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Strengthening Governance for Peaceful Uses of Nuclear Energy in Asia Pacific

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Summary

The Asia Pacific region is the world's main growth area for nuclear power. All of the key issues relating to peaceful uses – non-proliferation, nuclear security and safety - are highly relevant to this region. In all these areas nuclear governance requires strengthening. In particular mechanisms are needed for high-level consultation, assurance and transparency, and for collaboration to share best practices. It should be a priority to increase regional participation in major treaties. Developing regional approaches could also be an important contribution to reaching global solutions.

Nuclear Energy in the Region

1. The Asia Pacific region is the world's main growth area for nuclear power.[1] As Table 1 shows, today the region accounts for a quarter of the world's installed nuclear power capacity, and over half of the reactors that are under construction and planned. Five countries in the region – China, India, Japan, the Republic of Korea (South Korea) and Pakistan – have nuclear power programs. Vietnam has two reactors on order and is actively considering two more. Five other countries – Bangladesh, Indonesia, Malaysia, the Philippines and Thailand – are considering nuclear power.

2. In addition to the countries that already have power reactors, seven others – Australia, Bangladesh, Indonesia, Malaysia, the Philippines, Thailand and Vietnam – have significant nuclear activities as defined by the International Atomic Energy Agency (IAEA) (typically one or more research reactors).

3. Four countries in the region – China, the Democratic People's Republic of Korea (North Korea), India and Pakistan – have nuclear weapon programs.

Strengthening Nuclear Governance

4. Nuclear governance refers to the institutional arrangements dealing with nuclear energy, in particular treaties, decisions of international bodies, cooperation arrangements and other mechanisms for balancing national and international interests in the areas of nuclear non-proliferation, security and safety. Effective governance arrangements are essential for ensuring that national nuclear activities do not endanger other countries through the risk of nuclear weapon proliferation, or through inadequate security and safety standards.[2]

[1] This paper was discussed at APLN's meeting in Hiroshima on 7–8 August 2015. The paper has been revised to reflect APLN's Hiroshima Declaration on Nuclear Weapons, issued at the conclusion of this meeting: http://www.a-pln.org/sites/default/files/apln-analysis-docs/APLNHiroshimaDeclaration8viii15%20.pdf.

[2] For a further discussion on nuclear governance see John Carlson, "After Fukushima: Implications for Nuclear 3S (Safeguards, Safety and Security)," presentation to the Asan Institute's conference, Nuclear Crisis in North East Asia, Seoul, 1 November 2011, http://lowyinstitute.org/publications/after-fukishima-implications-nuclear-3s-safeguards-safety-and-security.

Table 1: Nuclear Power Reactors in Asia Pacific (July 2015)

Power reactors:	Operating			Under construction		Planned	
	Number	Capacity GWe	World ranking (GWe)	Number	Capacity GWe	Number	Capacity GWe
China	27	23.0	5	24	23.7	44	51.0
India	21	5.3	14	6	3.9	22	21.3
Japan	43*	40.3	3	2	2.6	9	12.9
South Korea	24	21.7	6	4	5.4	8	11.6
Pakistan	3	0.7	28	2	0.6	2	2.3
Taiwan	6	5.0	15	2	2.6		
Vietnam						4	4.8
Region total	124	96.0		40	38.8	89	103.9
World total	437	378.0		69	68.1	168	189.5

* All Japanese power reactors were shut down after the Fukushima accident. Restart of the Sendai No. 1 reactor commenced on 11 August 2015. A further 24 reactors are being considered for restart.

Sources: Reactors operating and under construction as at 22 July 2015, IAEA, www.iaea.org/PRIS/WorldStatistics/OperationalReactorsByCountry.aspx ; www.iaea.org/PRIS/WorldStatistics/UnderConstructionReactorsByCountry.aspx ; Planned reactors as at 1 June 2015, WNA, www.world-nuclear.org/info/Facts-and-Figures/World-Nuclear-Power-Reactors-and-Uranium-Requirements.

5. Today there is no single international nuclear governance system. Instead arrangements vary according to the different agreements involved. The IAEA is the nearest there is to a global nuclear governance body, but its authority over national activities is limited by its Statute and the terms of specific agreements. The IAEA's authority is greatest in the area of safeguards. For nuclear safety and security its role is largely to recommend standards, coordinate cooperation, and provide training and advice.

