

# Peak Load Events

Presented to WA Electricity  
Consultative Forum

By Lucas Zieland, Senior Engineer

2 March 2022



# Introduction

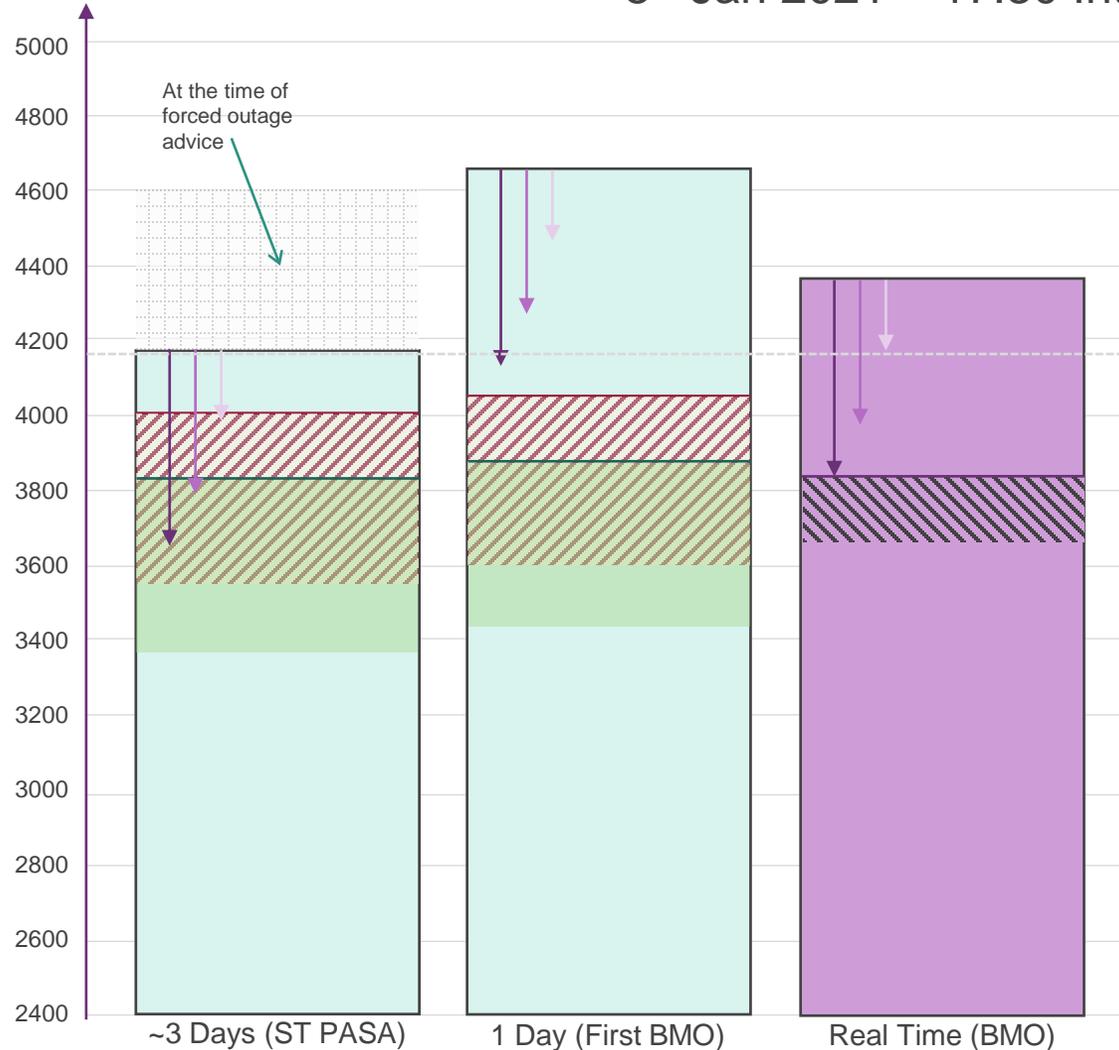
- Case studies are aiming to show some of the short term planning and considerations associated with recent peak load events
- Recent high temperatures and corresponding record loads
- Operational Planning Margin (per WEM Rules 3.18.11 and 3.19.6). Effectively secure after 1x Contingency. This is slightly higher than ES00 margin.

