



Submission to the Senate Environment and Communications Legislation Committee

Inquiry into the Environment and Other Legislation Amendment (Removing Nuclear Energy Prohibitions) Bill 2022

**Friends of the Earth Australia
nuclear.foe.org.au**

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This submission addresses matters discussed in the May 15 hearing.¹ Unless otherwise stated, comments referred to below were made at the May 15 hearing.

1. Legislation Banning Nuclear Power
2. Public Opinion
3. Energy Economics
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1. LEGISLATION BANNING NUCLEAR POWER

The arguments for retaining legal prohibitions banning nuclear power were detailed in the joint environment groups submission to this inquiry.² Importantly, the Climate Council, comprising Australia's leading climate scientists and other policy experts, has clearly stated that nuclear power reactors "are not appropriate for Australia and probably never will be" and further stated: "Nuclear power stations are highly controversial, can't be built under existing law in any Australian state or territory, are a more expensive source of power than renewable energy, and present significant challenges in terms of the storage and transport of nuclear waste, and use of water".³

Senator Hollie Hughes insisted that federal legislation banning nuclear power is "ridiculous" and "embarrassing". The legislation was introduced by John Howard's Coalition government and left untouched by the Abbott Coalition government, the Turnbull Coalition government, and the Morrison Coalition government.

¹

https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Nuclearprohibitions/Public_Hearings

² <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>

³ <https://www.climatecouncil.org.au/nuclear-power-stations-are-not-appropriate-for-australia-and-probably-never-will-be/>

There is a striking correlation between climate science denialism and nuclear power advocacy.⁴

Australian economist Prof. John Quiggin recently argued that nuclear advocacy in Australia is “a dog whistle to the climate denialists”:⁵

“Opposition Leader Peter Dutton’s call for nuclear power, made as part of his Budget reply speech, should not be taken too seriously. In its nine years in office, the L-NP took no steps to promote nuclear energy, not even an attempt to repeal the largely symbolic ban imposed by John Howard in 1998. Dutton’s renewed call can best be understood as a dog whistle to the climate denialists who dominate the party’s base, allowing him to oppose practical measures for decarbonisation without explicitly embracing denialism.”

Elsewhere, Prof. Quiggin has argued that, in practice, support for nuclear power in Australia is support for coal:⁶

“In summary, even on magical assumptions it would be impossible to get nuclear power going in Australia before 2040, by which time we would already have had to close most of the coal-fired generation fleet. It follows that the only effect of nuclear advocacy is to prolong the life of coal-fired power to the limits of technological feasibility. In practice, support for nuclear power in Australia is support for coal.”

News Corp’s national weekend political editor James Campbell noted in his review of the May 15 Senate hearing that those “who seem keenest on nuclear energy as a solution to our climate change problems tend in many cases to be exactly the same people who up until five minutes ago were confidently telling us we didn’t need to worry about climate change at all.”⁷

It should be noted nuclear power advocacy has generated serious divisions within the Coalition – but no such divisions within the ALP, the Greens, the union movement or the environmental movement. Submissions to the 2019 federal nuclear inquiry included the following from Liberal/LNP governments and parties:

- The Queensland state Liberal National Party’s submission⁸ argued for the retention of federal legislation banning nuclear power and that “Australia’s rich renewable energy sources are more affordable and bring less risk than the elevated cost and risk associated with nuclear energy”. The submission further states: “We would encourage the Committee to ensure an increased emphasis is placed on measures designed to encourage investment in renewable energy that creates green jobs and lowers electricity bills, both for consumers and industry, which does not include nuclear energy.”
- The South Australian Liberal government’s submission said that “nuclear power remains unviable now and into the foreseeable future”.⁹
- The Tasmanian Liberal government’s submission said that “Tasmania will not pursue nuclear energy ... and considers that Australia’s energy needs are best met by pursuing renewable energy options, such as pumped hydro, with additional firming capacity supported through greater grid interconnection.”¹⁰

⁴ Jim Green, 13 June 2019, 'Nuclear power exits Australia's energy debate, enters culture wars', <https://reneweconomy.com.au/nuclear-power-exits-australias-energy-debate-enters-culture-wars-47702/>

⁵ <https://johnquigginblog.substack.com/p/why-nuclear-power-wont-work-in-australia>

⁶ <https://johnquiggin.com/2018/08/13/coal-and-the-nuclear-lobby/>

⁷ <https://www.dailytelegraph.com.au/news/opinion/campbell-dutton-takes-a-punt-on-gambling-advertising-and-nuclear-energy/news-story/6db748cbb3c384b4091d9faf7d3b37ea>