6. Participation in the key nuclear treaties is an important practical way countries can contribute to strengthening nuclear governance. Obviously it is important for countries with nuclear activities to participate in relevant treaties and to contribute to the development of the regimes concerned. But even countries without nuclear activities can contribute by joining the key treaties – each step towards a treaty's universalization helps persuade those remaining outside that they too should join.

7. Treaty participation by the countries in the Asia Pacific region is outlined in Table 2 at the end of this paper. As can be seen from this table, regional participation is somewhat patchy and much more remains to be done.

8. In February 2013 APLN issued a discussion paper on the concept of an Asia Pacific Nuclear Energy Community.[3] APLN suggested that a regional nuclear energy community could facilitate: high-level consultation on nuclear plans and programs; regional cooperation and promotion of best practice in safeguards, security and safety (the '3 Ss'); and collaborative arrangements for energy security and fuel cycle management. Such a community could also ensure transparency and build confidence in nuclear programs in the region, helping members provide assurance that they are meeting best practice in nuclear safety, security and non-proliferation.

[3] An updated version was issued in June: John Carlson, "An Asia Pacific Nuclear Energy Community," APLN/CNND *Policy Brief* No. 4 (June 2013), http://a-pln.org/wordpress/wp-content/uploads/2011/03/Policy-Brief-No.-4-An-Asia Pacific-Nuclear-Energy-Community.pdf.

9. To date it seems APLN's discussion paper has attracted little attention, though in August 2014 South Korea's President Park Geun-hye launched the Northeast Asia Peace and Cooperation Initiative,[4] which parallels a number of the themes in the APLN paper. The issues raised in the APLN paper can be expected to gain in importance as nuclear programs in the region develop further.

Peaceful Uses

10. The principal concern with respect to peaceful uses is to ensure that 'peaceful' nuclear programs are not used for the production of nuclear weapons. This is an issue both for non-proliferation (ensuring that no further countries acquire nuclear weapons) and also for nuclear disarmament, where the concern will be to ensure that agreements for arms reductions, and eventually disarmament/elimination, are not circumvented. Production of nuclear weapons requires availability of fissile materials – highly enriched uranium (HEU) and/or separated plutonium. While it may be possible to acquire at least small quantities of these materials on the black market or by theft or seizure, in practice all countries with nuclear weapons have established indigenous uranium enrichment and reprocessing capabilities.

11. Non-proliferation measures comprise safeguards and controls on the availability of enrichment and reprocessing, and other proliferation-sensitive technologies. The purpose of safeguards – the principal example being IAEA safeguards – is to verify that nuclear materials and facilities are not being used contrary to the Nuclear Non-Proliferation Treaty (NPT) and other agreements prohibiting production of nuclear weapons. The risk of detection by safeguards helps deter treaty violations, but safeguards in themselves are not sufficient – if a violation is detected it may already be too late, the international community might not be able to act quickly enough to stop a country producing nuclear weapons. For this reason, the most effective barrier to proliferation is to avoid the spread of proliferation-sensitive technologies and materials.

12. Unfortunately today there is no international agreement against further countries acquiring enrichment and reprocessing capabilities, other than through export controls: national measures coordinated through mechanisms such as the Nuclear Suppliers Group (NSG). The problem is illustrated by the case of Iran. Iran was able to circumvent export controls through black market procurements. Iran violated the NPT by not declaring its enrichment activities to the IAEA, but insists that the NPT does not take away its 'inalienable' right to enrich. The recently concluded Joint Comprehensive Plan of Action with Iran does not directly address this problem, saying only that Iran will enjoy the same rights as other non-nuclear-weapon states party to the NPT, without saying what these are. Iran has foreshadowed plans to expand its enrichment capabilities by orders of magnitude after the 15-year limitation period set out in the Plan.

