

NEM Fossil generation failure in the 2017 heatwaves

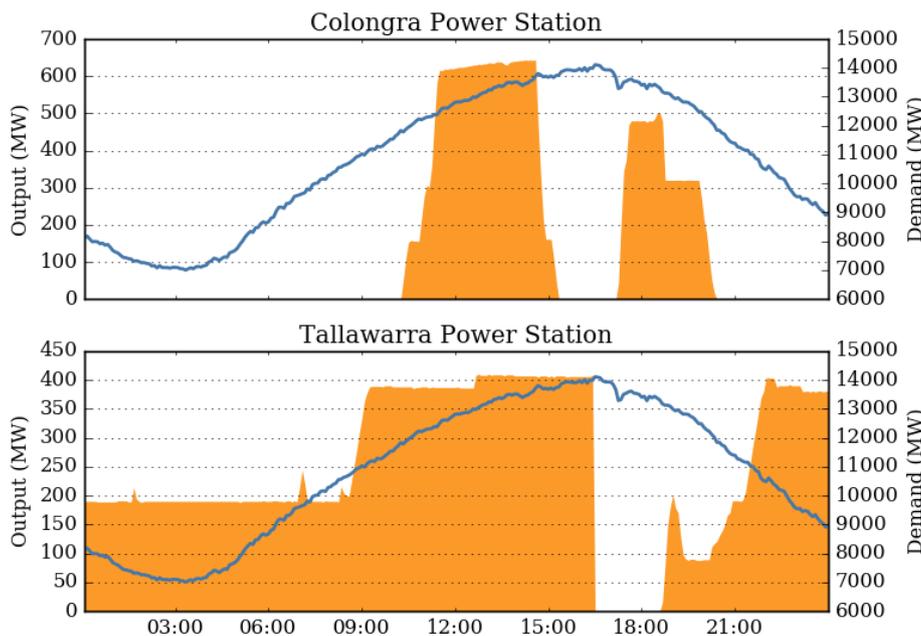
Briefing paper, December 2017

Outages during the February 2017 heatwave

During the February 2017 heatwave across south eastern Australia, **14% of fossil generating capacity (3,600 MW) failed during critical peak demand periods** in South Australia, New South Wales and Queensland as a result of faults, largely related to the heat.

- In South Australia, 17% of gas powered generation (438 MW) was unavailable during the peak demand period that led to the blackouts on the 8th of February.
- In New South Wales, 20% of coal and gas generation (2,438 MW) failed to deliver during the peak demand period on the 10th of February, leading to load shedding at Tomago aluminium smelter.
- In Queensland, 7% of coal and gas generation (787 MW) was withdrawn in the 4 hours leading to peak demand on the 12th of February due to technical issues, mostly and possibly entirely due to the heat. This led to dispatch prices reaching \$13,000 per MWh eleven times within three hours.

Figure 1: Output of Tallawarra and Colongra gas power plants February 10, 2017 (orange, LHS axis) with total NSW demand (blue, RHS axis)



Tallawarra failed immediately prior to the 4.30pm peak and Colongra failed to start.

These are two of the newest gas power plants in Australia and represent over 1,000 MW of failed capacity.

