

## Briefing Note 21.15 Energy Market Reform

**Purpose.** To explain that the rapid transition to renewable energy is impossible with existing storage technology

**Background.** All the major parties are in favour of increasing the supply of electric power from wind and solar energy. The Energy Security Board is preparing recommendations on the market reforms that will enable the transition from coal power to RE to proceed as rapidly as possible.

Kerry Schott, the chair of the ESB, has signalled that the 'simple' plan to move towards net zero emissions is to get in as much renewable energy and hydro as we can and back it up with pumped hydro and batteries.

The question is, how rapidly can it proceed given the problem of "wind droughts" and the lack of feasible or affordable grid-scale storage?

### Critical Issues.

The power supply will fail on windless nights, or overcast windless days, unless there is enough conventional power available to provide 100% of the demand *or there is enough grid-scale storage to cover the gap.*

The note 20.2 explains four reasons why the transition to green energy will be especially difficult in Australia. <https://www.riteon.org.au/netzero-casualties/#202>.

**Wind droughts.** There are frequent and prolonged "wind droughts" when there is next to no wind across SE Australia for many hours and even days at a time.

**The grid needs a continuous input of power** and the critical value of the input from intermittent sources is the lowest level. The RE transition is limited by **the lowest points in the supply of wind, not the installed capacity, the high points or the average** performance of the wind fleet.

**Australia is an island.** Almost every other place in the developed world has access to neighbours to supply power from many sources when domestic RE is in short supply.

**The Chief Scientist has advised that batteries do not have the capacity** to store the amount of power required to even out the peaks and troughs in the supply of wind and solar power.

Wind droughts occur frequently and they often extend across the whole of SE Australia (the National Energy Market). There was an early expectation that expanding the geographical coverage would enable wind power to be sent from areas where the supply is good to other areas where the wind is low. This cannot happen when the drought extends across the whole of the NEM.

This table shows the periods in 2020 when the wind farms across the NEM were delivering 10% or less of their nameplate or installed capacity (slow to load.)

<https://www.spasmodicenergy.com/Pages/Drought.aspx?start=01/01/2020&end=31/12/2020&wind=True&solar=False&percent=10&power=&chart=5>

On 18 occasions the duration of the drought was ten hours or more and in June the drought on the 5<sup>th</sup> and 6<sup>th</sup> lasted for 33 hours. Other droughts in June lasted for 18, 16, 14 and 9 hours.

## Wind Energy Production During June 2020

% MW



The “simple plan”: storage with pumped hydro and batteries.

### Will pumped hydro work?

Pumped hydro to support the green energy transition depends on using surplus RE power to pump water uphill to generate power for the grid when the water runs down through turbines. <https://www.snowyhydro.com.au/snowy-20/about/>

*The Snowy2.0 scheme will depend on wind power from 8GW of installed capacity, (a little less than the current system) and it is designed to provide a flow of 2,000MW (equivalent to a large coal-fired power station like Bayswater) for 175 hours (seven days.)* <https://www.snowyhydro.com.au/snowy-20/faqs/>

Storage schemes like Snowy 2.0 are intended to fill in the gaps in the intermittent supply of wind and solar. *But the gaps in supply are significantly more than 2,000MW and extend long enough to render Snowy 2.0 ineffective for backing up wind droughts.* Clearly the scheme cannot replace an equivalent (2000MW) coal-fired plant.

In addition, has anyone suggested where additional schemes will be located to replace the thousands of MW of coal-fired capacity that are scheduled to close in the next few years?

Briefing note 21.5 indicates the likely cost of using pumped hydro to firm the power from a fleet of wind farms to replace the four coal power stations that are scheduled to close in NSW by 2035. The estimated capital cost exceeds \$50 billion, assuming that sites can be found for the large number of additional wind farms and the pumped hydro facilities as well. <https://www.riteon.org.au/netzero-casualties/#215>

### Will firming with batteries work?

Briefing note 21.4 indicates the likely cost of firming a single wind farm with batteries, using the cost of the Hornsdale Power Reserve as a baseline. We are advised that the cost of batteries is plummeting but even if they are halved or reduced by a factor of ten, the figures remain astronomical. <https://www.riteon.org.au/netzero-casualties/#214>

It is important to realise that so-called “big batteries” contain negligible quantities of power compared with the demand in the grid. <https://www.riteon.org.au/netzero-casualties/#2112>

**Conclusion:** Further investment in RE capacity will be wasted until the storage issue is resolved