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The Nuclear Fuel Cycle Symposium: Communique

The report of the South Australian Royal Commission (SARC) into the Nuclear Fuel Cycle (NFC) was released on May 5th 2016.

This year, on April 11th, the Australian National University Energy Change Institute, supported by Engineers Australia, the Australian Academy of Science and the Australian Academy of Technology and Engineering, held the first national Symposium to discuss and analyse the SARC's key recommendations and findings.

The Symposium offered participants an opportunity to discuss each element of the nuclear fuel cycle including mining and fuel processing, nuclear power and waste storage. It also considered the NFC in the international context, its economic impact and human capacity implications, and the importance of a social licence to operate.

The Symposium was carried out under the Chatham House rule: the views expressed in this communique reflect the general flow of the discussions and are not attributable to particular individuals or organisations.

Symposium finding: Discussion and analysis of the SARC's 12 recommendations revealed general support for those findings. The Symposium therefore recommended the establishment of an ACOLA working group to build on the findings of the Royal Commission, and to continue developing the case for removing legislation that inhibits an evidence-based discussion of Australia's potential role in the NFC.

The Symposium was of the view that legislated prohibition is inconsistent with widespread government practice of supporting technology neutrality, and is an inhibiting factor in the free and open discussion of options available to society. Removing legislated prohibitions would provide a level playing field on which such discussions could take place, allowing the extent of the social license to operate in each element of the NFC to be more freely evaluated.

The Symposium generally supported the following relevant SARC recommendations:

Recommendation 6. *“Remove at the state level, and pursue removal of at the federal level, existing prohibitions on the licensing of further processing activities, to enable commercial development of multilateral facilities as part of nuclear fuel leasing arrangements.”*

Recommendation 8. *“Pursue removal at the federal level of existing prohibitions on nuclear power generation to allow it to contribute to a low-carbon electricity system”.*

Recommendation 12. *“Remove the legislative constraint in section 13 of the Nuclear Waste Storage Facility (Prohibition) Act 2000 that would preclude an orderly, detailed and thorough analysis and discussion of the opportunity to establish such facilities in South Australia”.*

Brief overviews of the different elements of the discussions during the Symposium are provided below under the Symposium topic headings.

Mining & fuel processing

Both panel and participant discussion indicated general agreement with the evidence that uranium exploration and mining industry in South Australia would be economically beneficial.

Regarding exploration, it was recognised that the problem of “cover” is significant. In a large proportion of the state, and indeed across Australia, the prospective uranium ores are covered by younger rocks and sediments that make exploration difficult. Therefore, the provision of pre-competitive geological and geophysical data that can help exploration firms assess the probability of recoverable uranium ore from under this cover will be critical to future exploration.

The current low price of uranium is an inhibitor worldwide to exploration. South Australia and Australia generally have an international competitive advantage in using their technologies and datasets to enable lowest cost exploration and mining.

In view of this, and the SARC recommendations, the South Australian Government is now increasing investment in pre-competitive data and in new technologies for exploration.

Symposium finding: The prohibitions in some other States on the exploration and economic assessment of uranium resources are significant barriers that prevent evaluation of a key national resource, and should be removed (as part of the general removal of legislated prohibitions).

Land access was identified as another issue, with the link being made on a number of occasions between the ability to access land for exploration and social licence to operate issues.

Working with local communities, landowners and local indigenous communities connected to the land, to gain their trust and support for NFC activities (whether mining or storage of radioactive waste), should be achieved through building relationships and working together, as well as benefits packages for impacts on livelihoods and lifestyles.

In contrast, the Symposium’s discussion of the economic case for commercialising fuel enrichment as part of the NFC drew the general view that although waste storage could potentially provide a substantial economic benefit, there was no economic case for separate participation in uranium processing such as conversion and enrichment.

Nuclear power

An overarching finding of the Symposium was that a bipartisan national energy policy is needed that delivers a low carbon, reliable and cost-effective energy system. This will require balancing the attributes of all energy sources as no single energy source satisfies all these requirements. Coal may provide firm supply but has high carbon emissions; gas is cleaner but supplies are limited and increasingly costly. Nuclear by comparison generates no carbon emissions, but is relatively high cost. Renewables like wind and solar are also zero emission and are low cost, but cannot guarantee supply without significant additional investment in over-capacity, storage and transmission.

The question then becomes: will renewables remain the lowest-cost, zero-carbon emission source of electricity when compared with nuclear power? An integrated whole-of-system approach is therefore needed to determine an electricity system that can strike the right balance between the three prerequisites of low emissions, security and affordability.

However, with the current legislative prohibitions effectively preventing any further investigation of nuclear as an option, it is impossible to develop a technology-neutral national energy policy that considers all the available options for power generation in Australia.

