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**Submission to**  
**Australian Energy Market Operator (AEMO)**  
**on**  
**CSIRO GenCost 2023-24 Consultation Draft Report**  
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**Introduction**

The update on current cost and timing on nuclear SMR in Section 2.4 of the CSIRO GenCost 2023-24 Consultation Draft Report is based on very limited data from the worldwide global nuclear energy industry.

Australia needs access to all available clean zero-carbon technologies, including nuclear energy, to meet the dual challenge of climate change and energy security.

Nuclear energy is widely used in many countries where it provides large-scale economically competitive electricity and security of supply as well as very low carbon emissions and other air pollution.

Worldwide, 28 new build nuclear power plants were added to the electricity grid in the past 5 years and there were 58 nuclear power plants under construction at the end of 2023 [<https://pris.iaea.org/pris/>].

Australia cannot afford to ignore the nuclear energy option. If the GenCost report is to provide an estimate of timing and cost of new nuclear, then the assessment should be based on all the data and worldwide experience rather than the superficial estimates in the GenCost 2023-24 Consultative report.

**CSIRO should provide a balanced assessment of the cost of nuclear energy**

The CSIRO GenCost Draft Report arbitrarily selects one cancelled high-cost nuclear power project and asserts that this is the future cost of nuclear in Australia and ignores the 58 nuclear power plants under construction around the world or the more than 80 commercial SMR designs being developed around the world.

The CSIRO's current cost estimate is based on the capital cost of a cancelled project to construct six first-of-a-kind NuScale SMRs for the Utah Associated Municipal Power Systems (UAMPS). Based on the data used, CSIRO could conclude the first-of-a-kind UAMPS NuScale Voyager plant would be too expensive for Australia, but it is unreasonable to extend this conclusion that all nuclear power plants are too expensive.

**Section 2.4 should include discussion of lifetimes, particularly that the lifetime of newly build nuclear plants is 2 or 3 times longer than wind or solar**

Modern nuclear plants are designed for a 60-year, or more, lifetime compared to a maximum of 20- to 30-years lifetime for solar and wind. Nearly all the solar and wind turbines currently operating will have to be replaced by 2050. To put the cost on a comparative basis the capital cost of solar and wind should be doubled or the capital cost of nuclear halved.

**Section 2.4.4 should include costs of large-scale nuclear plant**

The GenCost report does recognise that “large-scale nuclear plants ...are currently lower cost than nuclear SMR”. The report then ignores the known costs of these larger nuclear plants on the basis that it “has been advised by stakeholders that small modular reactors are the appropriate size for nuclear technology in Australia”. Surely, if larger plants are cheaper and are also appropriate for the Australian grid then their cost should be included in the assessment.

The Eraring coal station in NSW was built in 1982 with four 720 MW generators for a total capacity of 2,800 MW. Since then, electricity consumption on the grid has increased significantly. If a 720 MW generator was OK in 1982, it is reasonable to conclude that a 720 MWe or even 1000 MWe nuclear plant would be appropriate for central parts of the East Australian grid now. Nuclear plants would be particularly appropriate as replacement of retiring coal plants.

In the meantime, the CSIRO GenCost report should include the cost of new build nuclear plants built, and being built, around the world.

A recent analysis of costs of recent nuclear builds is in the ETI Nuclear Cost Drivers Project, Ingersoll, Gogan, Herter and Foss, Sept 2020

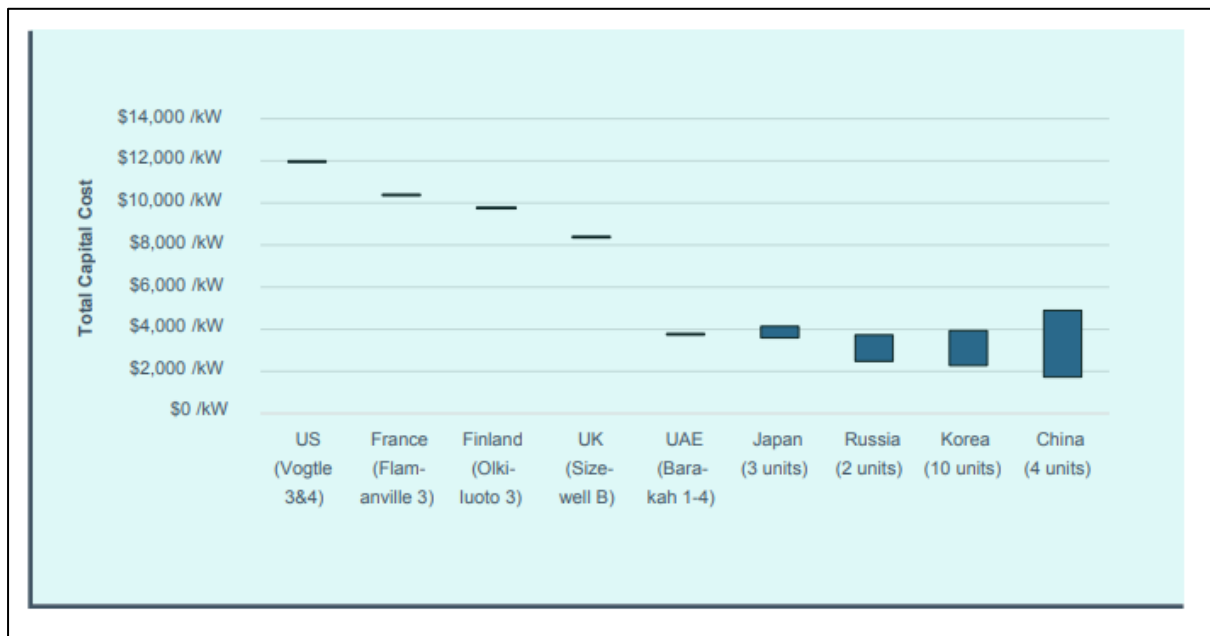


Figure 1. Capital costs of recent nuclear projects in USD per kW. Ref: ETI Nuclear Cost Drivers Project, Ingersoll, Gogan, Herter and Foss, Sept 2020. <https://esc-production-2021.s3.eu-west-2.amazonaws.com/2021/08/ETI-Nuclear-Cost-Drivers-Full-Report-FINAL.pdf>

The capital costs of all projects in Figure 1 are much less than the CSIRO GenCost cost estimate for SMRs of AUD31,138 per kW for 2023 (approx USD20,400). The CSIRO GenCost estimate for SMR reduces to AUD 15,959 in 2030 (approx. USD10,500) in the *Current Policies* scenario (Apx Table B1).

The capital cost of the UAE nuclear plants in Figure 1 is particularly relevant as it was a country with no nuclear when UAE decided in 2008 to have nuclear power and subsequently ordered 4 large power reactors from the Korea Electric Power Co. (KEPCO). Three of these four reactors are now operating.

## **Conclusion**

It is disappointing that the estimate of the cost of nuclear energy in the CSIRO GenCost report is based on such limited data. The report should include cost data for a range of nuclear plants including larger nuclear plants and provide a more balanced assessment of the cost of nuclear being built in Australia.

Experience in many countries demonstrates that nuclear power increases the reliability of energy systems and reduces carbon emissions. Australia has the expertise, the engineering, management and regulatory capability for a nuclear energy industry and nuclear energy is a viable option for Australia.

The challenge of climate change is real, and we must make all available technologies available. CSIRO should include a proper assessment of nuclear energy in the GenCost report.

Dr John Harries

Secretary, Australian Nuclear Association