



AUSTRALIAN NUCLEAR ASSOCIATION INC.

PO BOX 472, ENGADINE, NSW 2233, AUSTRALIA

Email: ANA@nuclearaustralia.org.au

Web: www.nuclearaustralia.org.au

Submission to

AEMO 2020 Planning and Forecasting Consultation on Scenarios, Inputs and Assumptions

7 February 2020

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. COST OF NUCLEAR

The Australia Nuclear Association strongly disputes costing of nuclear power plants in CSIRO's latest "*GenCost 2019-20: preliminary results for stake holder review*" December 2019.

The CSIRO provides an estimate of \$16,000 per kilowatt for the overnight cost of nuclear which is based on the GHD 2018 report¹. The GHD report says that this cost estimate is for a future Gen IV Small Modular Reactor of 300 MWe built after 2030 but provide no basis for how this cost was estimated. Gen IV reactors are advanced generally higher temperature reactors currently being researched.

The estimate of A\$16,000 per kW is a much higher overnight cost than the Gen III and III+ reactors currently being built around the world, even those that are first-of-a-kind.

According to the World Nuclear Association, "nuclear overnight capital costs in OECD ranged from US\$ 1,556/kW for APR-1400 in South Korea through \$3,009/kW for ABWR in Japan, \$3,382/kW for Gen III+ in USA, \$3,860/kW for EPR at Flamanville in France to \$5,863/kW for EPR in Switzerland, with a world median of \$4,100/kW. Belgium, Netherlands, Czech Republic and Hungary were all over \$5,000/kW. In China overnight costs were \$1,748/kW for CPR-1000 and \$2,302/kW for AP1000, and in Russia \$2,933/kW for VVER-1150. EPRI (USA) gave \$2,970/kW for APWR or ABWR, Eurelectric gave \$4,724/kW for EPR"²

¹ https://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/Inputs-Assumptions-Methodologies/2019/9110715-REP-A-Cost-and-Technical-Parameter-Review---Rev-4-Final.pdf

² <https://www.world-nuclear.org/information-library/economic-aspects/economics-of-nuclear-power.aspx>

The range of the overnight costs in OECD countries range from US\$1600 to US\$6000. These are modern nuclear power plants currently being built in countries many of which have comparable cost structures to Australia. Future nuclear plant could well be cheaper.

Gen III+ nuclear power plants similar to those currently being built and operated overseas would be very suitable for Australia if they meet Australia's regulatory and environmental conditions. It is unreasonable to cost all nuclear options to be based on a simplistic estimate of the cost of some future Gen IV SMR not yet designed.

The nuclear power industry is a mature and well recognised industry overseas and there are strong possibilities of nuclear power plants being used in Australia. Nuclear power plants are already used in most developed and many developing countries as reliable, safe and low carbon generator of electricity. Nuclear power is economic in many countries and many modern plants are being built in a timely manner and to budget.

At the end of 2019, there were 447 nuclear power plants in service in 30 countries and about 52 nuclear power plants under construction³.

Nuclear 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 estimated cost of nuclear using in the AEMO assessment should be based on the costs of recently built modern nuclear power plants and those under construction, not on an estimate for an unbuilt and yet to be designed Gen IV SMR.

The ANA recommends that the estimated overnight capital cost of nuclear power plants in the CSIRO report and used for AEMO forecasting be based on the overnight capital cost of the modern nuclear power plants recently built overseas.

³ IAEA Database on Nuclear Power Reactors, <https://pris.iaea.org/pris/> Accessed on 29th January 2020