2020-21 Preliminary review of ESOO 2020 demand forecasts

Review of maximum and minimum demand forecast performance to date

March 2021 FRG Meeting

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Background and Purpose

The purpose of today's presentation is to:

- Discuss the 2020-21 maximum and minimum demand actuals to date* versus 2020 ESOO Central scenario forecast, and,
- Receive FRG input on Summer 2022 maximum demand prior to presenting draft ESOO 2021 forecasts

Today's agenda includes:

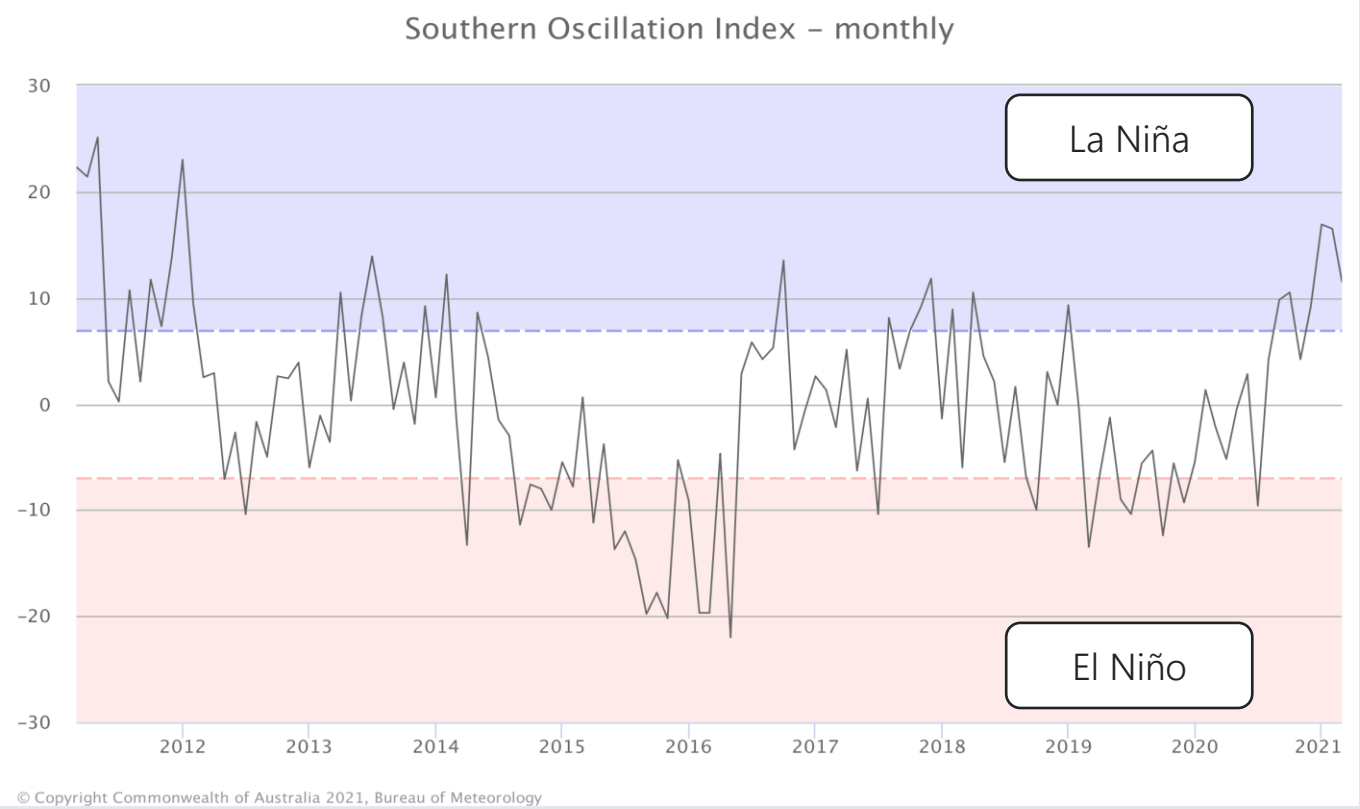
- Maximum demand – the impact from La Niña
- Minimum demand – the impact from under forecasting distributed PV installed capacity
- Assessment of COVID-19 on demand
- Discussion – are there additional factors we need to consider for the 2021 ESOO?

