

## **SUBMISSION TO THE JOINT STANDING COMMITTEE ON TREATIES (JSCOT) CONCERNING AUSTRALIA'S ACCESSION TO THE FRAMEWORK AGREEMENT FOR INTERNATIONAL COLLABORATION ON RESEARCH AND DEVELOPMENT OF GENERATION IV NUCLEAR ENERGY SYSTEMS**

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I make this Submission in good faith and in a personal capacity only. I am not employed by, nor do I represent, any vested interest, commercial or otherwise. I am a chemical engineer, holding degrees in applied science, chemical engineering and business administration, plus post-graduate qualifications in environmental studies and energy studies. I am a Fellow of the Institution of Chemical Engineers, a Chartered Scientist of the UK Science Council, a Fellow of the Australian Academy of Technological Sciences and Engineering, and a Foundation Fellow of the Australian Institute of Company Directors.

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### **Executive Summary**

As a student of Australia's involvement in nuclear technology, I strongly endorse this proposal for Accession to the Framework Agreement for International Collaboration on Research and Development of Generation IV Nuclear Energy Systems.

Australia's existing nuclear agencies do good work, which is no doubt the reason for this invitation to join the Generation IV International Forum as a full member. However, it is embarrassing that Australia does not itself use nuclear energy for electricity generation -- our most pressing need for deep decarbonisation of the economy. This must be corrected.

### **Discussion**

This Submission takes as its starting point the National Interest Analysis (2017) with Attachment on Consultation concerning Australia's Accession to the Framework Agreement under reference. Certain of the numbered points in the ' Overview and National Interest Summary ' Pages 3,4 and 5 will be discussed briefly as shown below.

**5. Accession to the Agreement will allow Australia to participate fully in the work of the Generation IV International Forum ("GIF"). Australia's participation in GIF will enable Australia to benefit from the activities of this major international research program, which aims to develop the next generation of nuclear reactor technologies, thereby furthering Australia's non-proliferation and nuclear safety objectives.**

This enabling of full participation by Australia in the work of the Forum, which aims to *"...develop the next generation of nuclear reactor technologies, thereby furthering Australia's non-proliferation and nuclear safety technologies "* is to be applauded, but it raises the question -- how can this be fully useful if the *"...next generation of reactor technologies"* is not able to be applied to the production of emissions-free electricity in Australia because of the existing 20 year old ban on nuclear power generation ?

This ban is making us look outdated and hypocritical, and should be removed as part of Australia's accession to this Agreement. The need for this to happen should be made clear in the Committee's report to Parliament.

The accession to the Agreement should be widely publicised so that the Australian community is made fully aware of the important work of our nuclear agencies, and can be comfortable about extending this work to the use of modern nuclear power technology for the generation of clean electricity within Australia itself.

**6. Accession to the Agreement will have important benefits for Australia from a security, economic and political perspective. It will improve the Australian Government's awareness and understanding of nuclear energy developments throughout the region and around the world, and contribute to the ability of the Australian Nuclear Science and Technology Organisation (ANSTO) to continue to provide timely and comprehensive advice on nuclear issues.**

*"Accession to the Agreement will have important benefits for Australia from a security, economic, and political perspective."* I agree strongly with this, and again, emphasise that these benefits should be made known to the Australian public.

**7. Accession to the Agreement will also benefit Australia in other important international nuclear fora, most notably the IAEA. Australia holds a permanent position on the preeminent policy making body of the IAEA, its 35-member Board of Governors. This position is held on the basis that Australia is the most advanced in nuclear technology in our Regional Group – South-East Asia and Pacific (SEAP). This assessment is periodically reviewed by the Group. No other member of SEAP is currently a member of GIF or is likely to join in the near future, so accession to the Agreement would further strengthen our claim as the most advanced nuclear country in SEAP, and accordingly as its permanent member of the Board of Governors.**

I agree. No doubt this is a fitting recognition of the international reputation of our nuclear agencies, which can now be reinforced through leadership of the South-East Asia and Pacific Regional Group. However leadership brings with it responsibilities, which will require Australian governments of all persuasions to ensure that adequate funding and political support is maintained for this advanced research and development.

**8. Membership of GIF requires all Parties to cooperate in efforts to develop next generation nuclear energy systems that can help meet the world's future energy needs. Generation IV designs will use fuel more efficiently, reduce waste production, be economically competitive, and meet stringent standards of safety and proliferation resistance**

This is an excellent statement of important global directions towards decarbonisation of energy systems. In Australia, it should be used by all political leaders in a unified and firm public declaration that will encourage social acceptance of advanced nuclear power systems as an option to power our economy. Unequivocal joint leadership on this issue is required.