⁸ <https://www.aph.gov.au/DocumentStore.ashx?id=5c2cf4df-5ef7-420c-86f3-eee32033fa3f&subId=669992>

⁹ <https://www.aph.gov.au/DocumentStore.ashx?id=1519c7ea-3f47-47a0-a65d-97d691827bf0&subId=671226>

¹⁰ <https://www.aph.gov.au/DocumentStore.ashx?id=69cdc369-9b09-477f-ba35-2b9ec182774a&subId=670563>

While in office the NSW Coalition government also remained skeptical about nuclear power. Then Treasurer Matt Kean said that nuclear power was like "chasing a unicorn" and "doesn't stack up at the moment on practical grounds or on economic grounds".¹¹ Kean said that nuclear is several times more expensive than renewables backed up with energy storage (a claim supported by CSIRO/AEMO research).

The Minerals Council of Australia's representative Tania Constable said at the May 15 hearing that the ban on nuclear power in Australia "limit[s] the opportunity to decarbonise faster". However, introducing nuclear power to Australia would necessitate 10 years for planning and approvals, 10 years for construction, and an estimated 6.5 years¹² to repay the energy and carbon debts from construction. Thus, nuclear power could only begin to contribute to reducing greenhouse emissions around 2050 even in the unlikely event that legal prohibitions were repealed in the near future. If we (arbitrarily) assume 10 years for the repeal of current legal prohibitions, nuclear power could only begin to contribute to reducing greenhouse emissions around 2060.

The Minerals Council of Australia receives substantial funding from fossil fuel industries and that would seem a likely explanation for the organisation's nuclear advocacy.

2. PUBLIC OPINION

A majority of polls which find strong support for nuclear power do so with loaded questions, such as linking nuclear power to climate change, or referring to 'advanced' nuclear power or the 'latest' nuclear technologies.¹³

One example of this manufacturing of consent was a 2009 web-poll conducted by ANSTO to gauge attitudes towards nuclear power. "I am against it" was easily winning, so an enterprising ANSTO staff member changed "I am against it" to "It is one of the options". A News Corp. journalist got wind of the subterfuge and ANSTO issued a public apology.¹⁴

Another loaded poll question was referred to by the Australian Nuclear Association at the May 15 hearing. The poll asked respondents whether they support 'considering' nuclear power. Inevitably, a higher number of respondents said 'yes' than would be the case if the question was whether Australia should *introduce* nuclear power.

A number of non-biased opinion polls, with non-loaded questions, were discussed in the joint environment groups' submission to this inquiry.¹⁵ Inevitably, support for nuclear power is considerably lower compared to polls with loaded questions.

¹¹ <https://iview.abc.net.au/video/NC2109V038S00>

¹² http://pandora.nla.gov.au/pan/66043/20061201-0000/www.dpmc.gov.au/umpner/docs/commissioned/ISA_report.pdf

¹³ <http://thirdway.imgix.net%2FThe-World-Wants-New-Nuclear.pdf>

¹⁴ http://blogs.theaustralian.news.com.au/greenblog/index.php/theaustralian/comments/how_not_to_carry_out_an_online_opinion_poll_about_nuclear_power/ (No longer online or available via the Wayback Machine. Further details available from jim.green@foe.org.au)

¹⁵ <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>

Most importantly, support for nuclear power plummets if it posed as a local issue (and “all politics is local” as the saying goes):¹⁶

- 2019 Essential poll: 28% "would be comfortable living close to a nuclear power plant", 60% would not.
- 2019 Roy Morgan poll: 19% would agree to a nuclear power plant being built in their area, 58% would be opposed and a further 23% would be "anxious" (so 81% would be opposed or anxious).¹⁷
- 2011 Roy Morgan poll: 12% of Australians would support a nuclear plant being built in their local area, 73% would oppose it.
- 2006 Newspoll: 10% Australians would strongly support a nuclear plant being built in their local area, 55% would strongly oppose it.

3. ENERGY ECONOMICS

The Minerals Council of Australia’s representative Tania Constable said at the May 15 hearing that “a US comparison has been made that it ranges from around \$102 and \$141 for solar and wind, if you're looking at the cost of that firming intermittency. So the costs are very similar, looking at the United States. It would be worthwhile if that was done in Australia.” So why on earth would the US add to its nuclear waste legacy, and add to the risks of catastrophic nuclear accidents, and add to security and other risks associated with nuclear power, when there is no cost advantage over firmed renewables? In fact, the number of operating reactors in the US is steadily falling and renewables are steadily growing. Further to the comment by the Minerals Council’s representative, such analyses HAVE been carried out in Australia, including the CSIRO research which clearly shows that firmed renewables are cheaper than nuclear power. Or in CSIRO’s terminology, renewables with ‘integration’ costs (including transmission and storage) are cheaper than nuclear.