13. The spread of nuclear latency – more and more countries having the ability to produce weapons-usable materials – will be destabilizing to international peace and security.[5] The international community must find alternatives to national enrichment and reprocessing programs: such as multinational fuel cycle operations, fuel leasing and supply guarantees, and so on.[6]

14. In the Asia Pacific region, currently five countries have enrichment and/or reprocessing programs. Four of these – China, India, Pakistan and North Korea – developed these capabilities for nuclear weapons purposes. The fifth, Japan, is a non-nuclear-weapon state. Concerns have been expressed in the region about the nuclear latency Japan has attained through enrichment and reprocessing. A sixth country, South Korea, has expressed strong interest in enrichment and pyro-processing, a form of reprocessing. South Korea and the United States are studying the extent to which pyro-processing may be proliferation-resistant.

15. Not only do enrichment and reprocessing programs present a potential proliferation risk, but weapon-usable materials from these programs present a security risk – that is, that ter-

[4] http://www.mofa.go.kr/ENG/North_Asia/res/eng_2015_0310.pdf.

[5] For more on nuclear latency and nuclear hedging, see John Carlson, "Assessing and Minimising Proliferation Risk," in Viatcheslav Kantor, ed., *The Limits of Secure Nuclear Tolerance* (Moscow: International Luxembourg Forum, 2014), pp. 34–49, www.luxembourgforum.org/eng/Forums_Library/items/Book%20by%20VVK%202014_eng.pdf.

[6] For more on multinational approaches see John Carlson, *Towards a New Global Order for the Nuclear Fuel Cycle*· Conference on Re-assessing the Global Nuclear Order, RMIT/MIT, Melbourne, 8–10 January 2015, http://belfercenter.org/files/JohnCarlson_2015_NuclearFuelCycle.pdf.

rorists may acquire such materials. International efforts to phase out highly enriched uranium (HEU) from peaceful programs remain ongoing but have been largely successful. Separated plutonium however is a more complicated issue. For countries committed to the closed fuel cycle, separated plutonium is an inevitable product of established reprocessing technologies.

16. Strategies for mitigating risks from use of plutonium include:

i. keeping plutonium supply and use in balance, to avoid growing stockpiles;
ii. minimizing the number of facilities where plutonium is processed, stored and used;
iii. conversion of plutonium to a less pure form – mixed oxide (MOX) and MOX fuel assemblies – as soon as possible;
iv. avoiding separation of plutonium in pure form – pyro-processing having considerable advantages in this regard;
v. avoiding production/separation of weapon-grade plutonium.

17. There is no international agreement requiring any of these strategies (though principles 16.i and 16.ii are recognized in the IAEA's Plutonium Management Guidelines)[7]; instead, risk mitigation depends on voluntary decisions by the countries concerned (an outstanding example being the commitment by Japan not to separate weapon-grade plutonium from fast breeder reactors, but to blend such plutonium with higher burnup plutonium during the separation process).[8]

18. At the moment the only Asia Pacific country undertaking civilian reprocessing is India (although mostly this is not under safeguards, raising concerns about how much of this plutonium may be available for military purposes). Japan has closed down its old reprocessing plant at Tokai, but is preparing for the full-scale operation of the much larger Rokkasho-mura plant in 2016:

(a) With India, a particular concern is its plan to separate weapon-grade plutonium from fast breeder reactors for use as fuel for thorium reactors. This presents serious terrorism risks, which could be easily avoided by not producing material of this quality;

(b) With Japan, concerns have been expressed about the already large stockpile of separated plutonium (almost 11 tonnes in Japan, and a further 36 tonnes held for Japan in UK and France), and the impact of bringing Rokkasho on stream (a further 6 to 8 tonnes of plutonium would be separated annually).

19. Countries in the Asia Pacific region should develop collaborative approaches to minimize and mitigate the risks involved with sensitive nuclear technologies and materials.

IAEA Safeguards – Additional Protocol

20. An essential aspect of the peaceful use of nuclear energy is the application of IAEA safeguards to provide assurance that national nuclear programs are in fact peaceful. The NPT requires non-nuclear-weapon states parties to accept safeguards on all their nuclear material and activities in accordance with the IAEA safeguards system. The contemporary expression of the IAEA safeguards system is the combination of a comprehensive safeguards agreement and the IAEA's Additional Protocol. The IAEA has made it clear that for a country without an additional protocol its ability to provide assurance of the absence of undeclared nuclear activities is substantially reduced.[9]

21. As will be seen in Table 2, in the Asia Pacific region currently there are two NPT states parties with significant nuclear activities that have signed but not yet ratified an additional protocol – Malaysia and Thailand. There are 15 other NPT states parties in this region, without significant nuclear activities, that have yet to conclude an Additional Protocol – four that have signed, and 11 that have not signed.[10]

22. Countries without additional protocols should conclude such a protocol without further delay. As noted earlier, this is worthwhile even for countries without nuclear activities, as concluding an additional protocol helps universalization. Countries with additional proto-

[7] IAEA document INFCIRC/549, https://www.iaea.org/sites/default/files/infcirc549.pdf.

