

Energy in a Changing Climate

Chancy winds of change

NOW that the Council of Australian Governments has agreed the design of the expanded national renewable energy target scheme to get 20 per cent of Australia's electricity supply from renewables by 2020, perhaps it is time to look at where this renewable electricity may come from and what effect that could have on our electricity supply and greenhouse gas emissions.

The scheme focuses on reaching the 20 per cent target at least cost. According to Department of Climate Change consultants McLennan, Magasanik Associates, the lowest cost renewable energy sources a megawatt hour are hydro, biomass, geothermal hot dry rocks and wind power. Leaving aside hydro (remember water shortages?), MMA saw biomass, HDR and wind as the main contributors to the 20 per cent target.

Biomass electricity is a mature technology but constrained by resources. We already get some electricity from biomass, mainly from bagasse, and MMA expects a 10-fold increase in biomass electricity by 2020.

HDR is emerging technology with enormous potential but there are still no HDR generators in operation in Australia. MMA is not expecting a significant contribution from geothermal before 2015. Given the recent incident at Geodynamics Habanero 3 well site, that date may be further delayed.

The largest contributor to the target is from wind. According to MMA, about a third of the 20 per cent will be from wind, a seven-fold increase over the existing installed wind power. In case anyone is wondering, MMA doesn't seem to have a great deal of confidence that solar power will make a significant contribution to the 20 per cent, probably because of its high cost. Remember that the RET scheme focuses on the least cost solutions. It seems unlikely solar electricity will be competing with wind any time soon.

The RET legislation will come with a big stick for those electricity retailers and large wholesale electricity purchasers that fail to meet their annual renewable energy targets. This will probably guarantee that much of the 20 per cent does get built. But what will get built and what are the implications? What we do know is that it will be the solutions that appear the lowest cost.

With the HDR wobbles, the resource constraint on biomass and the high cost of solar, the odds are it will be more wind power. Unfortunately, of the three main contenders wind is the most difficult to manage in the electricity network. It is variable and the least predictable energy source of the three. If the wind stops blowing we need to get the power from elsewhere.

Unlike countries in Europe, Australia is isolated so we can't buy power from our neighbours when we need it. If the weather turns calm in countries such as Denmark and Spain (that get a much higher proportion of their electricity from wind power than the RET may deliver) they have ready access to nuclear and coal-generated power from France and Germany. Australia has to be self-sufficient.

If it turns out that half or most of the 20 per cent target has to come from wind power, that will mean greater upgrading of grids and more fossil-fuel reserve generation capacity to cover for any drop in the wind. Apart from making wind power more expensive (and perhaps no longer the lowest cost), it may affect greenhouse gas reductions because reserve fossil-fuel generators will probably have to be kept running and producing greenhouse gases just in case the wind drops unexpectedly. Wind power may not actually replace very much fossil fuel generation.

The danger is that, in the haste to meet our RET targets, the wind power is built before the network is ready. NEMMCO, the electricity system operator, needs to maintain a high reliability standard and accurately match our demand for electricity with supply. The operator may be forced to curtail some of the available wind power to maintain the supply-demand balance. Degrading the wind power output could mean we have built the renewable capacity but are unable to meet the targets.

None of this concerned the NSW Government when it recently streamlined the approval process for new smaller wind farms giving them critical infrastructure status.

Governments are fond of setting specific targets by specific time frames to be seen to be doing something without properly considering the technical feasibility. Geothermal isn't ready for 2020. Hydro and biomass growth is limited by available resources. Solar, tidal and wave power are considered too expensive today and probably still will be in 2020.

Which leaves us with wind and that will probably not deliver as much greenhouse gas reduction as we might have expected unless we are prepared to sacrifice network reliability.

More Melbourne and Sydney blackouts anyone?

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