs, and media, among others. Emergency drills should be designed to test the existing response procedures and capabilities of all sectors for various unforeseen scenarios.

Public communication and information sharing

The significance of effective public communication and information sharing was also highlighted as one key lesson from the Fukushima accident. Public communication and sharing accurate information are crucial, given that nuclear accidents and nuclear safety are not just technical issues but also entail socio-political implications. For instance, the Japanese government still needs to negotiate with the Japanese public, specifically affected local communities, as to where to dispose the decontaminated soil and water. The evacuation of Fukushima residents also involves long-term social and psychological impact, with implications on local politics, accentuating the need to analyse the nuclear accidents from the social science perspective. The Japanese government has already come up with public communication plans regarding the revival of nuclear reactors. However, these are still to be implemented. One major challenge is that the government is rendered by the Japanese public as an untrustworthy institution. According to the 2015 public opinion poll, 70.8 per cent of the Japanese public opposed the re-opening of NPPs while 52.3 per cent believed that NPPs are "not so safe", and 29 per cent thought that they are dangerous.[1]

The rising number of cases of children diagnosed with thyroid cancer has been commonly associated with the radiation leaks from the crippled Fukushima reactors. The scientific community asserts that it is not scientifically possible to directly link an individual cancer case to nuclear meltdown in Fukushima. The public are nevertheless concerned over the impact of the accident on their health and the overall safety of nuclear reactors. Scientific explanations are of no help in alleviating lingering fears of radiation. One panellist recommended the promotion of improved access to objective information published by an independent, neutral organization in addition to the enhancement of mutual communication among stakeholders, including the general public. Sharing timely and accurate information can help address the negative public opinion on nuclear energy and allay public fears about nuclear accidents. Public consultations engaging local communities need to be conducted to inform them about nuclear energy and its associated multi-faceted safety issues.

Open-Forum Discussion

Key takeaways from the Fukushima nuclear accident resulted in significant improvements in nuclear safety, particularly in Japan. Prior to the accident, the Japanese government, nuclear operators, and even the public assumed that a Fukushima-like nuclear crisis was impossible to happen. Consequently, there was no real implementation of basic safety requirements, such as proper risk assessment, procedures to contain collateral damage, and appropriate evacuation planning.

The accident indeed shifted the paradigm of nuclear emergency preparedness—from being reactive anchored on the nuclear industry's safety myth, to being proactive, preparing for all possible and unforeseen hazards to nuclear facilities. The Nuclear Regulation Authority (NRA) of Japan now requires nuclear facilities to prepare for all hazards (such as earthquakes, typhoons, tsunamis, volcanic eruptions, and floods) that can trigger nuclear

1 "70.8% was against re-startup of existing reactors," Reuters, 2015/04/07 http://jp.reuters.com/article/energy-t-idJPKBN0MY0JX20150407

accidents. NRA has also recently revised its safety and security requirements to cope with terrorist attacks on nuclear reactors. NPPs are now required to have emergency backup operation facilities, usually on a highly elevated place, to provide emergency power to nuclear reactors and to prevent fuel rod meltdown. There are also new stringent procedures and legal requirements for both on-site and off-site emergency preparedness plans clearly delineating the responsibilities of each stakeholder. A cybersecurity attack is now considered a potential threat to the safety and security of nuclear facilities. Asian states with nuclear facilities need to bolster their capabilities to counter such assaults. One vital approach is enhancing the skills of nuclear staff in order to maintain effective cyber protection measures as well as detect insider threats, given that cyber-attacks can come from either outside or inside a nuclear facility.

The management of spent fuel or high-level nuclear waste would also need to be further strengthened in the post-Fukushima nuclear safety standards. It must be noted that spent fuel is under the purview not just of nuclear safety, but also nuclear security and safeguards. There is currently no final disposal site yet for the spent fuel from all NPPs worldwide. Hence, temporary storage facilities for the spent fuel as well as the transportation of nuclear waste should adhere to safety standards to avoid radioactive leakage and security regulations. This is to minimise risk of terrorists getting access to radioactive materials. In addition, there exists no comprehensive plan as to how to safeguard accumulating plutonium, a radioactive element from the spent fuel, which can be used in manufacturing nuclear weapons. Preventing the proliferation of nuclear weapons entails the need to secure and safeguard the plutonium stockpile of nuclear users. For instance, while Japan has a non-nuclear weapons policy, it has a stockpile of 30 tons of plutonium accumulated from its nuclear power plants—the biggest stockpile among non-nuclear weapons states. It is highly recommended for states interested in using nuclear power to craft a comprehensive plan on managing spent fuel, including plutonium.

