



## **AUSTRALIAN NUCLEAR ASSOCIATION INC.**

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### **Submission to Independent Review of the Environment Protection and Biodiversity Conservation Act**

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#### **1. AUSTRALIAN NUCLEAR ASSOCIATION**

The Australian Nuclear Association is an independent incorporated scientific institution with members from the professions, business, government and universities with an interest in nuclear science and technology. Many of our members are professional scientists and engineers with considerable experience and expertise in nuclear issues.

#### **2. Discussion Paper: Question 4 *Should the matters of national environmental significance within the EPBC Act be changed? How?***

The EPBC Act 1999 defines protection of the environment from “nuclear actions” as a matter of national environmental significance. Under Section 21(1) of the Act, “A constitutional corporation, the Commonwealth or Commonwealth agency must not take a nuclear action that has, will have, or is likely to have a significant impact on the environment”. This is a very broad requirement and even duplicates environmental impacts that would normally be the responsibility of the States and Territories. For no other matter of national environmental significance listed in the Act is there a requirement to assess all environmental impacts.

It is anomalous that a nuclear action triggers a referral to the Minister under the EPBC Act when there is no similar automatic referral for actions associated with any other major industry even those dealing with hazardous materials. Matters of national environmental significance should be based on the possible impact on matters of environmental significance and not by the industry a project happens to be in.

The inclusion of “nuclear actions” in the EPBC Act is viewed by ANA as a political or community-based consideration and not a technical consideration of environmental risk from the point of view of safety or environmental protection.

Under the Australian Constitution, the States have the primary responsibility for environmental protection. The Australian Government environment Minister only has

authority over the nine defined matters of national environmental significance which have been given to the Commonwealth by agreements with the States<sup>1</sup>.

The Commonwealth Minister cannot intervene in non-nuclear actions if they have no significant impact on one of the other eight matters of national environmental significance, even though there may be other undesirable environmental impacts. This is not because these other environmental matters are not important but because for other industries the environmental assessment and approval is a State or Territory responsibility.

The Heads of Agreement on Commonwealth and State roles and responsibilities for the Environment (COAG 1997) includes the following statement related to nuclear activities<sup>2</sup>.

### **6. Nuclear activities**

*The Commonwealth has a responsibility and an interest in relation to the assessment and approval of mining, milling, storage and transport of uranium and the development and implementation, in consultation with the States, of codes of practice as provided under the Environment Protection (Nuclear Codes) Act 1978 for protecting the health and safety of the people of Australia, and the environment, from possible harmful effects associated with nuclear activities.*

This agreement with the States and Territories allows the Commonwealth to have responsibility for assessing the environmental impact of some “nuclear activities”. The existing agreement does not specifically include nuclear power plants, but States and Territories are likely to accept a Commonwealth role in assessing and approving environmental and safety nuclear aspects of nuclear power plants.

The list of nuclear actions and nuclear installations in Section 22 of the Act should be updated so that the Act only requires referral for nuclear activities with potential significant impact.

#### **2.1 Uranium mining should not be a matter of national environmental significance**

The EPBC Act requires Commonwealth to approve the environmental impact of mining and milling of uranium ore. Assessing and approving the environmental impact of uranium mining should be the responsibility of the States and Territories as are all other mining activities.

The risks, hazards and environmental impact of uranium mining are similar to those of other mines already regulated and licenced in Australia. A uranium mine also needs to meet the existing State and Territory radiation safety regulations which apply to workers at the mine and the public. Radiation regulations for mining uranium are very well established and already applied in other industries managing radioactive materials and at mine sites with significant naturally occurring radioactivity.

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<sup>1</sup> <https://www.environment.gov.au/epbc/publications/factsheet-epbc-act-frequently-asked-questions>

<sup>2</sup> <https://www.environment.gov.au/resource/heads-agreement-commonwealth-and-state-roles-and-responsibilities-environment>

Even if the mandatory referral of uranium mining is removed, a proposal for a uranium mine might still come under the EPBC legislation if it triggers one of the other matters of national significance such as wetlands, heritage or threatened species.

**The Australian Nuclear Association (ANA) recommends that the “mining and milling of uranium” ore be removed from the list of nuclear actions in the EPBC Act and that uranium mining be regulated as any other mining project.**

## **2.2 Nuclear Power Plants should be included in the list of nuclear installations in Section 22 of the EPBC Act and prohibitions against certain nuclear actions (Section 37J) and nuclear installations (Section 40A) should be removed.**

The EPBC Act 1999 does not include nuclear power plants in the list of nuclear installations covered by the Act in Section 22 and the prohibits the Commonwealth Minister making any declaration about certain nuclear actions (Sections 37J) or approving certain nuclear installations (Section 40A).