Nuclear advocates want to endlessly extend the economic arguments because of nuclear power’s clear economic disadvantage; however they are selective in so doing. For example, none of their efforts to appraise the ‘full costs’ of nuclear vs. renewables includes the trillion-dollar costs associated with Chernobyl, or the similar costs associated with Fukushima (see p.26 of the joint environment groups’ submission¹⁸).

Senate Canavan said at the May 15 hearing that wholesale costs in SA have increased from \$30/MWh a decade ago to \$105/MWh in 2022. He opined: "So we're not seeing the big reduction in costs for the amount of money we're spending on renewables."

Senate Canavan failed to note that costs in 2022 were higher in states which are lagging behind SA with the renewable energy transition and are heavily dependent on fossil fuels e.g. \$132/MWh for NSW and \$162/MWh for Queensland (see the AEMO NEM Data Dashboard). Reasons for increased costs across Australia include higher gas prices (partly due to Russia’s war on Ukraine).

Some Coalition Senators appear to believe that requirements for new transmission infrastructure apply only to renewables and would not apply to nuclear power. Clearly that is not the case. If, for example, Australia was to develop 25 gigawatts of nuclear capacity comprising 100 small modular reactors at 100 different sites, each with a capacity of 250 megawatts, there would obviously be a need for significant new transmission capacity.

¹⁶ Details and results are not accessible online for three of the four polls cited here. Details on the polls available from jim.green@foe.org.au.

¹⁷ <http://www.roymorgan.com/findings/8144-nuclear-power-in-australia-september-2019-201910070349>

¹⁸ <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>

4. RENEWABLE ENERGY IS GROWING, NUCLEAR IS STAGNANT

The wide and widening cost advantage of renewables over nuclear power largely explains the growth of renewables and the stagnation of nuclear power. Renewables accounted for 29.1% of worldwide electricity generation in 2022 according to the Electricity Market Report 2023 report by the International Energy Agency (IEA).¹⁹ That is more than three times nuclear's share of 9.4%.²⁰ Nuclear power's contribution to global electricity generation has fallen 46% from a peak of 17.5% in 1996²¹ to 9.4% now. With respect to nuclear power generation, it has been stagnant for the past 30 years: a marginal/negligible increase in generation and a marginal decline in the number of operating reactors.

The growth of renewables is being turbocharged as countries seek to strengthen energy security, the IEA said in December 2022 when releasing its *Renewables 2022* report.²² The IEA projects that in 2027, renewable electricity generation will have grown to 38% of total global generation with declining shares from 2022-27 for all other sources: coal, gas, nuclear and oil.²³ Wind and solar PV are projected to more than double to account for almost 20% of global power generation in 2027.

If the IEA's 2027 renewables projection is realised, renewables will be generating four times more electricity than nuclear power. And the gap will continue to widen in subsequent years.

The Committee has heard numerous claims that the number of countries operating nuclear power reactors is set to increase dramatically. For example:

- Helen Cook told the May 15 hearing that "there are more than 50 countries in the world today that are actively considering nuclear energy or implementing new nuclear energy programs." Cook further stated that "The IAEA has a road map that countries utilise ... and 50 countries in the world are currently doing it."
- ANSTO's written submission stated: "As of 31 December 2021, 50 countries have expressed interest in introducing nuclear power."
- William Shackel told the May 15 hearing: "There are around 50 countries about to open up nuclear reactors."

However, as discussed in section 2.7 of the joint environment groups' submission to this inquiry, there have been a trickle over newcomer countries over the past three decades, and a trickle of countries exiting nuclear power:²⁴

- Over 80% of the world's countries have never operated nuclear power plants (158/195 countries or 81%).
- Over the 31-year period from 1991–2021, only five countries started up their first power reactors – China (1991), Romania (1996), Iran (2011), UAE (2020) and Belarus (2020).