The IAEA and regional networks in Asia are crucial in strengthening nuclear safety, security and safeguards (3S) in the region. One recommendation is to make the international peer-review system more than voluntary, covering all aspects of nuclear 3S, although opposition from several IAEA Member-States is expected. The IAEA peer review missions should appropriately address regulatory effectiveness, operational safety, design safety, and emergency preparedness and response. There is a need for enforcement mechanism to monitor IAEA Member-States' strict compliance to nuclear 3S standards and conventions. The regional networks such as the Asian Nuclear Safety Network (ANSN) can facilitate sustainable regional cooperation on nuclear safety in Asia, pooling and sharing of information, knowledge and practical experience in the nuclear field, and development of regional capacity-building system in Asia, among others. The Asia-Pacific region has a wealth of experience (including best practices, know-how, and resources) that can be shared with the region's "newcomers". There are also regional networks that can be tapped to widely disseminate this wealth of experience. Vehicles for sharing information and expertise through the IAEA, and, in particular, within the ASEAN framework, are also available.

SESSION 2
THE ASEANTOM AND REGIONAL COOPERATION ON NUCLEAR SAFETY IN SOUTHEAST ASIA

This session tackled the burgeoning regional cooperation on nuclear energy in Southeast Asia and the efforts of ASEAN Member-States to bolster the regional culture of nuclear safety. Panellists deliberated on the role of ASEANTOM in enhancing nuclear energy cooperation in the region.

(From left) Dr Hoang Sy Than, Mr Sabar Mohd Hashim, Ms Siriratana Biramontri, and Assoc Prof Mely Anthony. Photo Credit: Singapore International Energy Week/Energy Market Authority

Southeast Asia's interest in nuclear power

Several countries in Southeast Asia have been articulating their interest in using nuclear power, as they intend to strengthen their energy security though diversification of their energy mix. Vietnam used to be the lead driver of nuclear power development in ASEAN, from 2009 when it decided to build its first NPP, until November 2016 when its government decided to scrap its plan primarily due to the soaring cost of the project. Prior to the cancellation, Vietnam's 2400-megawatt Ninh Thuan 1 NPP was scheduled to be operated by 2028/29 (after several delays), while the 2000-megawatt Ninh Thuan 2 NPP was set to be commissioned by 2030. Russia's state-owned nuclear firm ROSATOM was tapped to build Ninh Thuan 1, while a consortium of Japanese nuclear firms led by Japan Atomic Power was considered for the construction of the Ninh Thuan 2. Nonetheless, although the government already decided to scrap its NPP project, it will still continue "promoting" nuclear power. In this regard, Vietnam plans to build a new research reactor, also known as the Center for Nuclear Energy Science and Technology, to further enhance the skills and technical know-how of its nuclear professionals and students.

Meanwhile, the Philippine government announced in November 2016 that it plans to conduct a feasibility study for the US$ 1 billion rehabilitation of the mothballed Bataan Nuclear Power Plant. However, Philippine President Rodrigo Duterte gave a clear instruction to the Department of Energy to focus specifically on the safety and security aspects of the 30-year-old power plant. Malaysia is still reviewing the feasibility of using nuclear power and working on public acceptance (which is deemed important) through public communication strategies. Indonesia and Thailand likewise have nuclear energy plans, but national decisions have not yet been made due to the prerequisite of meeting domestic public acceptance.

