SUBMISSION

Submission to the Australian Energy Market Operator (AEMO)

Submission to the 2023-24 GenCost consultation draft

9 February 2024

The Australian Academy of Technological Sciences and Engineering (ATSE) is a Learned Academy of independent, non-political experts helping Australians understand and use technology to solve complex problems. Bringing together Australia's leading thinkers in applied science, technology and engineering, ATSE provides impartial, practical and evidence-based advice on how to achieve sustainable solutions and advance prosperity.

ATSE welcomes the GenCost report, which provides a useful comparison for decision-makers to trace the most viable path to reducing emissions from the energy sector. The GenCost report can couple Australia's economic goals with climate goals. ATSE encourages a technology-neutral approach and urges consideration of sustainable technologies to reach net zero carbon emissions by 2035 (ATSE 2023). By providing an open and trustworthy comparison source, GenCost can also be leveraged by Australians seeking to reduce their greenhouse gas emissions by using consumer-level renewable technologies.

ATSE thanks the Australian Energy Market Operator (AEMO) for the opportunity to provide input and proposes the following recommendations for fine-tuning the final GenCost report:

Recommendation 1: Focus the GenCost report on energy technologies needed to reach net zero by 2035.

Recommendation 2: Clarify how international figures can be applied to Australia's cost of electricity generation in the GenCost report, for a range of current and emerging technologies.

Recommendation 3: Adopt the novel Levelized Full System Costs of Electricity (LFSCOE) methodology for current and future GenCost reporting.

Recommendation 4: Consider the economy of scale and expand upon learning rates in the GenCost report.

Recommendation 5: Include comparison information on consumer-level technologies in the GenCost report to facilitate household-level reduction of greenhouse gas emissions.

Costing sustainable energy technologies for a net-zero future

The changing energy landscape is complex and shaped by new technologies, alongside the transition to net zero. Figure 1 shows a forecast of renewable technologies in Australia up to 2028.

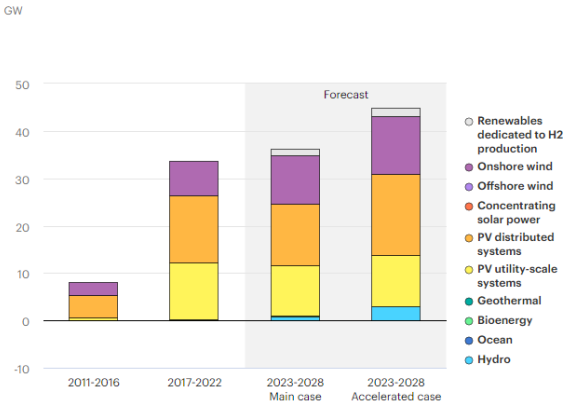

Figure 1: 5-year capacity growth by generation technology for Australia. PV data has been unified to direct current (DC). Image courtesy of the International Energy Agency (IEA 2024).

It is likely an assortment of complementing sustainable technologies, such as those outlined in ATSE's explainer (ATSE 2022), will be required to reach net zero. ATSE encourages future GenCost reports to take a technology-neutral approach to driving down emissions from energy generation and look to international examples to inform Australia's costings and decision-making.

Australia's vast landscape and reliable, predictable wind patterns mean that Australia is well-suited to using utility-scale wind turbines. The declining costs of solar and wind technologies mean they are the cheapest of all energy generation technologies (ATSE 2022). The Australian Government's ultra-low-cost solar plan predicts solar costs will reach as low as $15/MWh by 2030 (ARENA 2021).

While there is some growing international interest in the role nuclear energy can play in achieving net zero, nuclear small modular reactors (SMRs) are unlikely to be the fastest and cheapest path to net zero, as shown in the GenCost report. SMRs could, in the future, offer affordable, reliable and sustainable electricity generation. Further information in the report is needed on the assumptions driving the projected decline in SMR costs.

ATSE endorses the inclusion of the 'other technologies' section of the GenCost draft report (such as pumped storage hydropower, wave energy and tidal energy). An example of relevance is Snowy 2.0, a

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

PO Box 4776
Kingston ACT 2604
Australia

+61 2 6185 3240
info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

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pumped hydro battery megaproject in New South Wales, which is expected to achieve full commercial operation by December 2028 (Snowy Hydro 2023). Consideration of financial and environmental costs (such as habitat loss and water contamination) from specific energy storage mechanisms could be greater compared in the GenCost report. Clarification is also needed on how international figures on sustainable energy technologies could be applied to Australia, to guide a pathway towards net zero.

Recommendation 1: Focus the GenCost report on energy technologies needed to reach net zero by 2035.

Recommendation 2: Clarify how international figures can be applied to Australia's cost of electricity generation in the GenCost report, for a range of current and emerging technologies.

Upgrading the GenCost data analysis methodology

ATSE suggests using the research paper by Idel (2022) as an evidence-based approach for the GenCost report. The paper uses the Levelized Full System Costs of Electricity (LFSCOE)- a novel cost evaluation metric that compares the costs of serving the entire market using one source plus storage. The GenCost report can draw upon the methods of this work, including comparing real grids that have been widely studied, and presenting wind and solar independently and in combination (Idel 2022).

Within the GenCost report, ATSE supports considering economies of scale and learning rates (the fractional reduction in cost for each doubling of cumulative production/capacity) (Rubin et al. 2015). Incremental expansion of energy technologies reduces the project risk and increases the learning rate with innovation and research over many builds.

Recommendation 3: Adopt the novel Levelized Full System Costs of Electricity (LFSCOE) methodology for current and future GenCost reporting.

Recommendation 4: Consider the economy of scale and expand upon learning rates in the GenCost report.

Equipping Australians with the tools to make sustainable decisions

Consumer-level uptake of sustainable energy technologies is an important aspect of driving down greenhouse gas emissions. However, consumers may find it challenging to access trustworthy information on sustainable energy technologies, to assist in making informed decisions. ATSE suggests that the GenCost report compares incentives and input/output costs of sustainable technologies (e.g. solar photovoltaic and batteries) across states. Clear and accessible information on calculating capital payback times would also assist potential customers.

The analysis should reflect the cost and value of providing energy to the grid at peak times and stability across periods. Greater information on ongoing charges when drawing from the grid during peak times (and whether to install battery storage, for example) would better equip households with information to make cost-effective and sustainable decisions.

Recommendation 5: Include comparison information on consumer-level technologies in the GenCost report to facilitate household-level reduction of greenhouse gas emissions.

ATSE thanks the Australian Energy Market Operator (AEMO) for the opportunity to respond to the 2023-24 GenCost consultation draft. For further information, please contact academypolicyteam@atse.org.au.

Level 2, 28 National Circuit
Forrest ACT 2603
Australia

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info@atse.org.au
atse.org.au

ABN 58 008 520 394
ACN 008 520 394

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