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Response to AEMO ISP

In summary, the ISP should much more seriously consider the compelling economics of solar PV and wind.
AEMO should consider a net-zero fossil fuels strategy for 2050, which requires 15 GW of PV/wind deployment per year.
To model only slow PV/wind deployment is to build rapid obsolescence into the planning.

1. In my opinion, the ISP greatly underestimates the likely speed of solar PV and wind deployment.
2. The danger is that a self-fulfilling prophecy of slow PV/wind deployment is created, with insufficient transmission heavily constraining new wind and solar farms. This would push up prices.
3. Previous modelling and approval processes (developed in the coal era) are inappropriate for the current rapid transition to a PV/wind dominated electricity system
4. Surplus transmission capacity is a small and temporary risk. The fact is, that spare transmission capacity will be rapidly saturated with new wind and solar farms because of the compelling economics of PV/wind.
5. A much greater risk is the unexpected closure of a coal fired power station (eg because of sudden equipment failure or for commercial reasons). If transmission is not ahead of the PV/wind build-curve then new PV/wind will be unable to rapidly fill the gap.
6. New transmission should stop playing “catch-up” and get ahead of the PV/wind build curve. An obvious way to do this is to designate several renewable energy zones (REZ) in each state and provide 1-5 GW cables to each. It will quickly become clear whether this strategy works or not; are enough PV/wind developers attracted to the first few REZ to justify proceeding to the next? Thus, the risk is low.
7. PV/wind uptake is likely to increase rather than decrease. Transmission has to keep up. There is large potential upside which requires large-scale transmission construction.
    a. Current deployment rates of PV/wind are 6 GW per year (CER data); about 22 GW over 2018-21.
    b. Net-zero fossil fuels by 2050 requires this rate to increase to 15 GW per year, as a result of electrification of everything
    c. PV/wind is driving down prices.
    d. Rapid take-up of electric vehicles (displacing oil) and heat pumps (displacing gas) is likely to increase electricity consumption during the 2020s.
    e. The cost of PV/wind continues to fall which opens further markets, including direct competition with high temperature gas heating
    f. Its only a matter of time until PV/wind competes successfully with the marginal cost of operating existing coal power stations, leading to premature closures.

8. Deployment of new transmission needs to get out of a focus on short-term “fixes”. The least likely scenario is that PV/wind fail to drive many coal power stations out of business earlier than expected. Far more likely is that PV/wind deployment causes a series of coal power stations to close before nominal “retirement date”, causing shocks to the system if inadequate transmission has not allowed PV/wind to deploy in sufficient quantity.
9. The Step Change scenario is very pessimistic. Its absurd that the fastest deployment of PV/wind considered is 15 GW of new PV/wind by 2035! At current deployment rates, this 15 GW could happen within a few short years.
10. Realistic future scenarios for PV/wind deployment should be modelled: 6 GW per year, 10 GW per year and 15 GW per year of {rooftop PV + windfarms + solar farms}.

Climate change response in a nutshell

Renewable electrification of everything leading to zero oil, gas, coal = 85% emissions reduction. When do we reach this target using solar & wind (multiple GW per year of new deployment) to displace oil, gas and coal?

- *2.5GW/year of new PV/wind (Government projection from December 2019):* ***2200***
- *6GW/year (current rate):* ***2100***
- *15GW/year:* ***2050 → this could be the consensus position at the next COP meeting***
- *21GW/year:* ***2040***

