

Nuclear Power Expansion in Asia and its Global Governance Implications

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Thank you to the Korea Advanced Institute for Science and Technology and the Nuclear Nonproliferation Education and Research Center for the opportunity to participate today.

Through interactions with the Asia Pacific Leadership Network I follow regional nuclear power developments quite closely but there is no substitute for hearing firsthand from distinguished scholars and practitioners.

I am personally convinced that global and local factors make it sensible for governments throughout Asia Pacific to be rethinking the role of nuclear power in national energy mixes, not least because the urgency of action to slow climate change, but also given the growing disruptions to global energy markets.

So let me put the prospects for the broader use of nuclear energy into its multilateral governance contexts.

The Geo-strategic Context

It is inevitable in an increasingly interactive and still highly interdependent world, that changes in national nuclear energy strategies will be closely monitored by the international community. This will be done through various lenses: commercial; environmental and security.

My focus in this paper is the security dynamic. My key observation is that the Indo-Pacific is today the epicentre of global nuclear threats and risks. Six of the world's nine nuclear

armed states are active in the region. But the region lacks the experience in nuclear risk management that decades of East-West confrontation generated in the Atlantic.

Against that background it is to be expected that national nuclear plans and developments will all be subject to the closest scrutiny of both neighbours and the wider international community.

My second overarching observation is that Asia Pacific perceptions of nuclear risks will only be compounded by perceptions around the war in Ukraine. The unfolding disaster in Ukraine has highlighted the failure of world leaders to end the threat of nuclear weapons and a reminder that these weapons remain the greatest existential threat to human civilisation. A second aspect, and an especially important lesson for those in the industry, is the special concerns surrounding nuclear installations in regions of conflict and political crisis.

A further aspect as raised by other participants in this workshop, is that the war in Ukraine has revived concerns about assurance of supply of nuclear materials, technology and services. Assurance of supply was a major concern in the IAEA in the 1970s and 1980s but has been dormant for some years until now.

I will return to the situation in Ukraine later in this paper.

The Global Governance Framework for the Peaceful Uses of Nuclear Energy

My third key observation is that civil nuclear power production is now almost 70 years old – the Obninsk power plant, 100 kilometres from Moscow, was connected to the power grid in June 1954.

From the earliest days of the nuclear era there were efforts to eliminate the destructive uses of nuclear energy while fostering the peaceful uses. Today national nuclear activities operate in a complex matrix of multilateral governance mechanisms.

The key global institution with a statutory responsibility to facilitate the peaceful uses of nuclear energy is the International Atomic Energy Agency (IAEA). Created in 1956, the IAEA now has 173 member states, including virtually all the countries of Asia Pacific with one notable omission, DPRK. North Korea joined the IAEA in 1974 but withdrew in 1994 when the IAEA deemed North Korea had not declared all its nuclear activities as it was obliged to do by virtue of its Nuclear non-Proliferation Treaty (NPT) safeguards agreement.

The IAEA assists many states to utilise nuclear science in applications such as medicine, agriculture, industry and the environment. But by far its most important contributions have been to operations of nuclear reactors – whether they be designed for power generation or for isotope production or research.

The IAEA provides international oversight in three key areas

- Safeguards – verifying that nuclear activities remain peaceful
- Safety – of nuclear facilities but also radiation protection; and
- Security – ensuring that nuclear materials remain in authorised hands.

Verification

I turn to the first of these -- the IAEA's safeguards verification system. Verification provides assurance that nuclear activities subject to safeguards are not being diverted to making nuclear weapons.

The system has evolved over the decades. In the late eighties and early nineties, it was discovered that Iraq and North Korea had been cheating the system. Both countries had some installations and nuclear material under safeguards, but the IAEA discovered that both these countries also had parallel secret programs to develop weapons.

This led to a massive shake up of the IAEA safeguards system and a change in the culture of safeguards. The culture has shifted from *trust but verify*, to *don't trust and verify, verify, verify* Today IAEA inspectors are trained to find anomalies. They

harness open source and other intelligence, and have access to powerful technical tools such as environmental monitoring.

Two examples.

The case of DPRK was the first acknowledged use of overhead surveillance – images provided by a member state. The IAEA Board of Governors – the key policy making body of the IAEA – was shown a series of photos taken over several years of a site within North Korea's Yongbyong nuclear complex. The photos showed the excavation and construction of a large concrete facility; then that facility in operation; followed by its closure, with the site subsequently covered over with earth, trees were planted and an anti-aircraft battery installed. IAEA inspectors were denied access to the site because it was a military facility.