**9. The Agreement provides a framework for initiating international cooperation that is considered essential for timely progress in the development of Generation IV reactor systems. This cooperation makes it possible to pursue multiple systems and technical options concurrently and to avoid any premature elimination of potential reactor designs due to the lack of adequate resources at the national level.**

I agree completely with this statement. Australia has to overcome its poor international reputation of being willing to sell uranium to others, but refusing to use it for emissions-free power at home. We need to establish high-profile international collaboration to catch up with what other countries are doing.

For example, in recent weeks, Jordan and Saudi-Arabia have signed Agreements on cooperation to mine for uranium and carry out a feasibility study into the construction of two Small Modular Reactors (SMRs) in Jordan. (World Nuclear News, April 2017).

Two generating companies are looking at implementing a fleet of SMRs across Canada to fill 'gaps' in clean energy supply while meeting GHG reduction targets not unlike those of Australia. (Nuclear Energy Insider, April, 2017).

China and Thailand have signed an Agreement to cooperate on the peaceful use of nuclear energy in which China has undertaken *"....to provide Thailand with the most advanced , most economical, and safest nuclear power technology as well as equipment, management experience, and quality service. It will also provide training for hundreds of Thai nuclear professionals and technical personnel. "* (World Nuclear News, April, 2017).

In addition, the Chinese Academy of Sciences and the US Department of Energy have a Nuclear Energy Cooperation Memorandum of Understanding which is aimed at faster implementation of advanced nuclear technology for electricity generation.

The Australian community cannot continue to be unaware of these and other important developments which are setting the scene for our future, especially in the Asian region. It is incumbent on the political class to bring these matters to the attention of the Australian people, and engage them in informed dialogue about future energy choices.

**10. Accession to the Agreement will facilitate Australian technical cooperation with the 10 existing Parties: Canada, Euratom (European Atomic Energy Community), France, Japan, People's Republic of China, Republic of Korea, Republic of South Africa, Russian Federation, Switzerland and the United States. It is also contribute to maintaining and improving international relationships in research, energy and the peaceful uses of nuclear technology.**

Australia is joining an exclusive club -- a credit to all those who have helped to get it this far. What is needed now is the political will and joint cooperation to raise this to its appropriate level on the domestic stage so the community can be fully informed. If this is done, I have no doubt that many learned groups in Australia would be willing to help build the social licence necessary to implement modern nuclear technology as a component of our energy systems for the long haul.

**11. Membership of GIF requires unanimous approval of the existing Parties, which was granted to Australia at a meeting of the GIF Policy Group in Paris in April 2016. Approval followed a lengthy nomination process that required Australia to demonstrate that it could contribute to the research and development goals of the GIF in a unique and substantive way. Approval is recognition, in particular, of Australia's world-leading capabilities in materials engineering for extreme industrial environments and the development of nuclear safety cases.**

Gaining unanimous approval of the 10 existing Parties is an outstanding achievement, and should be widely publicised in the Australian community.

**14. The objectives of the Agreement are to collaborate to foster and facilitate achievement of the purpose and vision of the GIF: the development of concepts for one or more Generation IV Systems. Forms of collaboration may include, but are not limited to (as per Article II of the Agreement): --**

- a. joint research and technology development;**
- b. exchange of technical information and data on scientific and technical activities and methods and results of research and development;**
- c. support for the organization of technological demonstrations;**
- d. conduct of joint trials/experiments;**
- e. participation of staff (including scientists, engineers, and other specialists) in experiments, analysis, design and other research and development activities conducted at research centres, academic institutions, laboratories and other facilities;**
- f. exchange or loan of samples, materials and equipment for experiments, testing and evaluation;**
- g. organization of, and participation in, seminars, scientific conferences and other meetings;**
- h. monetary contributions to the deployment of necessary experimental facilities; and**
- i. training and enhancing the skills of scientists and technical experts.**

We need to get cracking on all of these activities, especially “....*training and enhancing the skills of scientists and technical experts.*” To advance this purpose in a modest way, I have instituted the *Barry Murphy Scholarships in Nuclear Energy* at the University of Queensland, whereby two outstanding engineering students each year will have the opportunity to spend a semester at a leading overseas University or Institution to learn more about advanced nuclear power technology, and bring that knowledge back to Australia.

## **Conclusion**

The objectives of the Framework Agreement encapsulate a broad spectrum of involvement with leading research communities in the advanced nuclear power area. Participation by Australia can only be to our great benefit, not only to receive leading-edge information and experience, but also to contribute.

This needs to be publicised by Government and Opposition, which hopefully will act as a stimulus to all sides of politics to encourage social acceptance of advanced nuclear power as an option for our clean energy future.

I strongly support Australia's accession to the Framework Agreement, and encourage the Joint Committee to endorse it.

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