Regional frameworks on nuclear energy cooperation in ASEAN

Despite the current absence of NPPs in Southeast Asia, the region has long recognised the importance of cooperation on the safe use of civilian nuclear energy and adopted various frameworks of cooperation in nuclear energy governance. These regional frameworks can even support the implementation of the global conventions and IAEA standards mentioned earlier. ASEAN Member-States first adopted the Southeast Asia Nuclear Weapons Free Zone Treaty (SEANWFZ) in 1995. The Treaty requires states pursuing nuclear energy to use nuclear facilities for peaceful purposes; subject its nuclear programme to rigorous safety review, adhering to IAEA's safety standards; inform fellow members, if requested, of the results of the safety review; follow the Nuclear Non-Proliferation Treaty (NPT) and the IAEA safeguard system; and dispose of radioactive wastes based on IAEA standards. Hence, the SEANWFZ does not just address prevention of nuclear -proliferation, but also promotes the safe use of nuclear energy in the region.

The *ASEAN Political-Security Community Blueprint 2025 (Section B.5.2)* also endorses the development of a regional approach in ASEAN to strengthen nuclear safety, in coordination with the IAEA and other relevant international organisations. This can be achieved primarily through the exploration of joint research and development projects in nuclear technology, with international organisations through workshops, seminars, and exchange of experts. The Blueprint also encourages ASEAN Member-States to comply with the global safety and nuclear emergency conventions mentioned earlier. But more importantly, the Blueprint promotes the strengthening of ASEANTOM so that it can effectively lead the development of the ASEAN regional approach to nuclear safety.

ASEANTOM was proposed to be established by Thailand's Office of Atoms for Peace in 2011 to promote collaboration among nuclear regulatory bodies and relevant authorities in ASEAN Member-States. ASEANTOM's primary role is to bolster nuclear safety, security, and safeguards within the ASEAN Community by enhancing cooperation and complementing the work among Member-States and also with existing mechanisms at the national, regional, and international levels. After finalising its Terms of Reference (TOR), ASEANTOM held its first annual meeting in Phuket, Thailand in 2013. Member-States recognised the need to formalise and enhance information sharing between countries with more expertise in nuclear energy research and those with limited experience in the nuclear field in the region. Another motivation for ASEANTOM to boost cooperation is the expected increase in the transportation of radioactive materials across territorial boundaries in the region, in light of nuclear energy plans and even non-power applications of nuclear energy by ASEAN Member-States. The establishment of the ASEAN Community also further encouraged nuclear regulatory bodies to come together and increase cooperation on nuclear safety, security, and safeguards. In order for ASEANTOM members to have better planning and coordination in their annual activities, they have identified four mutual interests, namely: (1) emergency preparedness and response, (2) environmental radiation monitoring, (3) nuclear security, and (4) nuclear safety.

Under the ASEANTOM Framework, Malaysia and Thailand since 2015 have been co-hosting annual nuclear security border exercises, including tabletop and field exercises in their shared borders and have been involving nuclear regulatory bodies, customs, police, and emergency response teams. All ASEAN Member-States are invited to participate in these exercises that test their capability to jointly interdict illicit trafficking of radioactive materials. Furthermore, ASEANTOM has two ongoing projects, with the assistance from the IAEA and the European Union, to strengthen joint nuclear emergency preparedness and response cooperation in ASEAN: (1) "Regional Cooperation Project Concept in South East Asia to Support Regional Environmental Radioactivity Database & Nuclear Emergency Preparedness and Response" assisted by the IAEA; and (2) "Enhancing Emergency Preparedness and Response in ASEAN: Technical Support for Decision Making" assisted by the EU.

The ASEANTOM was given political recognition by ASEAN Leaders in 2015 by designating it as an ASEAN body under the ASEAN Political-Security Community (APSC) Pillar in Annex 1 of the ASEAN Charter. This would aid ASEANTOM in promoting high standards of nuclear safety, security, and safeguards in the region. Its activities are now reported to foreign ministries of ASEAN Member-States and are even recognised in the ASEAN Summit Chairman's Statement.

It must also be noted that there exists a double oversight for nuclear energy cooperation in ASEAN, with the existence of two specialized bodies, the ASEANTOM and the ASEAN Nuclear Energy

Cooperation-Subsector Network (NEC-SSN). While ASEANTOM is under the purview of APSC, the NEC-SNN falls under the ASEAN Ministers of Energy Meeting. For 2016, the NEC-SSN meeting's main objectives were to enhance capacity building activities on civilian nuclear energy and to pursue regional nuclear safety cooperation with ASEAN dialogue partners. NEC-SSN likewise facilitates information sharing among Member-States with regard to nuclear safety and security. The double oversight, one panellist argued, signifies the strong commitment of the region to uphold nuclear 3S and foster regional cooperation on nuclear energy governance.