# Recent Peak Loads and Max Temps

Summer	Number of days >4000MW System Load	Max temp >40	Min Temp >25
2021/22* (So far!)	14	13	5
2020/21	1	5	0
2019/20	1	6	0
2018/19	0	3	0
2017/18	0	0	0
2016/17	0	4	0
2015/16	3	7	1
2014/15	1	2	0
2013/14	0	3	1
2012/13	0	5	5
2011/12	1	4	3
2010/11	0	2	3

Scheduled Generation (MW)

8<sup>th</sup> Jan 2021 – 17:30 Interval



- 3 Days Out:
  - No Planned Outages
  - ~420MW Forced Outages advised (2 large Facilities) in addition to existing smaller outages
  - ECT Stood Up
- On the Day:
  - ~240MW had returned (Incl. Env. Exception)
  - ~140MW tripped during the day, but returned before peak
  - Various plant with known availability risk – bushfires, “limping through”
  - Low actual NSG output

**Legend:**

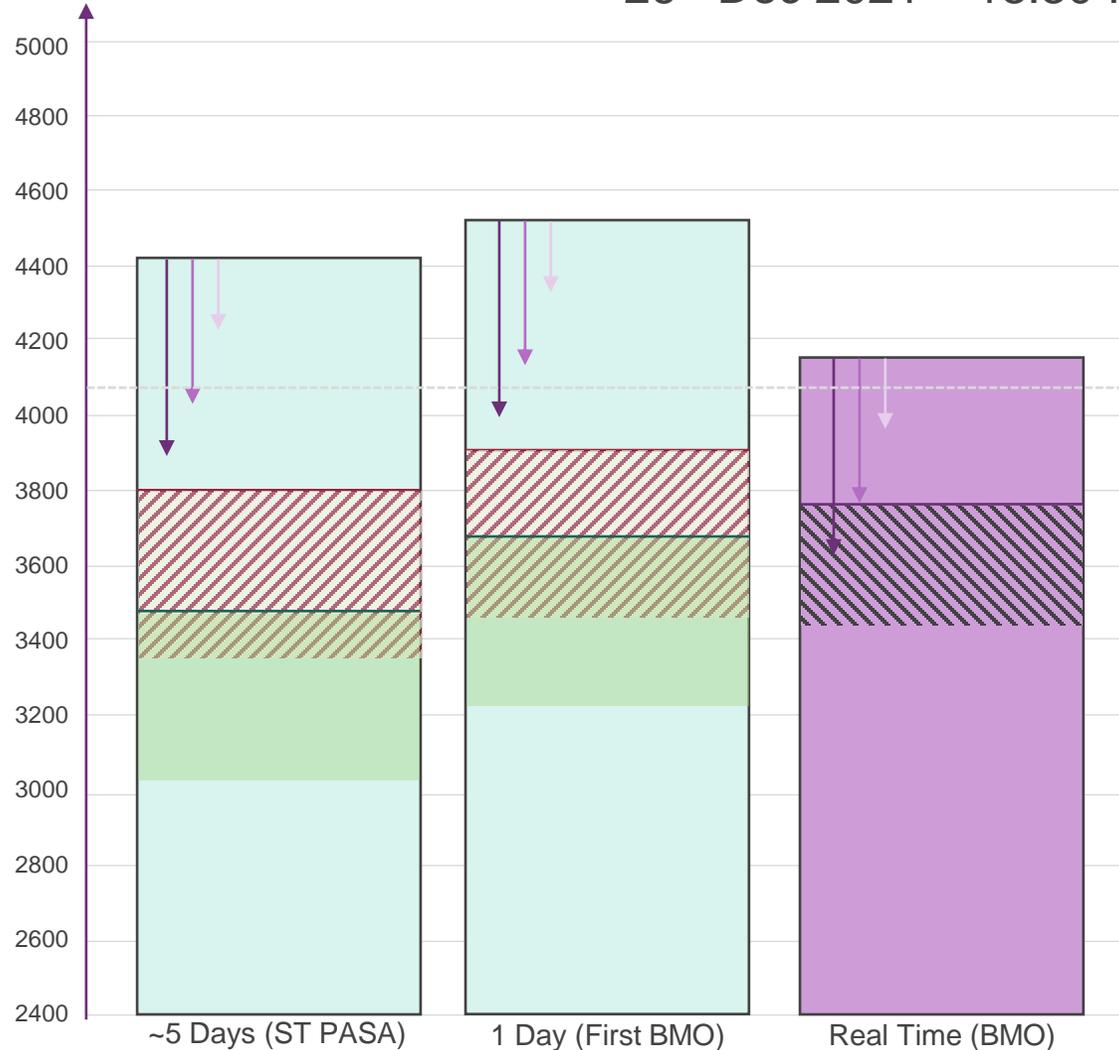
- Forecast SG Availability
- Forecast Load - PoE10
- NSG Uncertainty on POE10 Forecast Load
- Forecast Load - PoE50
- NSG Uncertainty on POE50 Forecast Load
- ESOO PoE10 Load Forecast (1 year in 10) (For this Capacity Year)

