Nuclear Energy post Fukushima: 
Nuclear Governance for the 21st Century

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Introduction

Nuclear governance refers to the institutional arrangements dealing with nuclear energy – in particular treaties, decisions of international bodies and cooperation arrangements – for balancing national and international interests in the areas of nuclear non-proliferation, safety and security. The international interest is not some abstract concept but is essentially the aggregation of the common national interest of all states.

Nuclear activities are a key area of international interest. The international interest in non-proliferation is long-recognised. Nuclear proliferation is a threat to every state – and is also a threat to nuclear disarmament. This international interest is particularly reflected in the Nuclear Non-Proliferation Treaty (NPT) and IAEA (International Atomic Energy Agency) safeguards.

There is also a substantial international interest in nuclear safety and security, though unfortunately less well reflected in international governance arrangements. The Fukushima disaster has reinforced that major nuclear accidents have international consequences. Even if there is no significant transboundary contamination, there will be an impact on public confidence and support for nuclear energy. So, Fukushima led to the German government’s decision to phase out nuclear energy by 2022. A major terrorist incident involving a nuclear facility or nuclear or radiological materials can be expected to have a similar impact.

There is a broader international interest at stake. If governments are serious about greenhouse gas mitigation, nuclear energy must be part of the energy mix – apart from hydropower, nuclear is the only proven low-emission source of base load electricity. But if accidents or other events cause loss of confidence in nuclear energy, so that nuclear is not allowed to realize its potential to contribute to greenhouse gas mitigation, the consequences will be global.

One of the very first issues addressed by the newly established United Nations in 1946 was “the problems raised by the discovery of atomic energy.” Proposals advanced at that time for international control of nuclear activities came to naught. Today nuclear activities are seen as a matter for national sovereignty, except to the extent qualified by treaties. However, the failings revealed by Fukushima – and also Iran’s nuclear activities – show the need for a more appropriate balance between national and international interests.

After the Chernobyl accident, governments and industry realized that substantial steps were needed to regain public confidence. This prompted a series of new agreements – including the Nuclear Safety Convention, the Convention on Early Notification of a Nuclear Accident and the Convention on Assistance in the Case of a Nuclear Accident. After Fukushima, international response so far has been muted. Governments and industry don’t seem to
understand the damage to public confidence and the need for change, to move from state primacy to greater international cooperation and accountability.

Non-proliferation and disarmament

This is the area where international governance is strongest – the NPT, IAEA safeguards, and related treaties and mechanisms – the CPPNM (Convention on the Physical Protection of Nuclear Material), nuclear-weapon-free zones, the CTBT (Comprehensive Nuclear-Test-Ban Treaty), UN Security Council Resolution 1540, the Nuclear Suppliers Group, and so on.

Commitments given under the NPT by non-nuclear-weapon states include not to acquire nuclear weapons, to use nuclear energy exclusively for peaceful purposes, and to cooperate with IAEA safeguards to verify compliance with these commitments. A major new challenge, raised by the Iranian situation, is how to deal with a nuclear program claimed to be peaceful but evidently having a military purpose. Building a break-out capability – the capability to produce nuclear weapons – cannot be considered a peaceful purpose as allowed by the NPT.

When the NPT was concluded it was assumed that IAEA safeguards would provide timely warning of any misuse of nuclear facilities, giving the international community opportunity to intervene. But a combination of factors – the time taken by international deliberative processes, the rapid breakout potential of modern enrichment technology, the lack of success of sanctions on Iran and North Korea – demonstrates the need for new institutional arrangements to better give effect to non-proliferation commitments.

President Obama in his 2009 Prague speech spoke of the need for “a new framework for civil nuclear cooperation … so that countries can access peaceful power without increasing the risks of proliferation.” There are several initiatives in this direction, though so far these have not been drawn together into an overall program or vision.

One aspect is the development of multilateral approaches to the nuclear fuel cycle – meeting the legitimate concerns of states for energy security, spent fuel management and equity without the need for national enrichment and reprocessing programs. As already noted, international operation of the nuclear fuel cycle was proposed unsuccessfully in the 1940s. This was looked at again by INFCE (International Nuclear Fuel Cycle Evaluation) in the 1970s, and the IAEA’s study of proposals for multilateral approaches in 2005.

Current initiatives include: long-term nuclear supply assurances; international fuel banks; and international fuel cycle centres. The first such centre has been established by Russia, at Angarsk. States can become partners in the centre, with assured supply of product and profit sharing. IFNEC (the International Framework for Nuclear Energy Cooperation – successor to GNEP), a collaborative effort by currently 29 participating states and 30 observer states, is working towards practical arrangements for long-term supply assurances, international cooperation on spent fuel management, etc.