Contributions of ASEAN Member-States to nuclear energy cooperation

Apart from the regional cooperation plans of ASEANTOM and NEC-SSN, various initiatives have already been proposed or implemented by ASEAN Member-States to promote the culture of nuclear safety, security, and safeguards as well as to actively contribute to the burgeoning nuclear energy cooperation and governance in Southeast Asia. These initiatives complement, and even strengthen, the various frameworks of cooperation in the region as well as the global conventions mentioned earlier.

For instance, Indonesia launched its International Center of Excellence on Nuclear Security and Emergency Preparedness (I-CONSEP) in Sep 2014. I-CONCEP aspires to be a center for capacity building for nuclear security in both regional and international levels; foster nuclear safety and security culture; enhance national coordination among competent authorities; and support regional and international information and experience sharing and cooperation in the field of nuclear security.

Thailand, Malaysia, the Philippines, and Vietnam also have their respective Environmental Radiological Monitoring System (ERMS) or radiation monitoring portals that can be used to monitor radiation levels as well as alert authorities in the case of an unusual increase in radiation that may indicate a leakage or an accident. Vietnam, in particular, has an ongoing project called "Radiation Monitoring and Emergency Response" that aims to effectively monitor nuclear accidents in the country and its borders. While it has been established that Vietnam will not be building NPPs until 2030, the project still becomes urgent since China has begun operating three NPPs near Vietnam's northern border. The first phase of the project includes building an operating center in Hanoi and a few more monitoring stations while the next phase involves building other regional stations, though the timeline for the project has not been made yet.

Malaysia also has enhanced its capability to provide national nuclear security support through strengthening its detection capability of illicit transport of nuclear materials. Through its National Nuclear Security Support Centre (NSSC), Malaysia has actively conducted exercises and activities on national detection in order to share experiences and best practices with IAEA and within the region. In this regard, IAEA cited the regional importance of Malaysia's NSSC, the first country in the region to receive such citation.

Meanwhile, in order to implement the exploration of joint research and development projects in nuclear technology as stated in the *APSC Blueprint 2025 (Section B.5.2.iii)*, Vietnam Atomic Energy Institute (VINATOM) has proposed the establishment of the ASEAN Network on Nuclear Power Safety Research. The primary objectives of this proposed Network are to promote research collaboration on nuclear safety and to share knowledge and experience on nuclear power safety research among the academic and research institutions of ASEAN Member-States. The Network can plan and perform joint-research projects on nuclear safety; hold workshops periodically to discuss on the results of the joint-research projects; publish technical reports of the joint research projects; and issue newsletters and progress reports periodically. In order for this Network to be realised, it was suggested that the proponents of this initiative should work regularly with existing ASEAN specialized bodies and mechanisms on nuclear energy cooperation.

Open-Forum Discussion

In view of the existing regional frameworks on nuclear energy cooperation and initiatives by ASEAN Member-States, could it be assumed that the safe and secure use of nuclear power in the region is already guaranteed? Panellists stated that cooperation among nuclear regulatory bodies is extremely important in verifying the capability of the region to uphold nuclear 3S and addressing the gaps at the national and regional levels. ASEANTOM is a relatively young regional body but its planned annual activities were crafted in such a way that its members can jointly develop a coordinated ASEAN approach to improve nuclear safety with the assistance from the IAEA. The region also needs to further

strengthen nuclear emergency preparedness and response in the region through cooperation. Some nuclear energy regulatory bodies have already come up with their national emergency preparedness and response plans together with exercises.

It was also recommended that the growing information sharing at the regional level should be replicated at the national level. Each of the ASEAN Member-States should facilitate multi-sectoral information sharing and communication among government agencies, communities, media, NGOs, scientists, private sector, and academe mainly in order to address public concerns over the safety of nuclear facilities and use of radioactive materials. One example is the initiative of the Malaysian government in organising multi-sectoral fora to discuss the potential use of nuclear power, gathering the perspectives of different stakeholders.