- Actual SG Availability
- Actual Load
- Actual NSG Offset
- Operational Planning Margin (n-1-1) – SIL = 515 MW
- ESOO Reserve Margin (Largest Unit + LFAS Up) – SIL = 376 MW
- Spinning Reserve Margin (~70% Largest Unit) – SIL = 177.8 MW

\*All Values Shown in Market Load Equivalent. Values have been converted from other metrics where necessary using best endeavours.

Scheduled Generation (MW)

26<sup>th</sup> Dec 2021 – 18:30 Interval



- 5 Days Out
  - No Planned Outages
  - Uncertainty in Load due to high temperatures over Christmas Period
  - ~300MW ongoing Forced Outages.
  - Outages relevant to GIA.
  - ~800MW thermal unit commitment required
- On the Day:
  - Forecast trended to earlier POE10 value
  - ~220MW had returned from forced outage for this event
  - ~330MW forced outage just before peak, frequency decline to 48.99Hz
  - (again, half of tripped facility returned for peak)
  - 6<sup>th</sup> Highest Load since records began (at the time of the event)

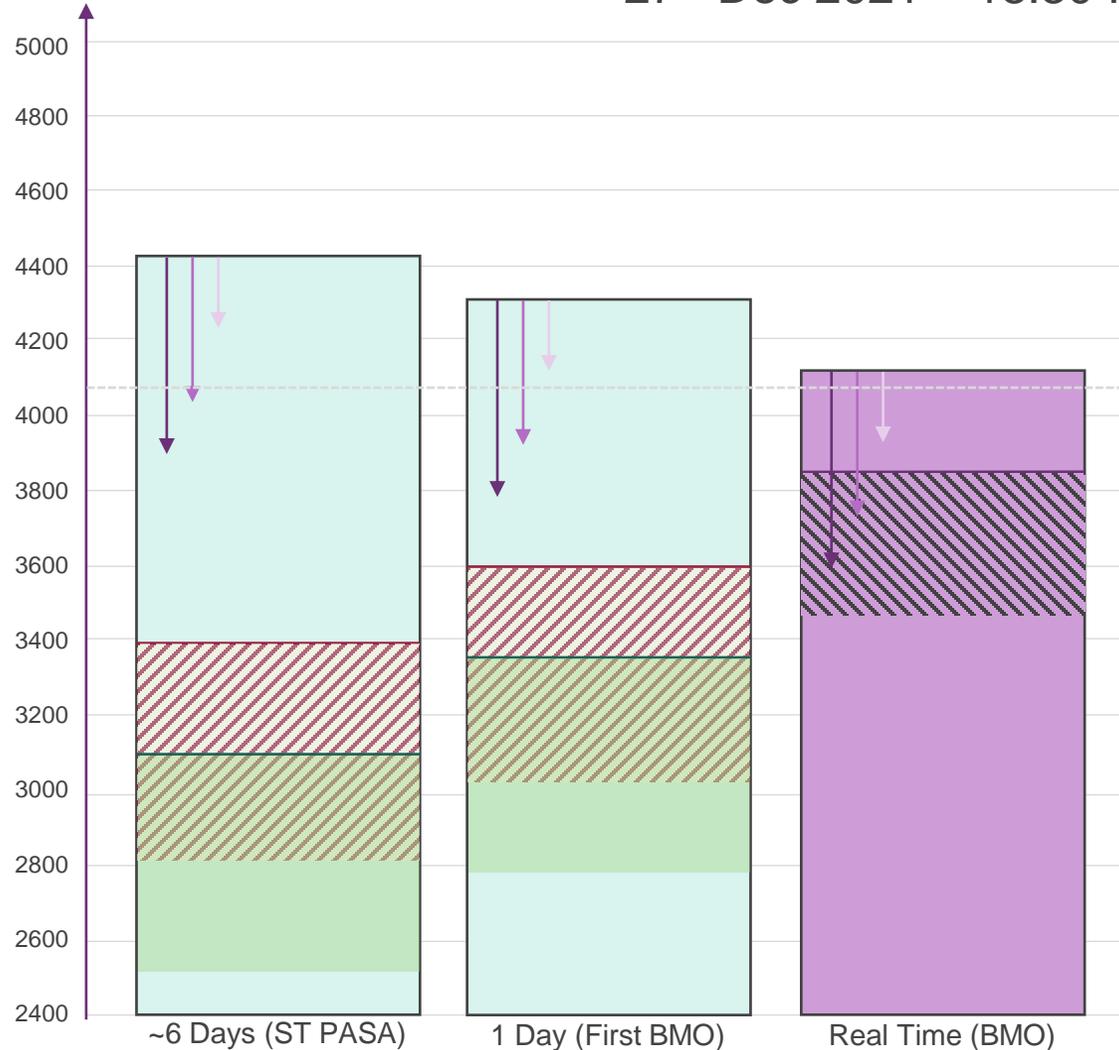
**Legend:**  
 Forecast SG Availability  
 Forecast Load - PoE10  
 NSG Uncertainty on POE10 Forecast Load  
 Forecast Load - PoE50  
 NSG Uncertainty on POE50 Forecast Load  
 ESOO PoE10 Load Forecast (1 year in 10) (For This Capacity Year)

