

Committee Secretariat
Standing Committee on Environment and Energy
PO Box 6021
Parliament House
Canberra ACT 2600

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

16th September 2019

Dear Committee Secretariat,

Re: Inquiry into the Prerequisites for Nuclear Energy in Australia

The Australian Energy Council (the 'AEC') welcomes the opportunity to make a submission to the Commonwealth Government's *Inquiry into the Prerequisites for Nuclear Energy in Australia*.

The Energy Council is the industry body representing 21 electricity and downstream natural gas businesses operating in the competitive wholesale and retail energy markets. These businesses collectively generate the overwhelming majority of electricity in Australia, sell gas and electricity to over ten million homes and businesses, and are major investors in renewable energy generation.

As the leading industry representative, the AEC has an active interest in public policy debate about energy and Australia's future energy mix. In this regard, the current inquiry into nuclear energy has potentially significant implications for the affordability, reliability and sustainability of Australia's energy system going forward. It is important then that this inquiry is robust and indifferent to ideological preferences. The best way to ensure this is through a technology neutral approach that assesses the viability of nuclear energy only on whether it meets appropriate scientific standards and provides value within a market context.

Taking a Technology Neutral Approach

The inquiry's Terms of Reference make clear that a key goal of this inquiry is to address the so-called energy 'trilemma': affordability, reliability and sustainability. It was noted in South Australia's 2016 *Nuclear Fuel Cycle Royal Commission Report* (the 'South Australian Report') that no single generation source is capable of resolving this trilemma:

No single option for electricity generation currently commercially available in Australia meets all three criteria because of the intermittency of renewables, the emissions intensity of fossil fuel generation, and the high capital costs of developing nuclear power.¹

For this reason, it is important any genuine effort to resolve the energy trilemma is technology neutral. A technology neutral approach recognises the role of both firm and intermittent generation, and seeks to optimise operation of the energy system at minimum cost.

Economic Viability of Nuclear Generation

As it currently stands, nuclear generation faces large, upfront capital costs at a time when other low carbon generation costs are dramatically falling. While no official estimate of capital costs has been undertaken in Australia, the UK's experience can provide some guide. The UK commissioned the construction of the

¹ Nuclear Fuel Cycle Royal Commission, *Nuclear Fuel Cycle Royal Commission Report* ('South Australian Report'), May 2016, page 63, https://s3-ap-southeast-2.amazonaws.com/assets.yoursay.sa.gov.au/production/2017/11/09/03/09/17/3923630b-087f-424b-a039-ac6c12d33211/NFCRC_Final_Report_Web.pdf

3,200MW Hinkley Point C nuclear power station in 2010 at an estimated cost of £16 billion (or \$28.5 billion AUD).² This cost has since ballooned out to £20.3 billion (or \$36.5 billion AUD) while the expected period of completion has been delayed.

This scenario also highlights the long period of construction that goes with nuclear power and the delay risks that accompany it. Both these points were emphasised in the South Australian Report, which estimated it would take at least fourteen years before a nuclear plant could become operational in Australia.³ Australia's energy system has changed considerably in the past fourteen years and in ways that could not be reasonably foreseen. Given this long timeframe and the volatility of the energy market, it is unlikely any investor would commit to the upfront capital costs without government assurance.

While the AEC would welcome government assurance in terms of a bipartisan energy policy, it does not support any form of government subsidy or underwriting of a nuclear power station to reduce these costs. This will only have the effect of chilling private investment in all forms of energy supply and prove counterproductive in the long run.⁴

Flexible Resources

Nuclear energy is a type of firm synchronous generation that is typically operated at a constant level. Because firm generation operates as required, it is a critical part of a reliable energy system. Moreover, synchronous generation provides additional services, such as system strength, that help stabilise the grid and maintain system security. In the case of nuclear energy, it can provide these functions while also reducing Australia's carbon emissions.

The downside to nuclear power is that the conventional designs used overseas are inflexible and difficult to turn on and off. Indeed, during periods of excess supply, it may even be more costly to reduce the output of these nuclear plants than to spill renewable generation. The recent influx of cheap, intermittent generation into the National and Western Australian grids means it is now difficult for inflexible generators to compete at certain times of the day. With large-scale investment in solar and wind energy expected to continue, this will increase in the future.

Given the significant capital costs outlined earlier, these market conditions will only further hamper the capacity of nuclear energy to become commercially viable. Furthermore, gaining value through scale efficiency by building large conventional nuclear units is unlikely to succeed because Australia does not possess the type of compact grid system conducive to this.

It is important then for the purposes of this inquiry to consider what future role nuclear power is expected to play in Australia's energy markets. Based on the above analysis, the AEC doubts that conventional reactor designs used overseas would offer much market value in the Australian context.

Unconventional Reactor Designs

It is noted that the Terms of Reference also ask the inquiry to consider unconventional nuclear reactor designs, in particular small modular reactors. Small modular reactors have a number of perceived benefits compared to conventional nuclear designs:

- Lower capital costs and construction times
- Capable of being used in a flexible mode of operation

² EDF Energy, *Building Our Industrial Future – Hinkley Point C Supply Chain – Be Part Of It*, 2012, page 3, https://www.edfenergy.com/file/1405/download?token=gcM0D47gaHPuYvBZ7XqN0y_fjxKHL0vYuZJg1hoqRjC.

³ South Australian Report at page 4.

⁴ AEC, Submission to Underwriting New Generation Investment program, 9 November 2018, <https://www.energycouncil.com.au/media/14522/20181109-aec-underwriting-investments-final.pdf>.

- Suited to remote, flat load situations (e.g. mining centres, decommissioned coal-fired plants)
- Enhanced mobility makes them portable

Despite these perceived benefits, small modular reactors are seldom used as a form of electricity generation. This means it is ultimately still an unproven technology. There would be considerable value then if this inquiry could investigate the apparent disconnect between the supposed benefits of small modular reactors and their slow uptake. Specifically, the inquiry should look into their true status of availability, costs of such designs and whether they can provide flexible power.

Creating a Long-Term Framework

Notwithstanding the AEC's position that existing nuclear technology is currently commercially unviable, we nonetheless do not support the ban on using nuclear technology to deliver electricity. The AEC believes the government should set in place a conducive regulatory and safety framework for nuclear generation so that if the market deems it has value in the future, it is an available option. This position is consistent with the recommendations of the South Australian Report:

The South Australian Government pursue removal at the federal level of existing prohibitions on nuclear power generation to allow it to contribute to a low-carbon electricity system, if required.⁵

Supporting the removal of existing restrictions on nuclear energy also reflects the AEC's preference for a technology neutral approach. It does not mean that nuclear energy is the best or only option, but rather an option equally open to private investment alongside other generation types. These regulatory reforms should be made now to encourage future research into nuclear technology, and provide any prospective investor with the time and certainty needed to construct a nuclear power plant, if ever required.

Government Focus

It is well recognised that the energy sector is currently in a state of transition as the world shifts towards a low-carbon future. This transition has brought with it a host of short and long term challenges to the affordability, reliability and sustainability of the energy system that will impact on businesses and customers alike if left unaddressed. While this inquiry is a useful endeavour, it is critical that it does not distract from more pressing challenges, such as the need for clarity on long-term energy policy.

Any questions about this submission should be addressed to Rhys Thomas, by email to Rhys.Thomas@energy.council.com.au or by telephone on (03) 9205 3111.

Yours sincerely,



Ben Skinner
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⁵ South Australian Report at page xv.