Public acceptance is crucial in making national decisions whether to use nuclear power or to reject it. Vietnam, for instance, conducted surveys, feasibility studies, and information drives in order to achieve public acceptance of the use of nuclear power in the country. It also built an information centre where workshops for local communities were held in order for them to understand nuclear energy and eventually gain public acceptance. In Malaysia, the state-owned Malaysian Nuclear Power Corporation is responsible in handling public communication and conducting the feasibility study on the use of nuclear power (which has not been released yet) will include a 10-year public communication plan. This plan contains key strategies such as knowledge sharing and public education. The work being done in Indonesia on public education was highlighted, particularly the inclusion of nuclear energy in the primary school curriculum. It is also important that apart from government agencies promoting nuclear power, other stakeholders such as think-tanks, NGOs, and scientists should also conduct public education in order to increase public awareness on nuclear energy as well as raise important issues and meaningful questions that need to be addressed by the government prior to making a national decision on NPP construction.

ORDER OF EVENTS

Orchid 4211 / 4212, Level 4, Marina Bay Sands Expo and Convention Centre
Friday, 28 October 2016

08.45-09.00 Arrival of Participants and Registration

09.00-09.05 Welcome Remarks
Ambassador Ong Keng Yong
Executive Deputy Chairman, RSIS

09.05-09.50 **Session 1: Post-Fukushima Nuclear Safety and Emergency Preparedness in the Asia-Pacific**

Speakers
Dr Olli Heinonen
S. Rajaratnam Professor of Strategic Studies, S. Rajaratnam School of International Studies and Senior Associate at the Belfer Center for Science and International Affairs, Harvard University
Dr Tatsujiro Suzuki
Former Vice Chairman of the Japan Atomic Energy Commission; Vice Director, Professor of Research Center for Nuclear Weapons Abolition (RECNA) at Nagasaki University
Mr Shah Nawaz Ahmad
Senior Advisor, India, Middle East and South East Asia, World Nuclear Association

Moderator
Ambassador Ong Keng Yong

09.50-10.25 Discussion

10.25-10.45 Tea Break

10.45-11.30 **Session 2: The ASEANTOM and Regional Cooperation on Nuclear Safety in Southeast Asia**

Speakers
Dr Hoang Sy Than
Deputy Director of Dept. of Planning and R&D Management, Vietnam Atomic Energy Institute (VINATOM)
Mr Sabar Mohd Hashim
Special Officer, Energy Section, Economic Planning Unit, Prime Minister's Department, Malaysia
Ms Siriratana Biramontri
Office of Atoms for Peace, Thailand and former chair of ASEAN Network of Regulatory Bodies on Atomic Energy (ASEANTOM)

Moderator
Assoc Prof Mely Caballero-Anthony, Head, Centre for Non-Traditional Security Studies, RSIS

11.30-12.00 Discussion

ABOUT THE SPEAKERS

Olli Heinonen is a Senior Associate at the Harvard Kennedy School of Government's Belfer Center for Science and International Affairs, and a Senior Advisor on Science and Nonproliferation at the Foundation for Defense of Democracies in Washington, D.C. His research and teachings include: nuclear safety, security, non-proliferation and disarmament, verification of treaty compliance, enhancement of the verification work of international organizations, and transfer and control of peaceful uses of nuclear energy.

Before joining the Belfer Center in September 2010 as a Senior Fellow until 2016, Dr Heinonen served 27 years at the International Atomic Energy Agency in Vienna. Heinonen was the Deputy Director General of the IAEA, and head of its Department of Safeguards. Prior to that, he was Director at the Agency's various Operational Divisions, and as inspector including at the IAEA's overseas office in Tokyo, Japan.

Prior to joining IAEA, he was a Senior Research Officer at the Technical Research Centre of Finland Reactor Laboratory in charge of research and development related to nuclear waste solidification and disposal.

Dr Heinonen studied radiochemistry and completed his PhD dissertation in nuclear material analysis at the University of Helsinki.