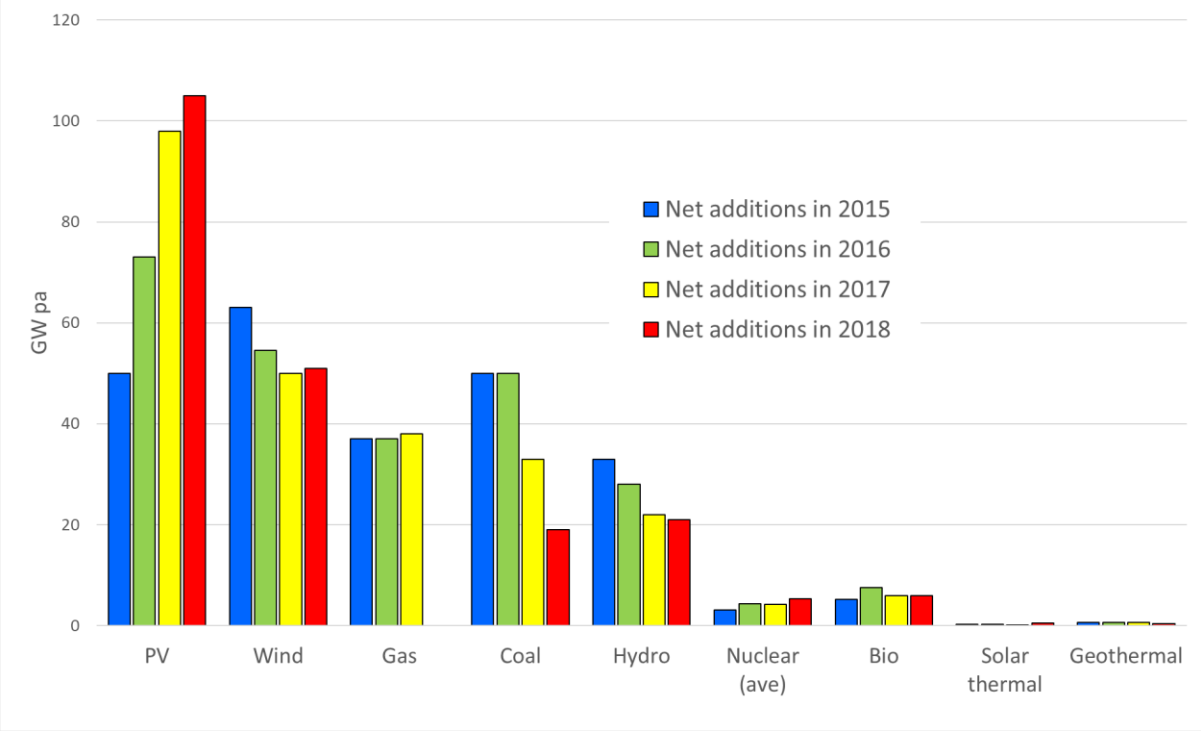

Fig. 1: Global annual net new generation capacity. PV/wind have won the energy race. In Australia, nearly 100% of new generation is PV & wind

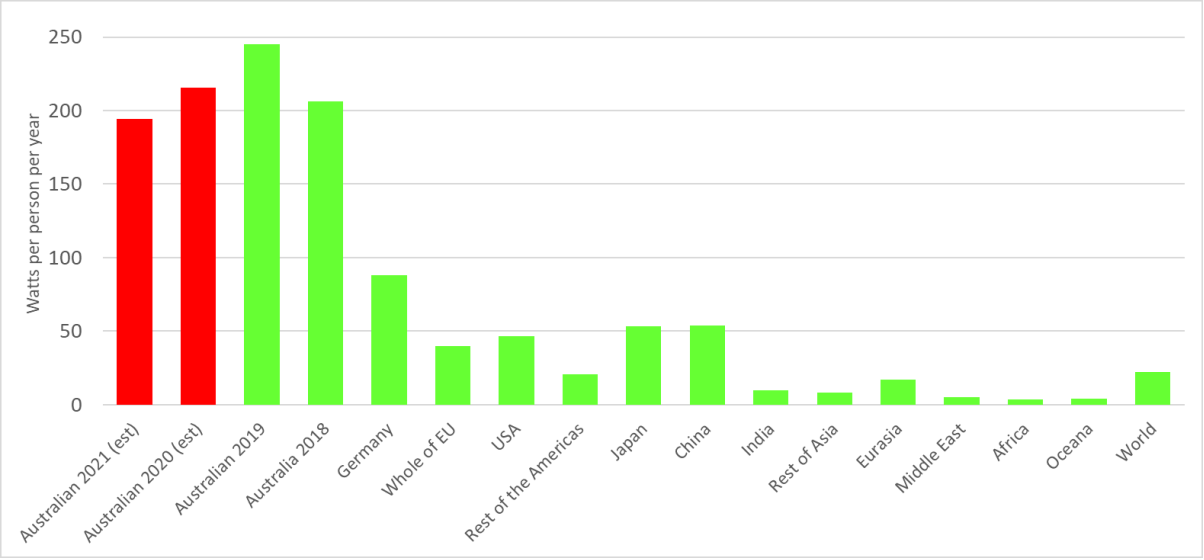

Fig. 2: Australia is the PV/wind superstar in terms of annual net new generation capacity per capita

