



Submission to the Inquiry into the prerequisites for nuclear energy in Australia

Addressed to:

Committee Secretary
Standing Committee on Environment and Energy

By email: Environment.Reps@aph.gov.au

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Contributors

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Confidentiality

This submission does not need to be kept confidential and may be made public.

Thank you for the opportunity to comment on matters relating to nuclear energy. We do so in our capacity as representatives of the Science Party where our aim is to improve quality of life and drive society towards the pursuit of knowledge for the benefit of all of humanity.

Summary

The politicisation of nuclear power is incredibly unfortunate for Australia's energy policy debate. In a world of both growing energy demands and a pressing need for decarbonisation, all reasonable options must be on the table.

Common criticisms of nuclear power is that it is dangerous, slow and expensive. As a form of electricity generation, nuclear is very safe. We support the existing Australian Radiation Protection and Nuclear Safety Act 1998 (ARPANS Act) and Environmental Protection and Biodiversity Act 1999 (EPBC Act) minus the prohibitions on nuclear energy. We also support furthering global efforts towards nuclear disarmament. While nuclear power plants are slow and expensive to build, these are not good reasons for them to be illegal.

If the ship has sailed on existing modes of nuclear fission providing power for Australia, so be it. We should still aspire to advancement in nuclear fission and fusion technology to power our future. A low-carbon future will entail substantial increases in electricity demand as we electrify our transport systems, increase our materials recycling efforts to reduce resource extraction and waste to landfill, and draw down atmospheric carbon. Nuclear power should be considered as a technology that can play a role in decarbonising our economy.

A significant practical barrier to nuclear power in Australia is the lack of expertise in the field. This is a chicken-and-egg situation, in that the absence of a local nuclear power industry attracts no talent, and without professionals in the field, such capacity will not be built.

None of this is to be read as support for a nationalised nuclear power industry. We do believe, however, that the Australian government should support energy research as a matter of priority, and this would include nuclear power research when nuclear power installations become legal.

Recommendations

- **Recommendation b1:** Amend the definition of "nuclear installation" under section 13 of the ARPANS Act to include a nuclear power plant, to remove ambiguity about the Australian Radiation Protection and Nuclear Safety Agency's role in regulating such an installation.
- **Recommendation b2:** Legalisation of nuclear power in Australia must be accompanied by funding to the relevant regulatory bodies as necessary to maintain safety.
- **Recommendation d1:** Instate a price on greenhouse gas emissions.
- **Recommendation h1:** Review relevant legislation to ensure that upon legalisation of nuclear power, there is provision to disallow any nuclear power installation that would prejudice national security.
- **Recommendation j1:** Repeal Section 140a of the Environmental Protection and Biodiversity Act 1999.
- **Recommendation j2:** Repeal Section 10 of the Australian Radiation Protection and Nuclear Safety Act 1998.

Terms of reference and direct responses

a. waste management, transport and storage

Waste management must be the responsibility of the operator, in compliance with all relevant safety standards. Australia can learn from other countries' experiences regarding disposal of spent nuclear reactor fuel.

b. health and safety

Nuclear power is not an untested technology — 450 fission reactors in 35 countries represent 5.7% of the world's electricity generation capacity¹. Nuclear is considerably less harmful to human health than fossil fuel electricity generation methods². We recognise that the advent of an Australian nuclear power industry could require new administrative overheads and that the workload might fall to the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA). Resourcing ARPANSA to do this work would be an investment in a new high-tech industry for Australia.

Recommendation b1: Amend the definition of "nuclear installation" under section 13 of the ARPANS Act to include a nuclear power plant, to remove ambiguity about the Australian Radiation Protection and Nuclear Safety Agency's role in regulating such an installation.

Recommendation b2: Legalisation of nuclear power in Australia must be accompanied by funding to the relevant regulatory bodies as necessary to maintain safety.

c. environmental impacts

Lack of water, air, or soil pollution during normal operation makes nuclear power substantially safer for human and animal life than fossil alternatives. Nuclear power, like wind and solar power, produces very low carbon dioxide emissions over its life cycle³.

Along with the negative impacts of greenhouse gas and particulate emissions, we must also consider direct destruction of the natural environment. Per unit of electricity produced, nuclear uses similar or less land area than coal or gas, and considerably less than solar^{4,5}. While solar and wind power infrastructure is compatible with grazing, for example, this is not true of coal- or gas-fired power plants. Thus, nuclear power combines low-carbon electricity generation with low land use.

One concern for the Australian context is the large volume of cooling water required which may limit appropriate locations for reactors.

As with waste management, site remediation after decommissioning must be the responsibility of the operator.