### ***37J. No declarations relating to nuclear actions***

*The Minister must not make a declaration relating to an action consisting of, or involving the construction or operation of, any of the following nuclear installations:*

- (a) a nuclear fuel fabrication plant;*
- (b) a nuclear power plant;*
- (c) an enrichment plant;*
- (d) a reprocessing facility.*

and

### ***140A. No approval for certain nuclear installations***

*The Minister must not approve an action consisting of or involving the construction or operation of any of the following nuclear installations:*

- (a) a nuclear fuel fabrication plant;*
- (b) a nuclear power plant;*
- (c) an enrichment plant;*
- (d) a reprocessing facility.*

These prohibitions on actions of the Commonwealth Minister appear to leave environmental assessment of these nuclear installations to State and Territory governments.

It is anomalous that the Commonwealth should have a role in assessing “a nuclear reactor for research or production of nuclear materials for industrial or medical use” (Section 22) but have no role in assessing the environmental impact should a nuclear power plant be built in Australia. Other countries with federal systems like the USA and Canada have national nuclear regulators for nuclear facilities including nuclear power plants.

The International Atomic Energy Agency safety standard on the governmental, legal and regulatory framework for safety requires<sup>3</sup>:

***Requirement 1: National policy and strategy for safety***

*The government shall establish a national policy and strategy for safety, the implementation of which shall be subject to a graded approach in accordance with national circumstances and with the radiation risks associated with facilities and activities, to achieve the fundamental safety objective and to apply the fundamental safety principles established in the Safety Fundamentals*

The setting of national policy on nuclear safety in Australia should be the responsibility of the Commonwealth Government through the APANS Act, not the EPBC Act.

The nuclear power industry is a mature and well recognised industry overseas and there is a strong likelihood of nuclear power plants being considered for use in Australia. The acceptance of operating nuclear power plants overseas demonstrates the absurdity of having a blanket ban on nuclear energy technology. Australia must consider nuclear energy on its merits and repeal the arbitrary prohibitions against a whole technology.

Nuclear power plants are already used in most developed and many developing countries as reliable, safe and low-carbon generators of electricity. At the end of 2019, there were about 447 nuclear power plants in service in 30 countries and about 52 nuclear power plants under construction<sup>4</sup>. In 2018, nuclear provided 10.2% of the global electricity and about 18% of the electricity of OECD countries<sup>5</sup>.

Nuclear energy contributes to the reliability of electricity supply in those countries that operate nuclear power plants. Nuclear power plants are very reliable; they operate at a high capacity factor – in 2018 the global average capacity factor was 79.8%<sup>6</sup> - and provide dispatchable electricity 24 hours per day.

Nuclear energy is clean energy, the nuclear power station emits no carbon emissions and very little other air pollutants. Some carbon is emitted in mining uranium and manufacturing nuclear fuel emissions and this is included in the life cycle emissions. Working Group III of the Intergovernmental Panel on Climate Change (IPCC) found that the life cycle carbon emissions from using nuclear energy are very low: very similar to carbon emissions from wind and less than the emissions from solar PV<sup>7</sup>.

In 2018, nuclear power plants around the world produced 50% more clean electricity than wind and solar combined<sup>8</sup>. In the European Union and USA, nuclear produces more low carbon electricity than hydro. The very low carbon emissions of nuclear power greatly assist

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<sup>3</sup> IAEA Safety Standards Series No. GSR Part 1 (Rev. 1). *Governmental, Legal and Regulatory Framework for Safety - General Safety Requirement 2016*

<sup>4</sup> IAEA Database on Nuclear Power Reactors, <https://pris.iaea.org/pris/> Accessed on 29<sup>th</sup> January 2020..

<sup>5</sup> *Electricity Information Overview 2019 Edition*, International Energy Agency 2019

<sup>6</sup> *World Nuclear Performance Report 2018*. World Nuclear Association, 2019

<sup>7</sup> Table A.III.2 in *Technology-specific Cost and Performance Parameters*. Annex III in: *Climate Change 2014 Mitigation of Climate Change*, Intergovernmental Panel on Climate Change (IPCC), 2014

<sup>8</sup> *Electricity Information Overview*, International Energy Agency 2019. Page 4.

countries using nuclear energy to reduce their carbon emissions and meet their international commitments.