Tatsujiro Suzuki is a Vice Director and Professor of Research Center for Nuclear Weapons Abolition (RECNA) at Nagasaki University, Japan. Before joining RECNA, he was a Vice Chairman of Japan Atomic Energy Commission (JAEC) of the Cabinet office from January 2010 to April 2014. Until then, he was an Associate Vice President of the Central Research Institute of Electric Power Industry in Japan (1996-2009) and Visiting Professor at the Graduate School of Public Policy, University of Tokyo (2005-009), an Associate Director of MIT International Program on Enhanced Nuclear Power Safety from 1988-1993 and a Research Associate at MIT Center for International Studies (1993-95) where he co-authored a report on Japan"s plutonium program. He is also a Council Member of Pugwash Conferences on Science and World Affairs (2007-09 and from 2014). Dr. Suzuki has a PhD in nuclear engineering from Tokyo University (1988).

Shah Nawaz Ahmad is currently Senior Adviser, India Middle East and South-East Asia, World Nuclear Association (WNA), London. He is a graduate in Electrical Engineering and has post-graduate qualifications in Nuclear Engineering as well as in Systems Management.

Mr Ahmad has over 50 years' hand-on experience in the nuclear power sector. He has worked, at national & international levels, in the areas of Policy & Planning, Management, Safety, Design, EPC contracting & Construction, Commissioning, Operations & Maintenance, Supply Chain, Public Awareness,Training, Business Development and International Co-operation.

Mr Ahmad has held senior positions with the Nuclear Power Corporation of India Ltd (NPCIL), Electronics Corporation of India Ltd (ECIL), & World Association of Nuclear Operators, (WANO) Tokyo. He has also worked for the International Atomic Energy Agency (IAEA), Atomic Energy of Canada Ltd (AECL) & the Indian Atomic Industrial Forum (IAIF). Additionally, Mr. Ahmad has provided consultancy to several national and international consultants and infrastructure businesses.

Hoang Sy Than is currently Deputy Director of Department of R&D Planning and Management which belongs to Vietnam Atomic Energy Institute (VINATOM), Ministry of Science and Technology (MOST). He got his PhD degree on Nuclear Physics from University Paris-Sud 11, Orsay, France 2009. He has more than 10 years of experiences on Nuclear Physics and Nuclear Power fields. In the past, Dr. Hoang worked for Vietnam Agency for Radiation and Nuclear Safety (VARANS, a regulatory authority under MOST) for one year and he was Manager of Nuclear Power & Renewable Energy Division, Power Engineering Consulting JSC No. 1 which belongs to Vietnam Electricity (EVN) for three years.

Dr. Hoang is Member of VINATOM's Expert Team to evaluate the Nuclear Power Plant Technologies for Ninh Thuan 1&2 NPP projects of Vietnam. His specialisation and interests are Technology of Nuclear Power Plants, Safety of Nuclear Power Plants, particularly in Probabilistic Safety Assessment and Severe Accident Analysis.

Sabar Md Hashim has been working at Tenaga Nasional Berhad (TNB), the premier power utility of Malaysia, since 1987. He obtained his B.Sc. (Electrical Engineering) from George Washington University in 1987 and his MBA from Ohio University, USA in 1996. Since 1998, through secondment, he has been fortunate to serve the Government in both energy and non-energy related work. From 1998-2001, he was part of the Independent Grid System Operator task force team in Energy section, Economic Planning Unit, Prime Minister's Department. Later, he was seconded successively to National Economic Action Council, (2003-2005), National Implementation Directorate (2005-2007) and later Malaysian Development Institute, (2007-2008) and Energy Section (since 2013), all in the Prime Minister's Department. During those stints, his focus areas have been in national energy planning, strategic research, economic monitoring (Far East, Middle-East etc.), policy-making, wealth-creation, and nation-building studies as well as preparing economic dossiers for the Ministers. He has also participated in international and domestic conferences in energy-related issues (especially nuclear energy), and contributed articles to international and domestic journals. In his leisure, he enjoys taking up interests in economics, nation-building, geopolitics, and civilisational dialogs among other things.