Using this evidence and the technical data generated by IAEA analysis of DPRK records, the IAEA Board of Governors subsequently reported to the UN Security Council that the DPRK appeared to be in breach of its safeguards obligations.

A second example was a voluntary exercise conducted jointly by the IAEA and Australia to demonstrate the power of environmental monitoring. The exercise in the 1990s involved trialling environmental sampling techniques to determine their ability to detect historical nuclear activity. The exercise was conducted in Australia in and around the Lucas Heights research facility near Sydney. IAEA inspectors were able to identify the full range of Australia's enrichment and reprocessing research which had been undertaken 20 years previous – activities discontinued when Australia joined the NPT in 1975. Similar environmental testing techniques have been used to help clarify Iran's nuclear activities and also Syria's nuclear program.

I mention these two examples to underline the range of tools available to inspectors in providing assurance of compliance with safeguards undertakings.

IAEA Safeguards and Member States

While the IAEA has to maintain a professional distance from the authorities it is inspecting, effective and efficient safeguards do require close cooperation between the IAEA and national authorities. Usually the relationships are managed through national regulatory body referred to a State System of Accounting and Control – or SSAC.

In the early days of IAEA safeguards national authorities were inclined to resent the intrusion of international inspectors. National nuclear authorities and private sector fuel cycle service providers had concerns over protection of their intellectual property and other commercial sensitivities. Inspectors and their equipment, such as cameras and seals, were often seen as costly intrusion, even a risk to safe operation of facilities.

Times change and nowadays most countries seek to establish good working relations with the IAEA, and the nuclear industry better understands the vital reputational importance of good non-proliferation credentials.

As an aside, I met with several IAEA officials last year – they underscored how COVID had created extraordinary problems for international verification activity. Travelling inspectors were obliged to quarantine adding days if not weeks to inspection visits. On top of that, the IAEA had to cover the higher cost of regular air travel, where still available, and the huge cost of charter aircraft where not, in order to maintain the tempo of scheduled inspections. It was remarkable that the IAEA managed these challenges without significant loss of safeguards confidence.

It is important to understand that the IAEA operates under funding constraints imposed by its member states. Growth in nuclear activity will inevitably put further pressures on the system. As a crude indicator of the ever growing workload

- in 2014 the IAEA was verifying almost 200,000 SQ¹ of nuclear material

¹ SQ stand for Significant Quantity. The IAEA defines an SQ as a '... "significant quantity" of nuclear material, or a "quantity of safeguards significance" ... understood to be the approximate quantity of nuclear material with respect to which — taking into account any conversion process involved — the possibility of manufacturing a

- this year the number is expected to have increased have by some 25% to nearly 250,000 SQ.

Several countries in our region already help IAEA safeguards with financial support for safeguards R&D, and the provision of ‘cost-free’ experts. Better still, we can encourage our governments to support increases in the IAEA’s budget to allow it to implement its mandate independently and transparently.

Safety and Security

I turn now briefly to the IAEAs contributions to nuclear safety and security.

The global nuclear power industry once regarded safety and the security of nuclear materials and installations as solely the responsibility of national governments. The major technology holders vigorously opposed any attempted interference in these domains by an international organisation with what they regarded as dubious claims to expertise and impartiality.

But in the safety field, events eventually demonstrated just how unsustainable this view was. The transboundary impacts of the Chernobyl accident inevitably led to demands for international intervention. Treaties were negotiated and global best practice standards established under IAEA auspices. The IAEA established a range of advisory and peer review services to allow countries to benefit from expertise from around the world. These services not only help countries adopt best practices, but also help them to demonstrate to neighbours and technology providers that they are indeed following best practice.

In short, IAEA advisory services now offer cradle to grave support, from determining the viability of the nuclear power option to design review of nuclear waste disposal facilities.

Changed attitudes to nuclear security can be attributed initially to the break-up of the Soviet Union over thirty years ago, and later the rise of global terrorism which triggered growing

nuclear explosive device cannot be excluded’. It is generally understood that with modern designs, much smaller quantities could be used to manufacture weapons.

awareness of the need for enhanced standards of nuclear security to prevent nuclear materials falling onto the wrong hands. Again, the IAEA has been the fulcrum for efforts to strengthen nuclear security offering advisory services and promulgating standards.

Case Study Ukraine

And here let me refer again to the situation in Ukraine. Both the Chernobyl and Zaporizhzhia nuclear complexes have been subject to military attack, causing great concern about the safety and health of the plant operators, and posing a threat of uncontrolled radioactive releases. The situation at Zaporizhzhia remains hugely problematic.