The Symposium therefore generally supported the recommendation of the SARC that there should be no legal impediments to nuclear power in Australia.

With the view that nuclear power is a mature low carbon technology, albeit with high up front capital cost, the Symposium generally agreed with the SARC that if there is a need for more rapid deep decarbonisation, then nuclear may be required as a potential future energy supply option.

The Symposium also noted that although a large scale nuclear reactor may not be commercially viable for SA or some other locations, alternatives such as modular nuclear reactors may be considered as an entry level investment that can be scaled up.

Waste storage

The Symposium noted that Australia is already part of the NFC, and has international obligations to store and manage its own waste products responsibly. The current national radioactive waste arrangements are unsustainable in the long term, and the need for a national low-level waste disposal and intermediate-level waste storage facility is clear. Australia has the capability to construct and operate in the long term, a national facility for its own radioactive waste.

Separately, as recommended by the SARC report, the Symposium saw potential merit in establishing a radioactive waste storage and disposal facility in Australia for waste generated overseas.

The geological and hydrological conditions in Australia, for example the stability of the geology and the sparsity of underground water in South Australia, provide ideal preconditions for a high-level waste repository. This, coupled with the development of low risk methods of storage and disposal in other countries such as Finland and Sweden, yielded general support from the Symposium for SARC recommendation 11 to:

“Pursue the opportunity to establish used nuclear fuel and intermediate level waste storage and disposal facilities in South Australia....”.

Given the global need and economic opportunity for a commercial waste facility in South Australia, the Symposium generally supported the removal of legislated prohibitions that currently rule out this option.

Waste storage would have significant non-proliferation benefits, by removing the rationale for national reprocessing programs for used fuel management reasons, and by removing national accumulations of used fuel which would otherwise be available for reprocessing in the future.

Waste storage as part of a fuel leasing arrangement was also explored. Guaranteed supply of fuel assemblies under an international leasing arrangement would benefit non-proliferation by removing the rationale for national enrichment programs. Leasing would be more attractive if it included used fuel take-back. Although it was noted that while the uranium mining industry has in the past been reluctant to embrace this capability, it remains open to investigating this opportunity as part of establishing a waste management industry.

Economic impact and human capacity

The Symposium was of the view that the greatest economic impact of participation in the NFC would be from the storage and disposal of international nuclear waste.

While there was some disagreement over the level of profitability that an international waste repository might generate, it was still clear that the economic benefit would be substantial even if economic returns were significantly less than those projected by the SARC. A key issue is that construction should only proceed if sufficient take-or-pay contracts have already been signed.

The Symposium also noted that Australia does not currently have sufficient human capacity to support all areas of the NFC. However, this could be ramped up over time by training Australian nationals, and also by importing expertise through targeted overseas recruitment and immigration.

International context

The Symposium generally agreed that engaging with international organisations in the nuclear fuel cycle provides Australia with a role in important decision making processes, such as nuclear non-proliferation. The Symposium also generally agreed that international engagement and collaborative partnerships will help build the skills needed by Australian nuclear regulatory bodies.

Further, as a major supplier of uranium, the Symposium believed that there was a responsibility for Australia to contribute to international responses to nuclear non-proliferation and safety issues.

The Symposium also welcomed increased opportunities for international engagement arising from Australia's participation in nuclear research through fora such as the Generation IV International Forum and ITER.

Social licence to operate

The Symposium explored the social constructs relating to the attitudes towards nuclear energy in Australia, which are different to some comparator countries internationally.

The current understanding of nuclear issues in Australia is often not based on empirical evidence and data, but rather on political and ideological beliefs and sentiments. The Symposium agreed that education is the one way that may help to build greater understanding in the community of elements of the NFC in Australia.

The Symposium noted that distributed fairness and procedural fairness were critical for building trust and acceptance. Similarly, confidence in government to be able to manage the associated risks of the industry to both individuals and the environment was also seen as important.

Finally, the Symposium generally agreed that a social licence to operate will not be achieved quickly. It will take time, transparency and extensive consultation.

Symposium Finding: Given that social license to operate is a key theme in all aspects of the NFC, the Symposium recommends that expertise in the humanities and social sciences be engaged to study the evolution and determining factors for public opinion on nuclear issues in Australia. This could be facilitated by engaging the Australian Academy of the Humanities (AAH) and the Academy of Social Sciences in Australia (ASSA) to propose jointly with the co-sponsors of the Symposium, an ACOLA research project on the NFC social license to operate as an extension of their original 2010 study (<http://acola.org.au/wp/PDF/Archive/NAF-NuclearAttitudes.pdf>).