[8] For more on plutonium issues, see NTI discussion paper, https://www.nti.org/media/pdfs/Managing_Stocks_of_Separated_Plutonium_to_Mitigate_Security_Risks_1.pdf.

[9] For more on the importance of the additional protocol see John Carlson, "Is the Additional Protocol 'Optional'?" *Trust and Verify* (VERTIC), Issue no. 132 (January–March 2011), pp. 6–9, www.nti.org/analysis/articles/additional-protocol-optional.

[10] In addition the Cook Islands and Niue are covered by New Zealand's safeguards agreement but not New Zealand's additional protocol.

cols should provide assistance to those that have yet to conclude a protocol.

Nuclear Security

23. Compared with nuclear safeguards, international arrangements for nuclear security are weak.[11] The relevant treaties are far from universal, there are no binding international standards, no international inspections, and no international reporting and accountability mechanisms.

24. The principal treaties for nuclear security are the 1980 Convention on the Physical Protection of Nuclear Material (CPPNM), which applies primarily to nuclear material in international transport, and the 2005 Amendment to the CPPNM, which will extend the CPPNM's application to protection of nuclear material in domestic use, as well as protection of nuclear facilities against sabotage. The CPPNM Amendment is not yet in force – this requires ratification by two-thirds of the states parties to the CPPNM: currently there are 87 ratifications, 14 short of the 101 required for entry into force.[12]

25. From Table 2 it can be seen that three Asia Pacific countries with significant nuclear activities – Malaysia, Thailand and North Korea – have yet to join the CPPNM, and there are 14 countries without significant nuclear activities that have yet to join. For the Amendment, there are five countries with significant nuclear activities yet to join – the three just mentioned plus Pakistan and the Philippines. There is no excuse for countries with significant nuclear activities to remain outside the CPPNM and its Amendment. There are 22 countries without significant nuclear activities yet to join. If all Asia Pacific countries joined the Amendment, this would be enough to bring it into force.

26. The other important treaty in this area is the 2005 International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT). Thirteen Asia Pacific countries are parties, seven have signed but not yet ratified, and 18 have not yet signed.

27. In addition to participating in the key treaties, other essential steps to strengthening nuclear security governance include:

(a) domestic arrangements – such as regulations, licensing and inspection processes, and an independent regulator – that meet international standards;
(b) assurance and accountability mechanisms – for example through reporting on how security standards are applied – so countries can assure their neighbours and the wider international community that they are maintaining appropriate standards;
(c) external review – a commitment to invite regular peer views by the IAEA and others (for example the World Institute for Nuclear Security – WINS), and to apply the results of such reviews;
(d) strengthened cooperation, including sharing best practice, capacity-building and training.[13]

28. As part of its promotion of stronger nuclear security governance, the Nuclear Threat Initiative (NTI) publishes the Nuclear Materials Security Index,[14] which ranks countries against a range of indicators for nuclear materials security practices and conditions. It should be noted that neither NTI nor any other external observer is in a position to determine actual security performance in each country. Rather, the Index looks at publicly available information on factors relevant to assurance and accountability – the ranking reflects the level of assurance that can be derived. Rankings from the 2014 Index are shown in Table 2. For most Asia Pacific countries the rankings suggest considerable scope for improvement.

