ASIA-PACIFIC
SOLAR RESEARCH CONFERENCE

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Solar photovoltaics (PV) and wind constitute nearly two thirds of global annual net new capacity additions. Sustained price reductions mean that PV and wind are competitive with fossil fuel generation in most countries. Thus, the PV/wind share of global generation could rapidly increase.

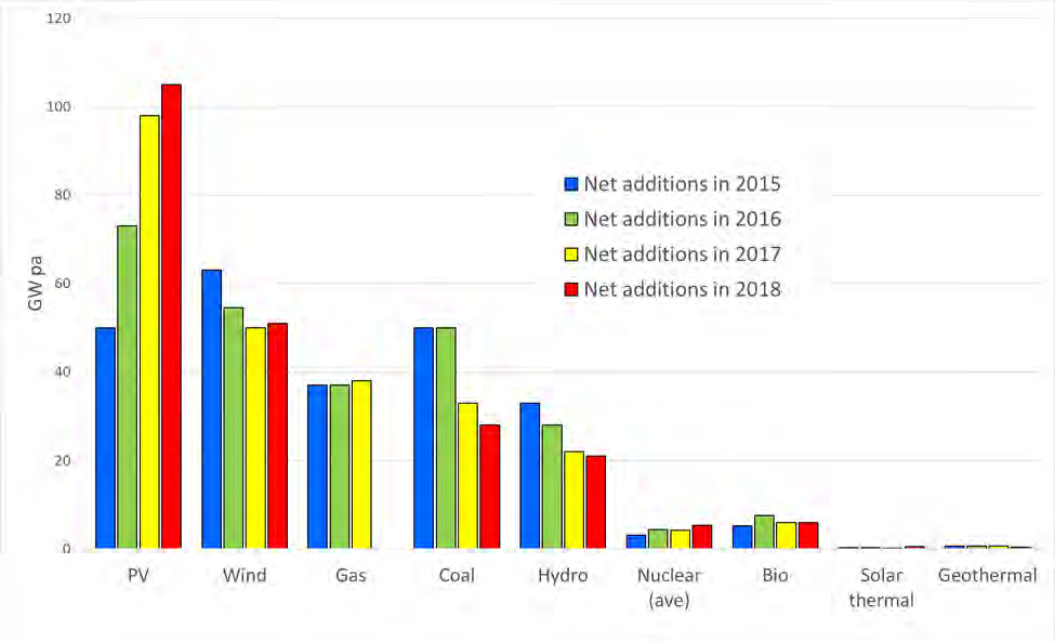

Fig. 1: Global net new capacity additions 2015-18

Oil, gas and coal are responsible for about 80% of Australia's greenhouse gas emissions. Thus, extensive renewable electrification of energy services could ultimately reduce greenhouse emissions by 80%. Low latitude countries have most of the world's population and emissions growth and can readily bypass an emissions-intensive fossil fuel era by investing in PV and wind.

Balancing an electricity system with 30-100% variable PV and wind is straightforward using off-the-shelf techniques comprising stronger interconnection over large areas to smooth out local weather; storage mostly in the form of pumped hydro and batteries; demand management; and occasional spillage of renewable electricity. ANU's global survey of off-river (closed loop) pumped hydro energy storage sites (http://re100.eng.anu.edu.au/global/index.php) identified 616,000 promising sites around the world with combined storage capacity of 23 million Gigawatt-hours, which is two orders of magnitude more than required to support 100% global renewable electricity. This is significant because pumped hydro storage is the lowest-cost storage method and is available off-the-shelf in large scale.

Australia is enjoying remarkable growth in PV and wind deployment, at a rate above 200 Watts per year per capita, which is 4-5 times faster than in the EU, USA, Japan and China. This is significant because it demonstrates that rapid deployment of PV and wind is feasible, with consequent rapid reductions in greenhouse gas emissions.