¹ *Nuclear Technology Review 2019*, International Atomic Energy Agency. p7
(<https://www.iaea.org/sites/default/files/gc/gc63-inf2.pdf>)

² Markandya A & Wilkinson P (2007) 'Electricity generation and health'. *The Lancet*, 370:9591
DOI:10.1016/S0140-6736(07)61253-7)

³ Pehl M et al. (2017) 'Understanding future emissions from low-carbon power systems by integration of life-cycle assessment and integrated energy modelling'. *Nature Energy*, 2:12 DOI:10.1038/s41560-017-0032-9

⁴ *Global Land Outlook*, United Nations Convention to Combat Desertification (2017) p216
(https://www.unccd.int/sites/default/files/documents/2017-09/GLO_Full_Report_low_res.pdf)

⁵ *The Footprint Of Energy: Land Use Of U.S. Electricity Production*, Strata (2017)
(<https://www.strata.org/pdf/2017/footprints-full.pdf>)

d. energy affordability and reliability

The high capital cost of nuclear power as well as its inflexible nature makes it ill-suited to the task of reducing bills for Australian consumers.

However, nuclear power is more competitive compared to fossil fuels in jurisdictions with a price on carbon emissions. The Science Party supports a cap-and-trade scheme for greenhouse gas emissions in any case, to price the negative externalities of this type of pollution.

Recommendation d1: Instate a price on greenhouse gas emissions.

Regarding reliability, nuclear typically has a high degree of availability compared to other energy sources. However, risk management is needed for the occasional trip of nuclear units, as their large size makes them the largest single contingency in any network. This can be managed with adequate provisions of fast acting battery reserves or load shedding.

e. economic feasibility

Given the high cost of construction and long lead time to electricity production it is unlikely that nuclear energy as we know it would be economically feasible without substantial government subsidies.

“Is nuclear power economically viable?” is not a question that should concern a government that positions itself as a champion of the free market. If that question were relevant, the same government should be looking to ban all financially unsound investments, which might include new large thermal coal projects. The relevant question is, “Should nuclear power be kept illegal?”

In the long term, advanced nuclear technologies may become more competitive, and Australia should position itself to be ready for that possibility.

f. community engagement

Our support for legalising nuclear energy does not mean we agree with misinformed suggestions to build nuclear power plants in sparsely-populated parts of Australia without concern for environmental or community impacts. Proposals to build nuclear infrastructure must be as acceptable to the local community as any other proposal before going ahead, and it is our understanding that the role of the current EPBC Act is to protect environmental interests.

g. workforce capability

Staffing an Australian nuclear industry would likely involve both training locals and allowing immigration of people with relevant skills. Once established, nuclear facilities will themselves provide training capabilities to sustain a workforce.

Lack of expertise is perhaps the greatest practical barrier to an Australian nuclear industry, but like expense, this is not a reason to ban nuclear energy unless it is thought we could never have the expertise to safely operate nuclear power facilities.

h. security implications

No nuclear facility should be built if it is prejudicial to Australia's national security. If section 8 of the ARPANS Act⁶ is not sufficient to ensure this outcome, then amendments should be made in the interests of the security of any nuclear installation.

Recommendation h1: Review relevant legislation to ensure that upon legalisation of nuclear power, there is provision to disallow any nuclear power installation that would prejudice national security.

Regarding nuclear weapons: Australia should reaffirm its commitment to a world without them. If it will not ratify the Treaty on the Prohibition of Nuclear Weapons, Australia should strongly promote the Nuclear Non-Proliferation Treaty and pursue the Comprehensive Nuclear-Test-Ban Treaty.

i. national consensus

A 2015 poll reported that 40% of respondents supported nuclear power and 40% opposed it (with the remainder unsure)⁷. This seems to represent a rebound from increased opposition to nuclear power after the Fukushima Daiichi disaster in 2011⁸. Nuclear has recently grown in popularity according to the Australia Institute's 'Climate of the Nation' report, which asks respondents to choose their three most preferred energy sources. Nuclear featured in 17% of respondents' top three in 2018⁹, and 22% of respondents' top three in 2019¹⁰.

j. any other relevant matter.

Aside from allowing nuclear to be considered for Australia's energy mix, a further reason to legalise nuclear power generation is that it would allow research into new technologies, such as newer-generation fission reactors and nuclear fusion, which currently cannot be conducted in Australia. Small modular reactors might power the world by mid-century, or some other technology might represent the global energy future. Nuclear fusion power will always be thought to be 30 years away until it arrives, and that will happen through sustained research. Nuclear technologies are common in spacecraft propulsion as well.

If Australia places itself at the forefront of energy research, Australia will be among the first to benefit from these discoveries. Our final recommendations are to repeal legislation that makes nuclear power illegal in Australia:

Recommendation j1: Repeal Section 140a of the Environmental Protection and Biodiversity Act 1999.

Recommendation j2: Repeal Section 10 of the Australian Radiation Protection and Nuclear Safety Act 1998.

⁶ Australian Radiation Protection and Nuclear Safety Act 1998 (<https://www.legislation.gov.au/Details/C2016C00977>)

⁷ Essential Research (<https://www.essentialvision.com.au/nuclear-power-plants-4>)

⁸ Bird DK et al. (2014) 'Nuclear power in Australia: A comparative analysis of public opinion regarding climate change and the Fukushima disaster'. *Energy Policy* 65. DOI:10.1016/j.enpol.2013.09.047

⁹ *Climate of the Nation 2018*, The Australia Institute, p11 (<https://www.tai.org.au/content/climate-nation-2018>)

¹⁰ *Climate of the Nation 2019*, The Australia Institute, p11 (<https://www.tai.org.au/content/climate-nation-2019>)