Source: Provided by Dylan McConnell of the University of Melbourne, 2017

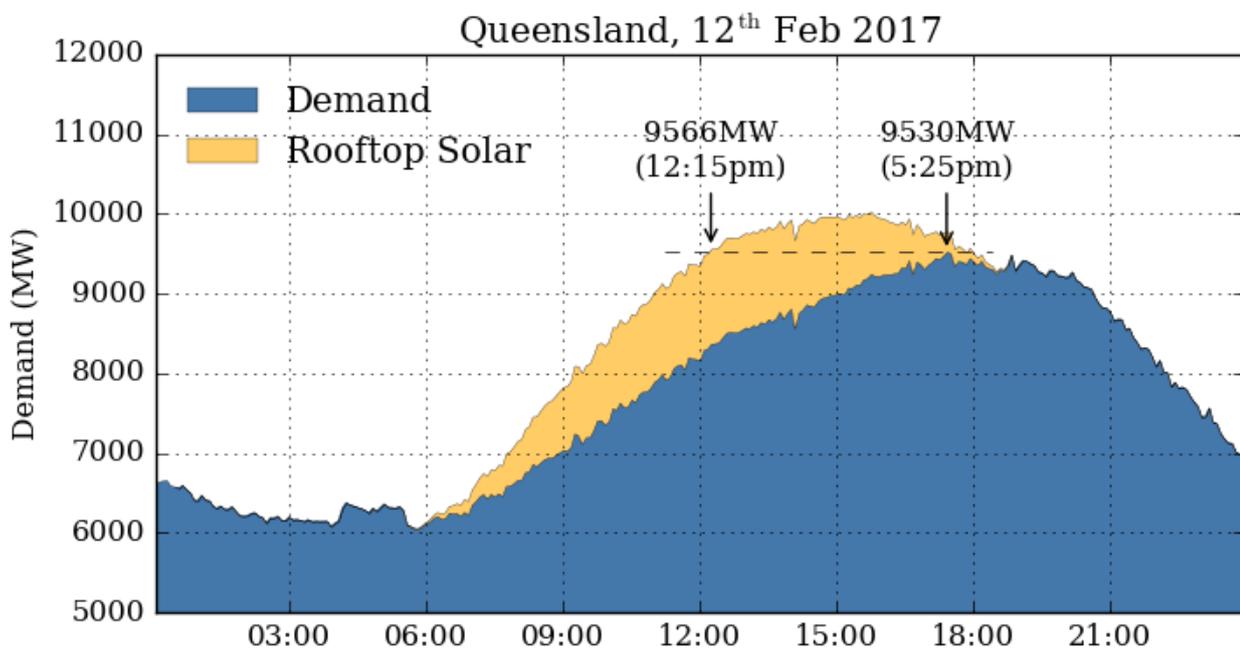
Solar PV delays and reduces peaks

In all three states, solar PV significantly reduced underlying demand, avoiding far greater disruption.

Without rooftop solar, the daily peaks that caused the blackouts, load shedding and high price events would have been exceeded:

- 4 hours 20 minutes earlier on the 8th of February in South Australia.
- 3 hours 25 minutes earlier on the 10th of February in New South Wales
- 5 hours and 10 minutes earlier on the 12th of February in Queensland¹

Figure 2: Total Queensland demand and rooftop solar generation on the 12th of February 2017



Source: Provided by Dylan McConnell of the University of Melbourne, 2017

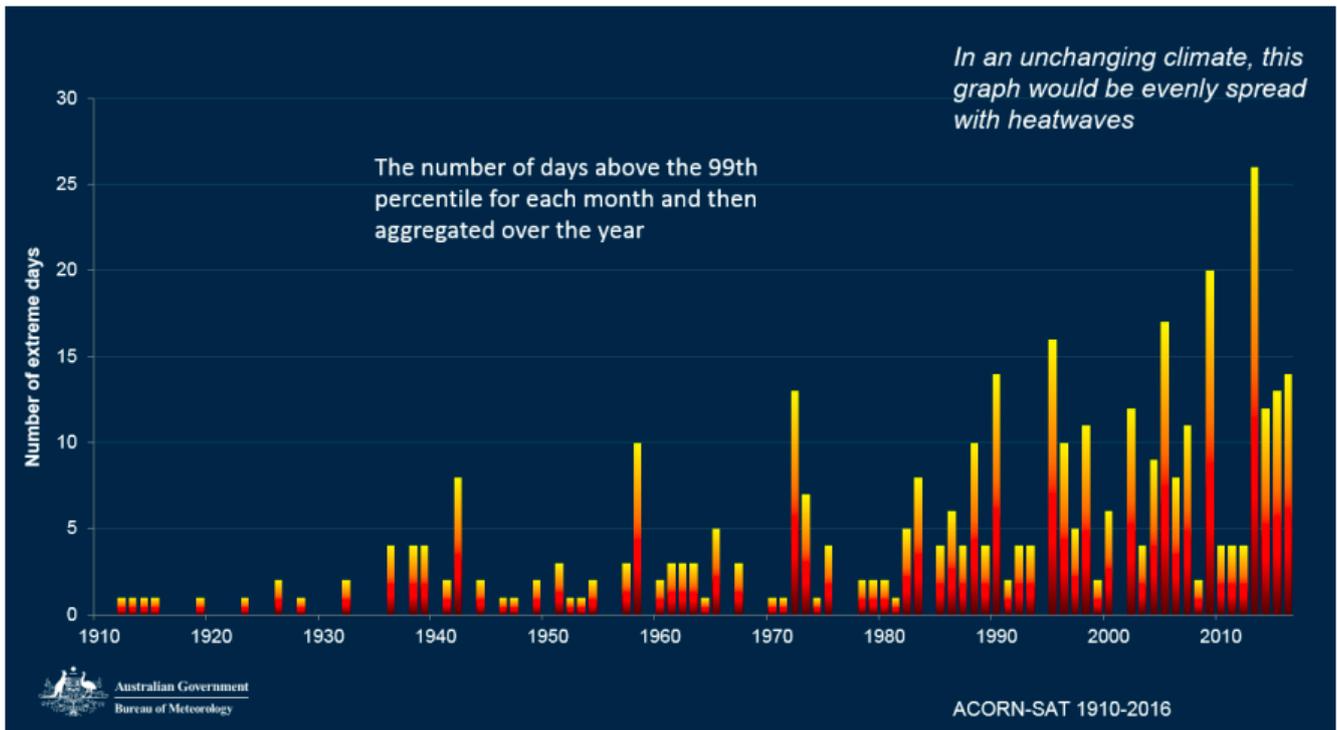
¹ Source: Provided by Dylan McConnell of the University of Melbourne, 2017

Heatwaves like this are increasing in frequency, intensity and duration.

An event equivalent to the 2017 heatwave in NSW would be a:

- One in 500-year event without global warming
- One in 50-year event with current global warming
- One in 5-year event with 2 degrees warming (possibly by 2050)²

Figure 3: Trends in Australian heatwaves



Source: AEMO (November 2017) *Summer operations 2017-18*

² World Weather Attribution (2017) *Extreme heat: Australia, February 2017*