Timing	ESOO MD forecast review	Responsible
Oct 2020	ESOO 2019 FAR	AEMO
Today	Discuss ESOO 2020 forecasts	AEMO
June 2021	Discuss ESOO 2021 draft forecasts	AEMO

* Saturday 06/03/2021

Coolest summer since 2011-12

- Australia is influenced by many climate drivers with the El Niño Southern Oscillation (ENSO) driver having the strongest influence.
- 2020-21 summer was classified as La Niña.
- Typically La Niña brings:
  - increased rainfall across much of Australia
  - lower average daytime temperatures (south of the tropics)
  - higher average overnight temperatures (in the north of Australia)
  - a shift in temperature extremes



All states maximum demand below expected due to La Niña

	New South Wales	Queensland	South Australia	Tasmania (TBC)	Victoria
NEM datetime	Saturday 28/11/2020 17:00	Monday 22/02/2021 18:00	Thursday 18/02/2021 19:00	Thursday 3/09/2020 19:00	Monday 11/01/2021 17:00
Temperature (°C)	39.2	27.9	34.8	9.8	35.4
Daily max temperature (°C)	41.5	34.2	37.1	17.6	36
Daily min temperature (°C)	19.1	20.9	27	8.6	19.5
Firm adjustment (MW)	0	52*	0	0	0
Potential adjustment (MW)	0	0	0	0	0
Adjusted sent-out (OPSO)	**12,136**	**9,087**	**2,774**	**1,473**	**8,044**
POE10 (MW)	13,786	9,523	3,245	1,724	9,859
POE50 (MW)	12,711	9,129	2,902	1,656	8,885
POE90 (MW)	11,767	8,778	2,635	1,604	8,216

- The impact of underforecast of PV installed capacities had a small impact, due to low solar output at the above times of peak demand.
- Large industrial loads were within forecasts except for South Australia down by approximately 100MW on POE90 and Tasmania down by approximately 36 MW on POE90.
- Tasmania's max demand typically occurs in winter so we have not yet seen a true max for the 2021 season year. Also, shoulder max forecasts are more autumn driven than spring.

Probability of Exceedance Key

POE10 (higher demand value)

Point of max demand

POE90 (lower demand value)

* Demand response management (DRM) of AC load.

Under-forecast PV led to below expected minimum demand in some regions

	New South Wales	Queensland	South Australia	Tasmania*	Victoria
NEM datetime	Friday 25/12/2020 14:00	Sunday 27/09/2020 12:00	Sunday 11/10/2020 12:30	Friday 8/02/2021 2:30	Friday 25/12/2020 13:00
Temperature (°C)	21.1	22.4	21.3	12.7	18.3
Actual PV installed capacity (MW)	3,463	3,458	1,460	182	2,555
Forecast rooftop PV installed capacity (MW)	3,054	3,281	1,392	175	2,449
OPSO (MW)	**5,177**	**3,604**	**290**	**850**	**2,313**
POE10 (MW)	5,382	4,197	413	914	3,004
POE50 (MW)	5,217	4,096	378	875	2,912
POE90 (MW)	4,967	3,963	348	824	2,766

- 4 of 5 regions had midday minimums. Therefore under-forecast PV installed capacity due to expected COVID-19 impacts had a large impact on minimum demand
- New South Wales experienced a cloudy Christmas day, minimum demand could have been lower for a clear sky day
- LNG loads in Queensland were down approximately 30 MW
- South Australia Large Industrial Loads were down around 45 MW on POE90, but VPP (Energy Locals and AGL) increased min demand by 5 MW[1]

*29/11/2020 and 9/02/2021 were absolute minimums but Basslink outages tripped a number of loads.

[1] https://aemo.com.au/-/media/files/initiatives/der/2021/vpp-demonstrations-knowledge-sharing-report-3.pdf