¹⁹ <https://iea.blob.core.windows.net/assets/255e9cba-da84-4681-8c1f-458ca1a3d9ca/ElectricityMarketReport2023.pdf>

²⁰ <https://iea.blob.core.windows.net/assets/255e9cba-da84-4681-8c1f-458ca1a3d9ca/ElectricityMarketReport2023.pdf>

²¹ <https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2022-HTML.html>

²² <https://www.iea.org/news/renewable-power-s-growth-is-being-turbocharged-as-countries-seek-to-strengthen-energy-security>

[Renewable's growth is being turbocharged as countries seek to strengthen energy security](https://www.iea.org/news/renewable-power-s-growth-is-being-turbocharged-as-countries-seek-to-strengthen-energy-security)

²³ <https://www.iea.org/reports/renewables-2022>

²⁴ <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>

- Countries phasing-out nuclear power include Belgium, Taiwan, Spain and Switzerland. Italy (1990), Lithuania (2009), Kazakhstan (1999) and Germany (2023) have already phased out nuclear power.
- An 'organic' nuclear phase out is underway in many other countries: existing reactors are ageing and the prospects for new reactors are slim or nil.

The same patterns are likely to apply over the next 15–20 years: a trickle of countries will begin operating nuclear power reactors, and a trickle of countries will close their last operating reactor.

Senator Hollie Hughes said at the May 15 hearing that Australia is “the only G20 country without a nuclear power civilian industry”. In fact:

- Six G20 countries have no operating power reactors: Australia, Germany, Indonesia, Italy, Saudi Arabia, and Turkey.²⁵
- Nuclear power makes a negligible contribution to electricity supply in a number of other G20 countries, e.g. Brazil (two reactors, 3% of electricity generation), Mexico (two reactors, 3% of electricity generation), and South Africa (two reactors, 5% of electricity generation).²⁶

5. SMALL MODULAR REACTORS – GENERAL COMMENTS

Attacking CSIRO for its *GenCost*²⁷ nuclear cost estimates was a recurring theme at the May 15 hearing and in submissions to this inquiry. CSIRO was accused of “cherry picking”, “misleading” the public, research which “doesn’t have much bearing on the real world”, and a “very incomplete process”.²⁸

Senator Hollie Hughes said it is “misleading and deceptive” for CSIRO to cost small modular reactors (SMRs) but not large reactors. Among other reasons, CSIRO doesn’t cost large reactors because the 2019 Coalition-led inquiry recommended retaining legislation banning large reactors.²⁹ Ted O’Brien — chair of the 2019 inquiry and now the Shadow Minister for Climate Change and Energy — said “Australia should say a definite ‘no’ to old nuclear technologies”.³⁰

Those attacking CSIRO show precious little understanding of the difficulty of costing technologies which have no meaningful existence. Only two SMRs exist, one each in China and Russia, and those reactors don’t fit the SMR definition of serial factory construction of reactor modules. Their combined capacity is 280 megawatts (MW). For comparison, about three times more renewable power capacity is added EVERY SINGLE DAY around the world.³¹

Those attacking CSIRO were insistent that CSIRO should give much greater weight to ‘expert’ cost estimates, by which they mean vendor estimates. Yet the track record of vendor estimates is appalling as discussed in the joint environment groups submission to this inquiry:³²

²⁵ Turkey has begun construction of a reactor.

²⁶ <https://www.world-nuclear.org/information-library/country-profiles.aspx>

²⁷ <https://publications.csiro.au/publications/publication/PIcsi:EP2022-5511>

²⁸ <https://www.innovationaus.com/nuclear-costs-meltdown-coalition-senators-attack-csiro-modelling/>

²⁹ https://www.aph.gov.au/Parliamentary_Business/Committees/House/Former_Committees/Environment_and_Energy/Nuclearenergy

³⁰ https://www.aph.gov.au/About_Parliament/House_of_Representatives/About_the_House_News/Media_Releases/Nuclear_Energy_-_Not_without_your_approval

³¹ Based on 2022 renewable capacity additions estimated at 320,000 MW, see https://read.oecd-ilibrary.org/energy/renewable-energy-market-update_faf30e5a-en#page1

³² <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>

- The cost of China's SMR was 2-3 times higher than early estimates. The cost of Russia's SMR increased six-fold. The cost of the still-incomplete SMR in Argentina is more than 20 times higher than early estimates.
- For large reactors, cost estimates for the only reactors under construction in the US have increased 12-fold. Cost estimates for the only reactors under construction in the UK have increased 8-fold. Cost estimates for the only reactor under construction in France have increased 6-fold. (The current cost estimates for reactors under construction in those three countries range from A\$25 billion to A\$30 billion per reactor.³³)

Another demonstrably false argument put forward by some witnesses at the May 15 hearing is that cost estimates are reliable when reactor construction is soon to begin. The above examples disprove that claim. Very early estimates tend to be too low by a huge margin. Estimates close to construction start tend to be too low by a factor of two or more ... sometimes far more. For example in 2005, the Senior Vice President of the US Nuclear Energy Institute claimed that Westinghouse's estimate of US\$1,365 / kW for AP1000 reactors "has a solid analytical basis, has been peer-reviewed, and reflects a rigorous design, engineering and constructability assessment."³⁴ In fact, the estimate was proven to be wrong by a factor of 11 – an order of magnitude! (The latest cost estimate for two AP1000s in the US state of Georgia is US\$34 billion (A\$52.2 billion) for a 2,200 MW plant³⁵ or US\$15,450 / kW.)

