A new word for electricity generators – overspill.

Here's a word that hasn't been part of the of the electricity generation lexicon – Overspill

In the history of Australian electricity generation the dominant forms of generation have had significant fuel costs. As a result, generation has always been equal to demand. That is, if demand has fallen, some generators have been shut down (or wound back) to save fuel costs.

In the future, where generation sources will be increasingly dominated by technologies with no marginal cost – for example, wind and solar – this won't necessarily be the case. In fact, it would be quite realistic to imagine situations where high periods of solar or wind generation result in greater production than is able to be used or stored.

For example, ANU researchers Andrew Blakers, Matt Stocks and Bin Lu modelled scenarios of a 100% renewable NEM, where power was supplied by solar and wind, and the matching of the variability (and vagaries) of supply to demand was undertaken by high voltage DC transmission as well as pumped hydro storage. This analysis is interesting in that it shows that a 100% renewable grid is possible with today's technologies, that the amount of storage is not impractically large (less than a day of NEM demand would be required) and that the costs are quite manageable ($93/MWH in 2016 prices – which is quite competitive with today's baseload futures prices).

An interesting aspect of this modelling is that the scenarios involved 7-24% annual spillage. That is, a significant proportion of electricity produced was wasted.

This is a quite rational outcome. The lowest cost way of ensuring there is sufficient electricity production to meet demand is to:

- pursue a diversified basket of solar and wind generation (with this diversified by location to take advantage of the differences in weather across states); as well as
- energy storage/transmission (so that energy can be shifted through time and space to meet mismatches between supply and demand).

The optimal mix aims to ensure there is sufficient supply to meet demand – it is not to ensure that there is no un-stored surplus power. When the marginal cost is zero – it doesn't necessarily matter that some power is wasted. Costs are driven by capacity – not output.

What does this mean for investors in renewable generation? It means that forecasts of revenues should contemplate the possibility that a significant portion (maybe 10-20%) of output might attract very low (or zero) prices. There is already some evidence of this in South Australia – where prices quite frequently go negative during periods of strong wind and low demand.[1] [2]. Over the next few decades it is likely to happen more broadly.

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