Nuclear power is economic in many countries and most modern nuclear power plants are being built in a timely manner and to budget.

The cost of electricity from nuclear power plants is competitive with coal and firmed renewables in many countries, although probably not with coal in Australia unless nuclear receives financial or market benefits for being carbon-free. In the USA nuclear cannot compete with the low cost of gas although several US States have recognised the benefits of supporting their nuclear power plants to help meet carbon emission targets.

We dispute the assertion of some commentators that the cost of nuclear energy is so high that nuclear energy will never be considered for use in Australia and this is a reason to continue the prohibitions. If nuclear power plants are not competitive in Australia, they will not be built and there is no need to have legislative prohibitions.

The overnight capital costs of nuclear power plants recently built and under construction in the USA and Western Europe have been between US\$6000 and US\$8500 per kilowatt (2017 dollars)<sup>9</sup>. Most of these power plants are first of a kind design and costs suffered because of changes in design during construction and lack of an experienced supply chain. In contrast, nuclear power plants in Asia are being built on time and to budget at overnight capital costs less than US\$5000 per kilowatt<sup>10</sup>.

The US National Renewable Energy Laboratory estimates the overnight capital cost of advanced nuclear power plants in the USA to be US\$6200 per kilowatt (2017 dollars) based on two AP1000 nuclear power plant units being built on a brownfield site<sup>11</sup>.

Two APR1400 power reactors are under construction at Shin-Kori South Korea at a cost of US\$8.6 billion. When adapted for Australian materials and labour rates plus enabling infrastructure the overnight capital cost is about A\$7000 per kilowatt.

The new designs of Small Modular Reactors (SMRs) now being assessed overseas have the potential to be factory-built which could reduce the capital cost and construction time.

These overseas costs indicate that a nuclear plant could be economic for Australia and there is no reason to prohibit nuclear based on perceived costs. Nuclear power plants for Australia are likely to be of a modern design, recently built overseas and have design, construction and operation licences from the country of origin.

Australia is increasingly faced with power prices that are destroying the competitiveness of our manufacturing sector. Together with the urgent need to meet international carbon emission commitments, nuclear is a real option to be part of Australia's energy future and make a very significant contribution to improving energy cost and reliability and lowering carbon emissions of Australia's energy system.

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<sup>9</sup> See Figure 2.3 in MIT Study: *The Future of Nuclear Energy in a Carbon-Constrained World* 2018

<sup>10</sup> *Nuclear Energy: a New Beginning?* Lecture by Professor Japoco Buongiorno, Professor of Nuclear Science and Engineering, Massachusetts Institute of Technology, Ultimo NSW 28 Jan 2020

<sup>11</sup> 2019 Annual Technology Baseline: Electricity, US National Renewable Energy Laboratory 2019 of the USA Department of Energy <https://atb.nrel.gov/electricity/2019/index.html?t=cn>

Currently, vendors cannot offer proposals for nuclear power plants in Australia or develop realistic costings while the technology itself is prohibited in the EPBC Act. Now is the time to remove the prohibitions to allow nuclear energy to be considered on its merits as part of Australia's energy future and significantly reduce carbon emissions as well as cost to the consumer.

Nuclear energy could make a significant contribution to the reliability of Australia's electricity grid and reduce carbon emissions. Australia can benefit from current and emerging nuclear power plant designs as well as from the considerable international experience accumulated in regulating nuclear power plants, taking into account safety, environmental, technical, economic and social factors.

The role of the Commonwealth Government towards the future energy system should be technology neutral and to allow nuclear energy to be considered as one option in meeting the trilemma of low cost, reliable and low carbon energy.

It is important that the Commonwealth be able to assess the safety and environmental impact of any nuclear power plant proposed to be built in Australia which means removing the prohibitions.

**The Australian Nuclear Association recommends that nuclear safety be administered by an expanded ARPANSA under Commonwealth legislation with appropriate budget provision.**

The States and Territories would continue to have a role in occupational health and safety, environmental and non-nuclear aspects of a nuclear power plant. A legislative framework between the Commonwealth, States and Territories is required for the effective and efficient regulation of nuclear facilities including nuclear power plants.

**The ANA strongly recommends amending the “nuclear actions” and “nuclear installation” requirements in the EPBC Act by:**

- **including nuclear power plants in the types of nuclear installations listed in Section 22,**
- **repealing Section 37J “No declarations relating to nuclear actions” and**
- **repealing Section 140A “No approval for certain nuclear installations”**