Actual SG Availability  
 Actual Load  
 Actual SG Requirement Range (with and without NSG)  
 Operational Planning Margin (n-1-1) – SIL = 515 MW  
 ESOO Reserve Margin (Largest Unit + LFAS Up) – SIL = 376 MW  
 Spinning Reserve Margin (~70% Largest Unit) – SIL = 177.8 MW

\*All Values Shown in Market Load Equivalent. Values have been converted from other metrics where necessary using best endeavours.

## 27<sup>th</sup> Dec 2021 – 18:30 Interval

Scheduled Generation (MW)



- 6 Days Out
  - (Same as previous day)
- 1 Day Out
  - Opportunistic Outage approved (sufficient reserve margin)
- Morning Of
  - Despite load forecast increase, and ongoing forced outage of facility from previous day, reserve margin remained positive (hence no outage cancellation).
- On the Day:
  - Additional significant increase in load forecast and load above previous day's POE10
  - ~500MW increase in central case forecast over 6 days (weather)
  - 6<sup>th</sup> Highest Load since records began (at the time of the event-yes, again)

Legend:

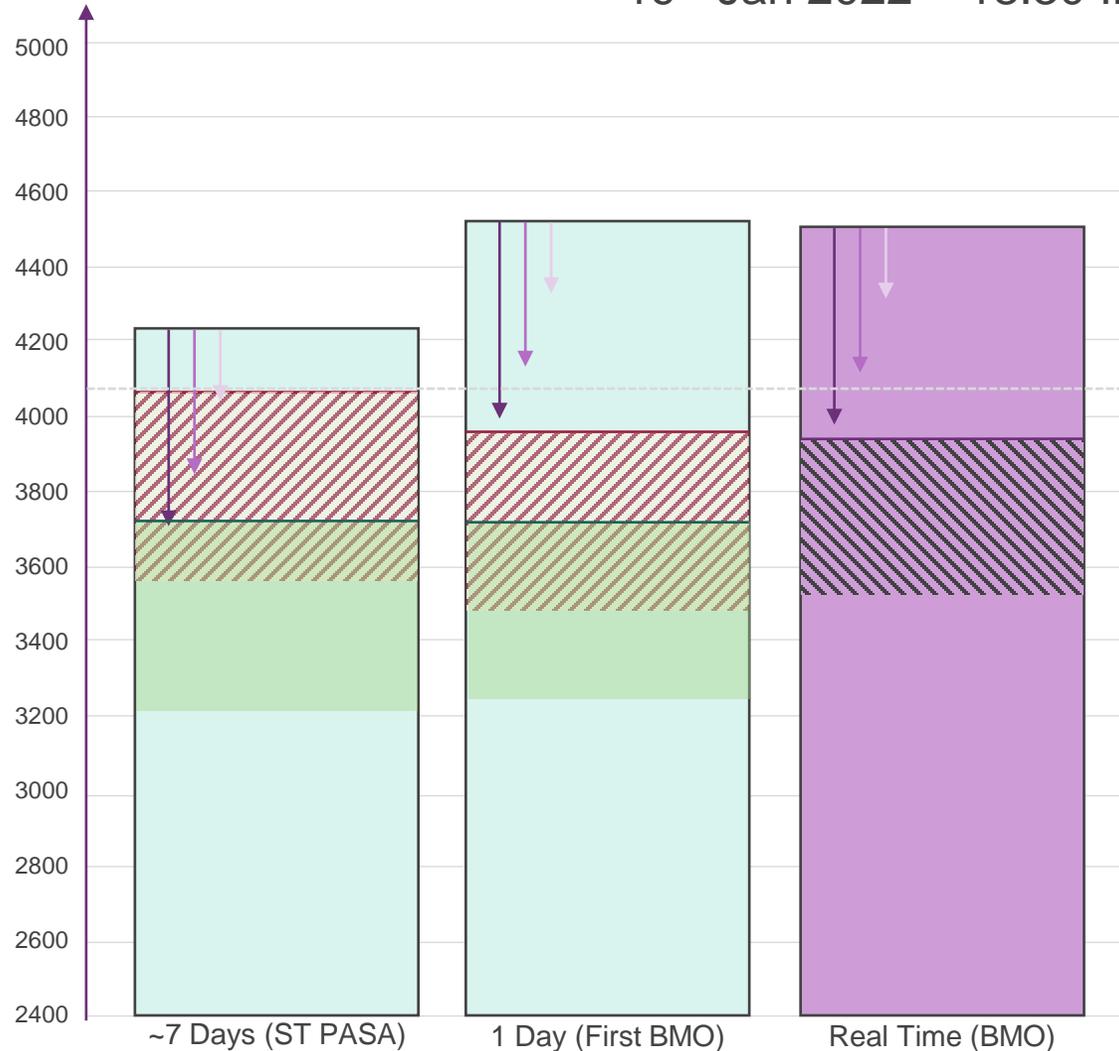
- Forecast SG Availability
- Forecast Load - PoE10
- NSG Uncertainty on POE10 Forecast Load
- Forecast Load - PoE50
- NSG Uncertainty on POE50 Forecast Load
- ESOO PoE10 Load Forecast (1 year in 10) (For This Capacity Year)