29. At the 2014 Nuclear Security Summit, 35 participating countries launched the Initiative on Strengthening Nuclear Security Implementation.[15] The participants commit to following the IAEA's Fundamental Principles on nuclear security, meeting or exceeding the intent of IAEA security recommendations, continuous improvement of their nuclear security regimes, and so on. Of the 12 Asia Pacific countries that

[11] See Ramesh Thakur, "The Global Governance Architecture of Nuclear Security," *Policy Analysis Brief* (Muscatine, Iowa: Stanley Foundation, March 2013).
[12] At 31 July 2015 the CPPNM had 151 states parties.
[13] For more on these matters see for example http://www.nti.org/about/projects/global-dialogue-nuclear-security-priorities/, and http://www.nti.org/about/projects/global-dialogue-nuclear-security-priorities/event/may-2015-global-dialogue-meeting.
[14] See www.ntiindex.org.
[15] http://www.nss2014.com/sites/default/files/documents/strengthening_nuclear_security_implementation.pdf.

participated in the 2014 Summit, six – Australia, Japan, New Zealand, the Philippines, South Korea and Vietnam – joined the nuclear security strengthening initiative. It is to be hoped that the other six – China, India, Indonesia, Malaysia, Pakistan and Singapore – will also be prepared to join.

30. In June 2013 APLN issued a discussion paper on Improving Nuclear Security Governance in the Asia Pacific.[16] This paper advocated a regional approach, including: joining the key treaties; assurance mechanisms such as a common national reporting system; greater use of peer reviews; and strengthened collaboration. On the issue of mechanisms to succeed the Nuclear Security Summits (it is expected that the 2016 Summit will be the last in this series of summits), the paper suggested that regional countries could work together on building support for regular CPPNM review conferences, along the lines of those under the Convention on Nuclear Safety.

31. Pending global consensus on steps to strengthen international nuclear security governance, many practical steps could usefully be taken at a regional level on the matters outlined here. Informal mechanisms could have a significant role to play in encouraging and facilitating these actions. Asia Pacific countries are urged to address the various issues discussed here and in APLN's 2013 Policy Brief, with the objective of promoting greater regional collaboration in pursuing what should be common nuclear security goals.

Nuclear Safety

32. Nuclear safety is of particular interest to APLN because of the significant connection between nuclear safety and nuclear security. The Fukushima nuclear accident underscores this connection – terrorists might well attempt to replicate an accident of this kind, for example by sabotaging a reactor's cooling system and emergency power supply or by sabotaging spent fuel ponds. The Nuclear Security Summits have noted that failures in safety protection may create opportunities for sabotage. This close connection between safety and security is recognized by the 2005 CPPNM Amendment which, when it enters into force, will extend the Convention to include protection of nuclear facilities against sabotage.

33. Table 2 shows participation by Asia Pacific countries in the key nuclear safety conventions. For the main convention, the Convention on Nuclear Safety (CNS), there are three countries with significant nuclear activities that have not joined – the Philippines, which has signed but not yet ratified, and Malaysia and North Korea. As the primary focus of the CNS is on power reactors, non-participation of these countries might be excused, but any country considering nuclear power should become a party – and participation by others is an important way for them to gain insight into the safety performance of countries with nuclear power programs, through the convention's national review process. Apart from the three countries mentioned, there are 25 other Asia Pacific countries that have not joined the CNS.

34. For the Joint Convention on Spent Fuel and Radioactive Waste, there are seven Asia Pacific countries with significant nuclear activities that have not yet joined – the Philippines, which has signed, and Bangladesh, India, Malaysia, North Korea, Pakistan and Thailand. In addition to these countries, there are 25 other Asia Pacific countries that have not joined this convention.

35. Nineteen Asia Pacific countries have not joined the Convention on Early Notification of a Nuclear Accident, and 21 have not joined the Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency. These figures include North Korea, which has signed both but not ratified. The other non-parties are mainly Pacific Island countries. While these conventions might not seem very relevant to most of these countries, in fact the conventions encompass accidents with radioactive sources, which are used in a number of these countries, so they would benefit by joining.

36. As with nuclear security, the main issues on nuclear safety governance relate to transparency and accountability. There are no internationally binding nuclear safety standards. The IAEA promulgates safety standards, but the application of these is voluntary. When the CNS was negotiated some states proposed an active monitoring role for the IAEA, but this was not agreed. In contrast with nuclear security, for nuclear safety there is at least a peer review process for national regulatory arrangements,

[16] John Carlson, "Improving Nuclear Security Governance in the Asia Pacific," APLN/CNND *Policy Brief* No. 5 (June 2013), http://a-pln.org/wordpress/wp-content/uploads/2011/03/Policy-Brief-No.-5-Improving-Nuclear-Security-Governance-in-the-Asia Pacific.pdf.

through the CNS, and mandatory peer review at the facility level through the World Association of Nuclear Operators (WANO).