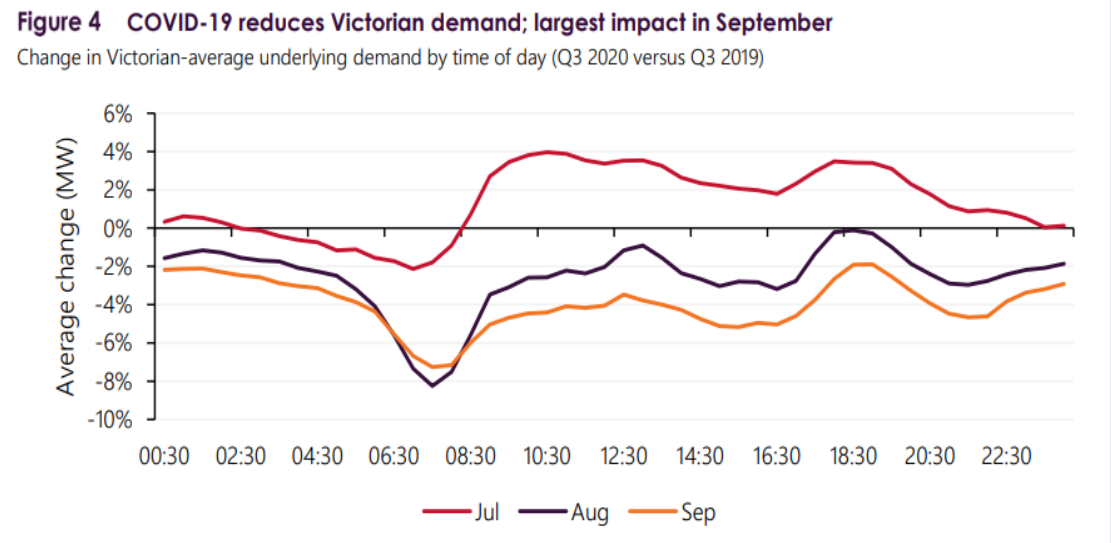
Was low max demand due to COVID-19?

COVID-19 influenced the energy sector at various times and places.

But did it materially impact annual minimum and maximum demand?

Analysis to date:

- None of the states were in lockdown at their times of maximum demand. Only New South Wales had restrictions in place during its minimum.
- "With Victorian stage 4 COVID-19 restriction lifted on 28 October 2020, COVID-19 did not materially impact demand outcomes this quarter." (QED Q4) [2]



Victoria was under COVID-19 lockdowns for much of the period in the above graph[1] (7th July 2020 – 18th October 2020). But it was not in lockdown during its maximum or minimum demand.

Definitive analysis is challenged by only one maximum and minimum demand figure a year, but variables include economy, temperature, solar penetration, and now COVID-19.

Overall, there is no clear evidence that COVID-19 materially impacted annual maximum and minimum demand.

Given the outlook of the Australian vaccination program rollout, there's no current plans to factor in COVID-19 for ESOO 2021 maximum and minimum demand forecasts.

[1] Quarterly Energy Dynamics report https://aemo.com.au/-/media/files/major-publications/qed/2020/qed-q3-2020.pdf
[2] Quarterly Energy Dynamics report https://aemo.com.au/-/media/files/major-publications/qed/2020/qed-q4-2020.pdf

Next steps in maximum and minimum demand

- Maximum demand:
  - Continue to forecast demand distributions using climate data adjusted for climate change (Representative Climate Pathway)
  - Monitor forthcoming analysis of Q1 demand data for evidence of material COVID-19 impact

- Minimum demand: Forecast Improvement Plan Section 3.1 on PV forecast improvements:
  - Make use of the DER register for data validation
  - Increase analysis of short-term installation trends – as a benchmark when reviewing consultant forecasts for ESOO 2021
  - Updated normalised PV generation profiles – now leverages improvements in satellite data and cloud/aerosol modelling

Stakeholder discussion

Do you think the explanations for the actuals are reasonable?

Are there any material risks for the 2021 ESOO demand forecast?

Appendix

Recap: what is 10% POE? (1/2)

The 10% POE demand forecast represents a demand that only has a 10% probability of being exceeded in the forecast year.

Extreme high demands, generally only occur when a number of conditions are all met:

- High temperature* on the day
- Following on the back of several days of high temperatures*
- Weekday outside of the Christmas break (from Christmas to 1 week into January) or a public holiday
- No cool change late in the day

*above is a summer example, for winter max demand, this is driven by low temperatures.

Recap: what is 10% POE? (2/2)

AEMO's maximum and minimum demand forecasts represents forecast demand in the absence of:

- Directed load shedding
- Network outages
- Mandatory restriction schemes in effect
- Call for voluntary reduction in demand
- Demand side participation (DSP) including any under RERT

It accounts for daily operation of load control, such as timer controlled hot water, or ripple controlled hot water/pool pump loads.

Any load shedding or atypical reduction in demand should be added back to the actual demand (counterfactual) when comparing with the forecast.