- Actual SG Availability
- Actual Load
- Actual SG Requirement Range (with and without NSG)
- Operational Planning Margin (n-1-1) – SIL = 515 MW
- ESOO Reserve Margin (Largest Unit + LFAS Up) – SIL = 376 MW
- Spinning Reserve Margin (~70% Largest Unit) – SIL = 177.8 MW

\*All Values Shown in Market Load Equivalent. Values have been converted from other metrics where necessary using best endeavours.

Scheduled Generation (MW)

19<sup>th</sup> Jan 2022 – 18:30 Interval



- 7 Days Out
  - Routine reserve margin checks and discussion with participants warranted outage withdrawals and cancellations
- On the Day:
  - Load hit the POE10 from previous day, reserves were just sufficient.
  - 3<sup>rd</sup> Highest Load since records began (the 1<sup>st</sup> / 2<sup>nd</sup> are from one week in 2016)
  - Typical of multiple hot days this January/February

**Legend:**  
 Forecast SG Availability  
 Forecast Load - PoE10  
 NSG Uncertainty on POE10 Forecast Load  
 Forecast Load - PoE50  
 NSG Uncertainty on POE50 Forecast Load  
 ES00 PoE10 Load Forecast (1 year in 10) (For This Capacity Year)

Actual SG Availability  
 Actual Load  
 Actual SG Requirement Range (with and without NSG)  
 Operational Planning Margin (n-1-1) – SIL = 515 MW  
 ES00 Reserve Margin (Largest Unit + LFAS Up) – SIL = 376 MW  
 Spinning Reserve Margin (~70% Largest Unit) – SIL = 177.8 MW

\*All Values Shown in Market Load Equivalent. Values have been converted from other metrics where necessary using best endeavours.

# Considerations

- Despite system conditions, there was always adequate generation to meet demand. 😊
- We came close to, but did not exceed, the ESOO POE10 load forecast. 😊
- Operational considerations/complexities:
  - A “low wind” scenario, with output less than capacity credits?
  - Wind volatility in excess of LFAS (weather front, GIA binding)?
  - A “long-term” forced outage in addition to these events?
  - A large contingency right at the time of peak?
- Note that Peak events are getting later, contrast:
  - 16:30 interval in Summer 15/16 (1<sup>st</sup> / 2<sup>nd</sup> highest system loads since records began)
  - 17:30 interval in Summer 20/21,
  - 18:30 interval in Summer 21/22,
  - Consider that DPV contribution at peak are not increasing?
- The reliability criteria (and potentially availability classes) will be examined as part of the RCM Review which will provide an opportunity to address current and emerging reliability inadequacies.



# Questions and Feedback

[wa.sm.operations@aemo.com.au](mailto:wa.sm.operations@aemo.com.au)