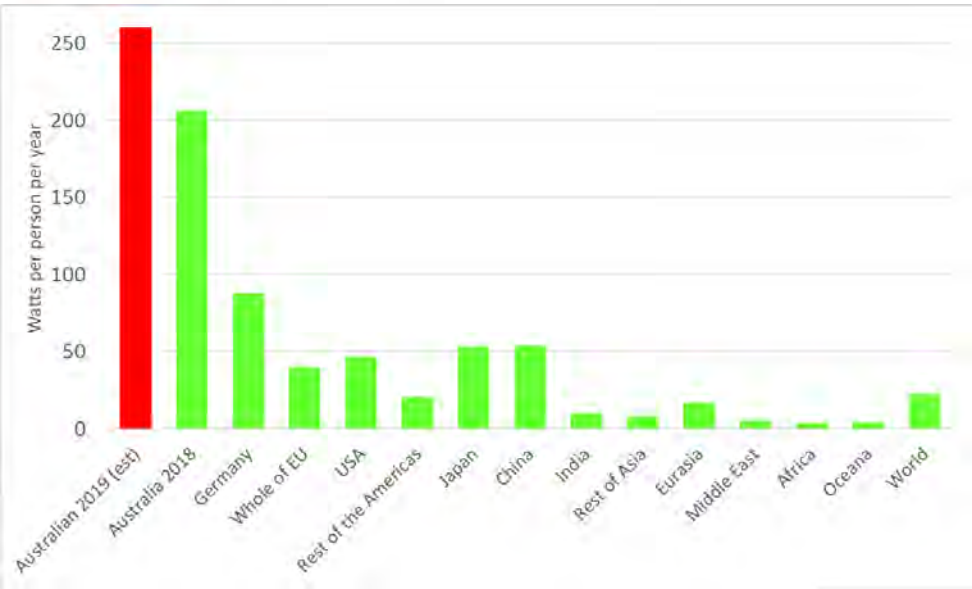

Fig.2 Annual per capita renewables deployment rate for countries and regions. Data for Australia (2018 and 2019) is from the Clean Energy Regulator and data for other countries/regions (2018) is from IRENA

Australian Greenhouse emissions have been rising slowly but steadily, whereas they should be falling towards Australia's Paris target. Much of the increase has been caused by fugitive emissions associated with LNG exports. LNG construction has now finished, and this factor will now stabilise. This provides large scope for PV and wind to rapidly reduce emissions. Annual emissions are likely to peak at the end of 2019 provided that the current build rate of PV and wind (5-7 GW per year) continues. This build rate reduces emissions by about 10 Megatonnes per year and would allow Australia to reach its Paris targets several years early. Crucial to this desirable outcome is facilitation of adequate transmission & storage.

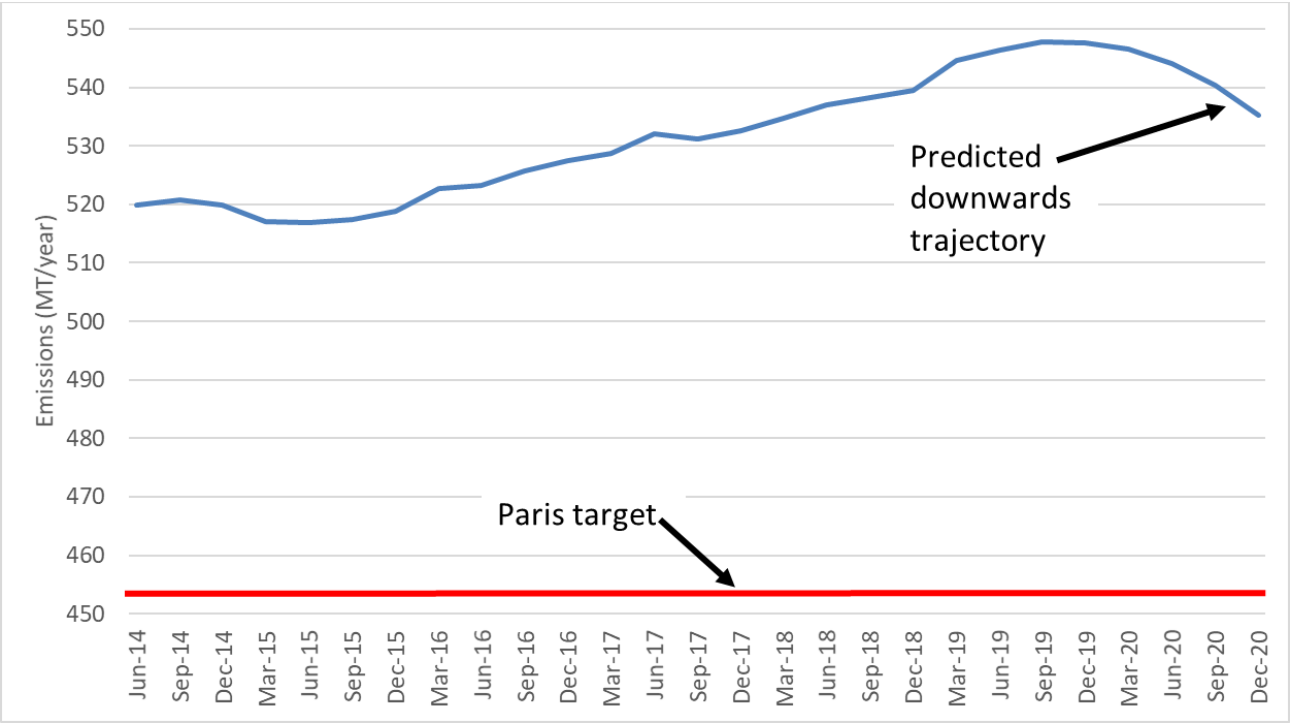

Figure 3: Actual (to December 2018) and projected annual greenhouse emissions (over the preceding 4 quarters) assuming that the current build rate of PV and wind (5-7 GW per year) continues