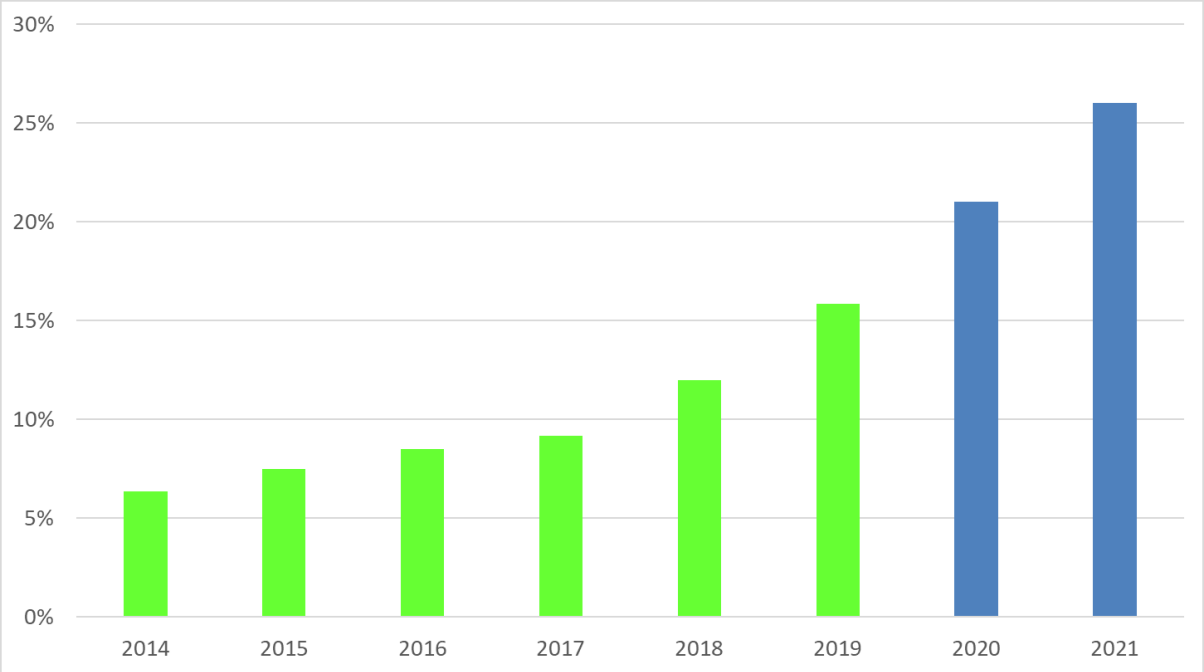

Fig. 3: Rapidly increasing PV + wind fraction of NEM generation. The green bars are past data and the blue bars are confidently predicted data because of "locked-in" new deployment. Note that hydro is 6-7% on top of PV/wind generation, on average. At current PV/wind deployment rates we are headed for 50% renewable electricity in the NEM by 2025

This PV/wind deployment could drive coal power stations out of business sooner than expected.

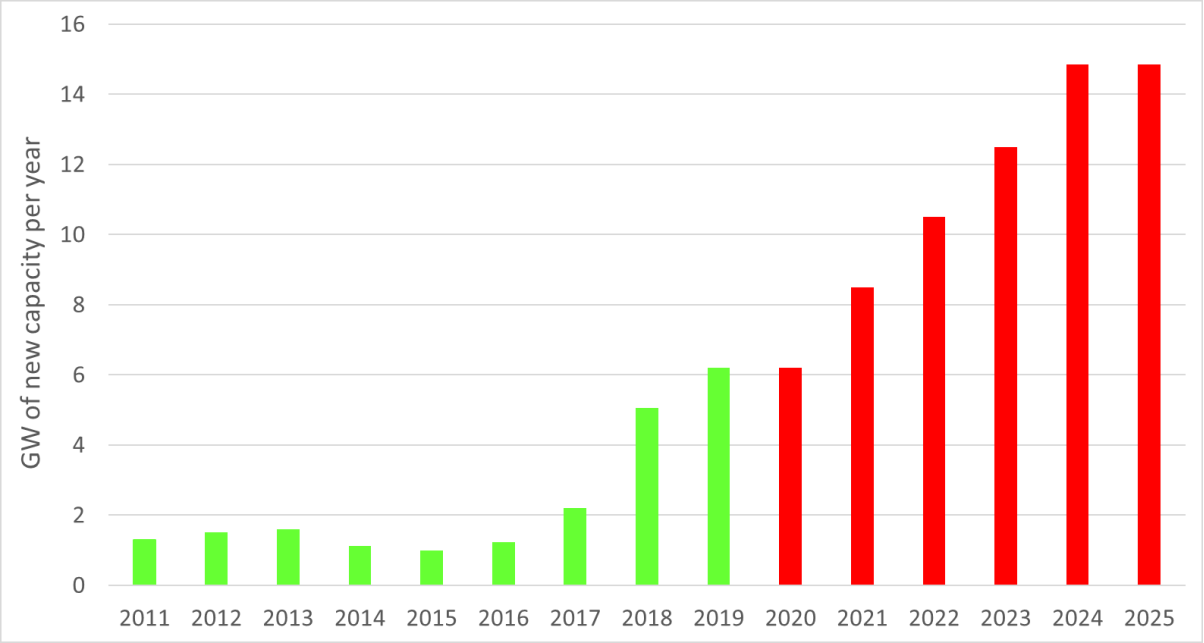

Fig. 4: Australia has increased its deployment rate of PV/wind from 1 GW/year to 6 GW/year (green bars). Net zero fossil fuels in 2050 (85% emissions reduction) requires 15 GW per year (red bars). AEMO needs to include 6, 10 and 15 GW per year PV/wind deployment scenarios in its planning.