37. Given the challenges of achieving global consensus for major changes, it may be more productive to proceed initially on a regional basis. APLN's discussion paper on an Asia Pacific Nuclear Energy Community is highly relevant to regional nuclear safety governance and collaboration. A specific regional initiative is the proposal for a Northeast Asia Nuclear Safety Consultative Body, launched by President Park in August 2014 as part of her broader Northeast Asia Peace and Cooperation Initiative, mentioned earlier. It appears however that so far neither China nor Japan has been persuaded of the need for such a body.[17]

Comprehensive Test-Ban Treaty

38. The CTBT reinforces peaceful use commitments, and is an essential part of the international nuclear architecture. Table 2 shows that 12 Asia Pacific countries have not ratified the CTBT. Four of these – China, India, North Korea and Pakistan – are Annex 2 states, the ratifications of which are required before the Treaty can enter into force. China has signed the Treaty; India, North Korea and Pakistan have not signed. Other Asia Pacific countries that have signed but not yet ratified are Myanmar, Nepal, Solomon Islands, Sri Lanka and Timor-Leste. Other regional countries that have not signed are Bhutan, Tonga and Tuvalu.

39. Asia Pacific countries that have not yet signed the CTBT, and those that have not yet ratified, are urged to do so. A particular case is India, which not only has not signed the Treaty but withdrew consent for four CTBT monitoring stations, thus impacting on the International Monitoring System's efficacy.[18] If India could join China and the United States as signatory states, this would put pressure on Pakistan to sign, leaving North Korea as the only non-signatory from the 44 countries whose ratifications are required for entry into force.

APLN Hiroshima Declaration on Nuclear Weapons

40. This declaration, issued after APLN's meeting in Hiroshima on 7–8 August 2015, contains a number of recommendations directly relevant to the issues discussed in this paper, including:

> (18) All states should ensure that peaceful nuclear energy programs do not contribute to the proliferation of nuclear weapons and do not endanger human and environmental health and safety.
>
> (19) All states should build and sustain strong nuclear security and safety cultures in relation to all fissile material, nuclear weapons and military and civil nuclear facilities, share best practices, and take steps to strengthen the international nuclear security architecture.
>
> (21) All states should promote intensive dialogue among and between nuclear industry and government bodies, including national regulators, with a view to improving nuclear security and safety regulations, and regulatory effectiveness and transparency.
>
> (22) To strengthen nuclear energy governance in the region across all three crucial areas of safeguards, security and safety, the East Asia Summit should explore the concept of an Asia Pacific Nuclear Energy Community.
>
> (23) All states should promote knowledge and awareness of nuclear issues through appropriate advocacy, educational and training activities.

Conclusion

41. Strengthened nuclear governance is especially important in the Asia Pacific region:

(a) regulatory challenges are faced by those undertaking substantial growth in nuclear energy programs – China and India – as well as those planning new programs;
(b) concerns about the 'peacefulness' of nuclear programs has the potential to add to strategic tensions – as demonstrated by concerns about the unsafeguarded parts of India's power program, and suspicions

[17] See http://nautilus.org/napsnet/napsnet-special-reports/securing-nuclear-safety-in-northeast-asia-rok-proposal-on-northeast-asia-nuclear-safety-mechanism/.
[18] See Ramesh Thakur and John Carlson,"How India can support the CTBT before signing," *The Japan Times*, 9 April 2015, http://www.japantimes.co.jp/opinion/2015/04/08/commentary/world-commentary/india-can-support-ctbt-signing.

about Japan's nuclear latency and South Korea's interest in sensitive stages of the fuel cycle;

(c) increasing use of plutonium fuels has the potential to increase proliferation and terrorism concerns.

42. Against this background, an important contribution could be made by a high-level regional mechanism for consultation and consensus-building on nuclear developments, especially developments with strategic implications. The concept of an Asia Pacific Nuclear Energy Community has been proposed to meet this evolving need. Asia Pacific countries are urged to seriously study this concept, as well as taking the specific actions discussed in this paper, particularly participation in key nuclear treaties and development of mechanisms for assurance, accountability and greater collaboration.