A CSIRO representative at the May 15 hearing correctly noted that vendor estimates are the "lowest quality data".

James Voss, Managing Director of Ultra Safe Nuclear Australia Pty Ltd, claimed at the May 15 hearing that the company is building SMRs in North America ("our first two plants that we're building now"). The company still needs licensing approvals and funding before it begins construction. Voss claimed that there should be no taxpayer subsidies to facilitate the introduction of SMRs to Australia — but the company would not have made the progress it has in North America without taxpayer subsidies and other forms of government support, and it will grind to a halt without further subsidies and support.

Minerals Council of Australia chief executive Tania Constable told the Senate committee there is no difference between SMRs and nuclear-powered submarine reactors. If that was the case the US and the UK — Australia's AUKUS partners — would have plenty of SMRs given that they have a long history with nuclear-powered submarines. They have no SMRs whatsoever. Nor do France or India, countries which operate nuclear-powered submarines. Of the six countries with nuclear-powered submarines, only Russia and China have SMRs, and they only have one each, neither of them meeting the SMR definition of serial factory construction of reactor modules. Using the standard definition of SMRs (<300 MW capacity; serial factory construction of reactor modules), no country (with or without nuclear powered submarines) has any SMRs whatsoever.

6. SMALL MODULAR REACTORS – NUSCALE POWER

One witness told the May 15 hearing that US company NuScale Power estimates a cost of \$4,200 per kilowatt for its SMR. In fact, NuScale's latest estimate is A\$30,000 per kilowatt (US\$9.3 billion (A\$14 billion) for a 462 megawatt plant).³⁶ Despite lavish government subsidies amounting to A\$6.3 billion,

³³ <https://reneweconomy.com.au/is-nuclear-power-in-a-global-death-spiral/>

³⁴ <https://www.govinfo.gov/content/pkg/CHRG-109shrg20004/pdf/CHRG-109shrg20004.pdf>

³⁵ https://www.worldnuclearreport.org/The-World-Nuclear-Industry-Status-Report-2022-HTML.html#_idTextAnchor086

³⁶ <https://ieefa.org/resources/eye-popping-new-cost-estimates-released-nuscale-small-modular-reactor>

NuScale is struggling to secure private-sector finance to get the project off the ground and it still has licensing hurdles to clear for its revised 77 MW reactor modules.

NuScale's latest LCOE is US\$89 / MWh (A\$137 / MWh).³⁷ That LCOE estimate is well in excess of CSIRO's estimate for firmed renewables. Moreover, construction of NuScale reactors has not even begun and massive cost increases can be confidently predicted. Further, a study by WSP / Parsons Brinckerhoff, commissioned by the South Australian Nuclear Fuel Cycle Royal Commission, estimated costs of A\$225 / MWh for power from SMRs based on the NuScale design.³⁸ The Minerals Council of Australia states that SMRs won't find a market unless they can produce power at a cost of A\$60–80 / MWh³⁹ – about one-third of the WSP / Parsons Brinckerhoff estimate for NuScale technology, and about one-half of NuScale's current estimate.

A witness claimed that Australia could have an operating SMR within 7 years. In fact, NuScale's history can be traced to the turn of the century but it hasn't even begun construction of a single reactor. Projected timelines have been revised again and again and again. Likewise, Argentina's SMR project can be traced back to the last millennium but it hasn't completed construction of a single reactor.⁴⁰

³⁷ <https://ieefa.org/resources/eye-popping-new-cost-estimates-released-nuscale-small-modular-reactor>

³⁸ <http://nuclearrc.sa.gov.au/app/uploads/2016/05/WSP-Parsons-Brinckerhoff-Report.pdf>

³⁹

https://www.parliament.vic.gov.au/images/stories/committees/SCEP/Inquiry_into_Nuclear_Prohibition_Inquiry_/Transcripts/25_June_2020/5_FINAL_-_Minerals_Council_Aust.pdf

⁴⁰ <https://www.aph.gov.au/DocumentStore.ashx?id=e6d63b51-45cb-4720-a27b-9dab61f2fe66&subId=732042>