In response the IAEA has intervened to assure the safety, security and safeguards of nuclear installations in Ukraine. The head of the IAEA, the dynamic Argentinian diplomat Rafael Gross, has issued regular reports – some 146 to date – on the situation. In September last year he led a team of experts to Zaporizhzhia, and an IAEA team has remained there ever since. The latest rotation of staff was to happen this week but has been delayed due to increased military activity in the area.

Regional Arrangements

Global nuclear governance arrangements operate at different levels and in different modes

- truly international, as we have been discussing
- regional arrangements, which I will comment on briefly
- and two other categories of arrangements which are beyond the scope of this paper namely
 - coalitions of like-minded states (such as the Nuclear Suppliers Group and the Proliferation Security Initiative)
 - and bilateral arrangements (which often govern supply of nuclear materials and equipment).

Many parts of the world have thought it useful to supplement international mechanisms with regional arrangements that address specific concerns. Nuclear weapon free zones have been

negotiated, first in South America in the 1960s, then the South Pacific in the 1980's, and in Southeast Asia in 1995. The Treaty of Bangkok – full title The Treaty on the Southeast Asia Nuclear Weapon-Free Zone or SEANFZ – reinforces ASEAN commitments to non-proliferation and to best practice safety and waste management. SEANFZ highlights the centrality of the IAEA in these areas, and like other such zones it creates mechanisms for settling disputes with provision for referring unresolved issues to the IAEA or the UN Security Council.

It is worth noting that Europe and South America have for different but overlapping reasons gone a step further, developing their own regional verification mechanisms which work alongside the IAEA verification system

- EURATOM, which dates back to 1957 when the IAEA was still in formation, and includes all EU members states
https://energy.ec.europa.eu/topics/nuclear-energy_en
- and the Argentina-Brazil Agency for Accounting and Control of Nuclear Materials (ABACC), finalised in 1991.
<https://www.abacc.org.br/es/a-abacc/sobre>

Both these institutions have responded to particular local needs and sensitivities, contributing to confidence building and assurance of non-proliferation. They have also eased some of the IAEA's verification burden.

Over the years been proposals have been advanced for an Asiatom or Pacatom or even Indo-Pacatom, with various ideas as to the membership and the scope of activity, ranging from simple confidence building measures to facilitating safeguards, to the creation of multinational regional fuel cycle facilities. One proposal was to expand the Korean Energy Development Organisation (KEDO), the innovative, ambitious but sadly doomed multinational project to resolve the North Korea nuclear crisis, to create an inclusive Asia Pacific nuclear cooperation framework. All these proposals shared one aim: to enhance regional collaboration and security, but regrettably it seems the

time is not yet quite right.

<https://www.rand.org/pubs/drafts/DRU1367.html>

There are however some practical mechanisms for regional cooperation. The IAEA's Regional Cooperative Agreement for Asia and the Pacific (RCA) was first established in 1972 to promote the peaceful application of nuclear science and technology among the RCA parties. In 2009, with the leadership of Australia, Indonesia, Japan and Republic of Korea, several regional governments set up the Asia-Pacific Safeguards Network (APSN). APSN currently has some 18 members collaborating to improve the quality, effectiveness, and efficiency of IAEA safeguards implementation, and more generally promote regional cooperation in nuclear matters in the Asia-Pacific. And ASEAN itself offers channels for collaboration: first, the ASEAN Nuclear Energy Cooperation Sub-sector Network; and second, linked to the geo-strategic context, the ASEAN Regional Forum inter-sessional meetings on non-proliferation and disarmament which address all three pillars of the NPT.

Final Remarks

That concludes my outline of the multilateral governance context of nuclear activity in Asia ... it is necessarily sketchy and also incomplete. As noted, I have not explored the activities of like-minded groupings or bilateral arrangements, let alone national contributions such as this series of workshops. Also missing is any analysis of the range of legal instruments from the NPT and Comprehensive Nuclear Test Ban Treaty (CTBT) to the Treaty on the proliferation of Nuclear Weapons (TPNW) in the non-proliferation space, to the various health, safety and environmental instruments that impact on nuclear activities world-wide.

In summary, my key conclusions

- There is a strong case for expanding the contribution of nuclear power to the Asia Pacific energy mix and for greater utilisation of the ever growing range of nuclear technologies.

- Growth of nuclear science and technology will be facilitated by closest collaboration with international nuclear governance infrastructures led by the IAEA.
- High level regional political focus is required to create the environment of confidence necessary for major growth in peaceful nuclear capabilities in Asia Pacific – perhaps the East Asia Summit could be the platform.

As is evident we are continuing the discussion that nations had seventy years ago – namely how to exploit the growing peaceful uses of nuclear energy while eliminating their military uses. Much has been achieved but there is so much more still to be done.