Gaining support for multilateralisation of proliferation-sensitive stages of the fuel cycle will be a challenge, but already there are practical precedents – Russia’s international enrichment centre, and the long-established Urenco enrichment group. What is needed now is to change the focus from assertions of national “rights” to the common interests of non-proliferation, energy security and strengthened international cooperation.
Nuclear safety

Compared to non-proliferation, the international role in nuclear safety is weak. The IAEA has only a recommendatory role. The IAEA develops and promotes nuclear safety standards, but these are only voluntary – there is no requirement to adopt these standards.

The principal treaty in this area, the Convention on Nuclear Safety, is described as an “incentive instrument.” Parties are committed to apply fundamental safety principles but there are no detailed or binding standards. When the Convention was negotiated some states proposed an active monitoring role for the IAEA, but this was not agreed. The Convention has a broad peer review process, which requires each party to report on its implementation of the Convention. National reports are discussed at three-yearly meetings.

More specific peer reviews, including at the facility level, are offered by the IAEA and by the non-government World Association of Nuclear Operators (WANO). These reviews fulfil an important role, but they are entirely voluntary – there is no obligation to invite a review or to follow its recommendations.

Fukushima has led to the calling of two high-level nuclear safety meetings – by the IAEA Director General on 20-24 June, and by the UN Secretary General on 22 September. The IAEA meeting resulted in the adoption of an action plan on nuclear safety. However, this plan is seen by a number of states as failing to meet international expectations – containing “few new commitments and little in the way of increased transparency or safety peer reviews”.

A number of states, notably France, proposed mandatory, regular and transparent external safety inspections. This was resisted by the US, India, China and Pakistan, amongst others.

At the September meeting the Secretary General called for “greater transparency and open accountability”, and for stronger international safety standards. French President Sarkozy said that while the IAEA plan was a step in the right direction, the world could not accept different standards. “The highest requirements must be applied to everybody on all continents,” President Sarkozy said. “This must go through a harmonization of technical safety standards.”

Despite the position taken by France and several others, at this stage nuclear safety remains very much a matter of national prerogative. Fukushima shows the risks in this. For example, the IAEA and others had previously identified the issue of inadequate regulatory independence in Japan – only now has the Japanese government accepted this and committed to better arrangements. If a major state like Japan has difficulties with nuclear regulation, as well as emergency management, what is the situation with smaller states, and those planning new nuclear programs?

Currently there is resistance from key states to the idea of binding nuclear safety standards and international safety inspections. While these issues are debated further, a minimal step that should be taken is to strengthen the peer review process, through a commitment by governments to seek more regular and in-depth peer review, and to implement recommendations from peer review. These processes should be transparent, so it is known

\[1\] Quote from Canadian delegate.
where peer reviews have been undertaken and where they have not, and whether recommendations have been acted upon, and if not, why not.

Another action, prompted by Fukushima, would be to strengthen the safety certification process for reactor upgrades. The civil aviation industry demonstrates the value of international cooperation in ensuring effective safety regulation and best safety practice. Aircraft manufacturers’ safety upgrade notices are enforced by regulators around the world. Why shouldn’t the same apply in the nuclear industry?

For the future, governments should consider the possibility of concluding agreements with the IAEA, as is done with safeguards, giving the IAEA an active monitoring role in nuclear safety. Pending agreement on a global approach, states might consider regional arrangements. For example, in regions where there is no experience of operating nuclear power programs, such as the Middle East and South-East Asia, not only could there be close collaboration on regulation, nuclear programs could even be owned and operated on a regional or transnational basis.

**Nuclear security**

In nuclear security, the parallels with nuclear safety are striking. Here too the IAEA is denied a monitoring role. The main treaty, the Convention on the Physical Protection of Nuclear Material and its 2005 Amendment, sets out fundamental principles but not detailed standards. The IAEA issues security guidelines which are only recommendatory. Unlike nuclear safety, there is no mandated peer review process. There are two peer review mechanisms – by the IAEA and more recently by the non-government World Institute for Nuclear Security (WINS). These are entirely voluntary.

The strong international interest in nuclear security is reflected by the Nuclear Security Summit process initiated by President Obama. If terrorists succeed in stealing fissile material in one state, this could pose a threat to other states. There is a lack of transparency in how well states are performing in nuclear security. The international interest could be strengthened through a commitment to regular peer review and to transparency. The need to avoid compromising security measures should not be used as a pretext for avoiding external review. External review is not simply about compliance, but can be vital in identifying overlooked vulnerabilities. It is to be hoped better progress is made on these issues at the next Summit, in Seoul in March 2012.

**Conclusions**

For nuclear energy to make a substantial contribution to global needs this century, it is essential to build confidence that it does not present unacceptable safety, security and proliferation risks. The major lesson of Fukushima – and also the ongoing Iranian situation – is that the 20th century emphasis on national sovereignty is increasingly out of step with international needs for assurance, transparency, accountability and cooperation. Better governance arrangements are needed to ensure a more sustainable balance between national and international interests.