Table 2: Asia Pacific Region – Participation in Key Nuclear Treaties

	Safeguards Additional Protocol	CPPNM	Amended CPPNM	NTI Nuclear Security Index ranking	Nuclear Terrorism Convention (ICSANT)	CTBT	Nuclear Safety Convention (CNS)	Joint Convention on Spent Fuel and RadWaste	Early Notification Convention	Nuclear Assistance Convention
Australia				**1**						
Bangladesh				*72*						
Bhutan				*125*						
Brunei				*114*						
Cambodia				*99*						
China				**20**		signed				
India				**23**						
Indonesia				*66*						
Japan				**13**						
Korea, DPR				**25**					signed	signed
Korea, Rep				*18*						
Laos	signed			*117*						
Malaysia	signed			*97*	signed					
Mongolia				*36*						
Myanmar	signed			*142*		signed				
Nepal				*131*		signed				
New Zealand				*12*	signed					
Pakistan				**22**						
Philippines				*66*	signed		signed	signed		
Singapore				*52*	signed					
Sri Lanka				*85*		signed				
Thailand	signed			*99*	signed	signed				
Timor-Leste	signed			*137*	signed	signed				
Vietnam				*79*						

Other South Pacific Forum members										
Cook Islands										
Fiji				*73*						
Kiribati	signed									
Marshall Islands										
Micronesia										
Nauru										
Niue										
Palau					signed					
PNG				*131*						
Samoa				*119*						
Solomon Islands				*119*		signed				
Tonga				*108*						
Tuvalu										
Vanuatu				*119*						
Totals - 38	17, + 6 signed	21	11		13, + 7 signed	24, + 7 signed	10, + 1 signed	6, + 1 signed	19, + 1 signed	17, + 1 signed

Notes:

Countries with significant nuclear activities shown in bold.

Additional Protocol: IAEA, 2 July 2015

CPPNM (Convention on the Physical Protection of Nuclear Material): IAEA, 19 January 2015

Amended CPPNM: IAEA, 31 July 2015.

ICSANT: UN, 9 July 2015, https://treaties.un.org/Pages/ViewDetailsIII.aspx?src=IND&mtdsg_no=XVIII-15&chapter=18&Temp=mtdsg3&lang=en

CTBT: www.ctbto.org/the-treaty/status-of-signature-and-ratification, accessed 10 July 2015

CNS: IAEA, 23 April 2015

Joint Convention: IAEA, 9 October 2013

Early Notification: IAEA, 22 September 2014

Nuclear Assistance: IAEA, 7 August 2014

NTI Nuclear Materials Security Index 2014, http://ntiindex.org/

Bold - ranking out of 25 – countries with weapon-usable nuclear materials (highly enriched uranium and/or separated plutonium)

Italics - ranking out of 151 – countries without weapon-usable nuclear materials

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APLN and CNND

The **Asia Pacific Leadership Network (APLN)** comprises around fifty former senior political, diplomatic, military and other opinion leaders from fourteen countries around the region, including nuclear-weapons possessing states China, India and Pakistan. The objective of the group, convened by former Australian Foreign Minister and President Emeritus of the International Crisis Group Gareth Evans, is to inform and energize public opinion, and especially high-level policy-makers, to take seriously the very real threats posed by nuclear weapons, and do everything possible to achieve a world in which they are contained, diminished and ultimately eliminated. See further http://apln.anu.edu.au.

The **Centre for Nuclear Non-Proliferation and Disarmament (CNND)** contributes to worldwide efforts to minimize the risk of nuclear-weapons use, stop their spread and ultimately achieve their complete elimination. It works in partnership with the Geneva Centre for Security Policy (GCSP) and the Stockholm International Peace Research Institute (SIPRI), and acts as the Secretariat for APLN. The director of the Centre is Professor Ramesh Thakur, former UN Assistant Secretary-General, and it is assisted by a distinguished International Advisory Board chaired by Professor Gareth Evans. See further http://cnnd.anu.edu.au.

APLN/CNND Policy Briefs

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