

21.1 - GenCost 2018

Purpose: To challenge the view that electricity generated by wind farms is less expensive than coal fired generation.

Background: Governments and other agencies have generally accepted the advice in the CSIRO publication GenCost 2018 (updated in 2020) that the cost of wind and solar power is less than that of coal fired power stations.

Critical Issues:

1. The GenCost study does not include the costs to 'firm' (balance) wind farms when the intermittency of wind causes their power outputs to reduce dramatically.
2. Wind farm output intermittency is currently masked by the availability of coal fired or gas fired power stations to compensate. These coal fired power stations will be progressively decommissioned, which means that alternative firming generation must be constructed to prevent NEM wide blackouts.
3. The cost of electricity generated by wind farms is marginally less than coal fired plants. However, when the cost of firming generators is taken into account, the cost is greater than coal fired generation.

Recommendations:

Governments:

1. Should review their electricity strategies and immediately implement a life-extension program for, for example, the five operational NSW coal fired power stations.
2. Should immediately implement construction of additional units at existing coal fired power stations where these were to be provided at a future date. For example, Mt Piper in NSW.
3. Should plan to replace coal fired power stations with modern HELE coal fired plants at the completion of their extended lives.
4. Should ensure all renewable energy (RE) generators must be dispatchable at nameplate rating and be economically viable without subsidies and/or preferential treatment before being connected to the transmission network.
5. Should ensure transmission infrastructure required by such a connection must be funded by the RE Generator prior to connection.

Supporting Information

Wind Farm Intermittency

It is well known that the total output of all wind farms in the National Electricity Market (NEM) rarely approaches their nameplate rating and is often less than 10% of capacity that we regard as a wind drought. Weather dependent wind power is unreliable and non-dispatchable.

CSIRO Admission that Firming Costs are not Included in GenCost 2018

Section 4.1 of GenCost 2018 states;

'While the capital cost projections are primarily designed to be included in Australian electricity modelling studies as scenario inputs we recognise that some stakeholders require access to levelised cost of electricity (LCOE) data for comparing technologies outside of models. On the other hand

LCOE estimates, in their current form, can be misleading if they apply the same discount rate regardless of exposure to climate policy risk and inherently do not recognise the additional balancing technology that is required by variable renewable generation as its share of the generation mix increases. Given the variable renewable share is expected to increase in most Australian states, towards or beyond 50%, this is an issue that needs to be solved. **This report provides some advice on what comparisons are and are not appropriate using current methods and describes a process by which future updates will seek to solve this issue with new approaches.'**

Section 1.4 of GenCost 2020 states:

“In 2020, we have prioritised extension of Levelised Costs of Electricity (LCOE) estimates to include the costs of balancing variable renewable energy. **This research is not included in this report but will be shared with stakeholders during 2020'.**

NSW Coal Fired Power Plants Commissioning

As an example of the need for immediate action, the following table illustrates the age of the existing fleet of NSW coal fired power stations. It is evident that action must be undertaken to replace them to ensure that NSW continues to generate reliable, affordable and dispatchable electrical energy.

Plant	Commissioning period	Age
Eraring	1982-84	36 years
Bayswater	1982-1984	36 years
Liddell	1971-73	47 years
Mt Piper	1993	27 years
Vales Point B	1978	42 years

Costs per MWh for Firmed Wind Farms

An analysis has been undertaken where the capital, operating and maintenance costs were calculated for a scenario consisting of a HELE coal fired plant, an independent wind farm (not firmed), a wind farm firmed with open cycle gas turbines and a wind farm firmed by combined cycle gas turbines. The analysis was conducted for a 50-year period which is the expected life of a properly maintained HELE coal fired power station. The results are tabulated as follows.

Generator	Cost per MWh
HELE coal fired plant	\$53.10
Windfarms unfirmed	\$48.87
Windfarms firmed with OCGTs	\$121.15
Windfarms firmed with CCGTs	\$70.53

It is evident from the data above that the energy generated by a modern HELE coal fired plant is significantly less expensive than energy produced by firmed windfarms. Whilst the electrical energy generated by unfirmed windfarms is less expensive than coal, unfirmed wind is not an option unless blackouts are accepted as routine.