Siriratana Biramontri is currently a special consultant of the Office of Atoms for Peace (OAP), Thailand. She joined OAP in1978. She was the OAP's former deputy secretary general and responsible for safeguards, nuclear security, nuclear non-proliferation and nuclear forensics. She also served as Chair of ASEANTOM from 2013 to 2014.

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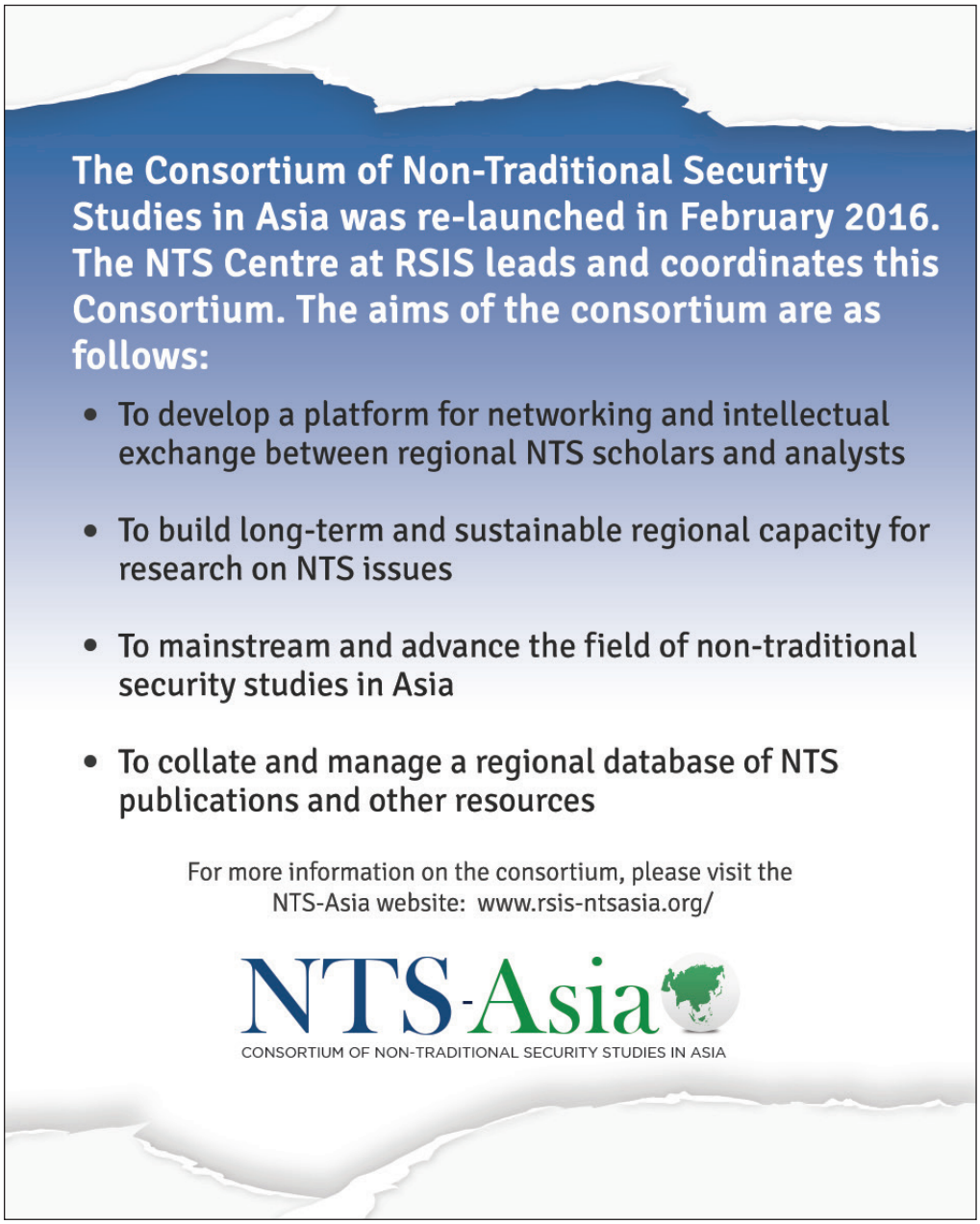

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