Draft Demand Side Participation (DSP) forecasts

For the 2023 ESOO

31 May 2023

Forecasting Reference Group Meeting

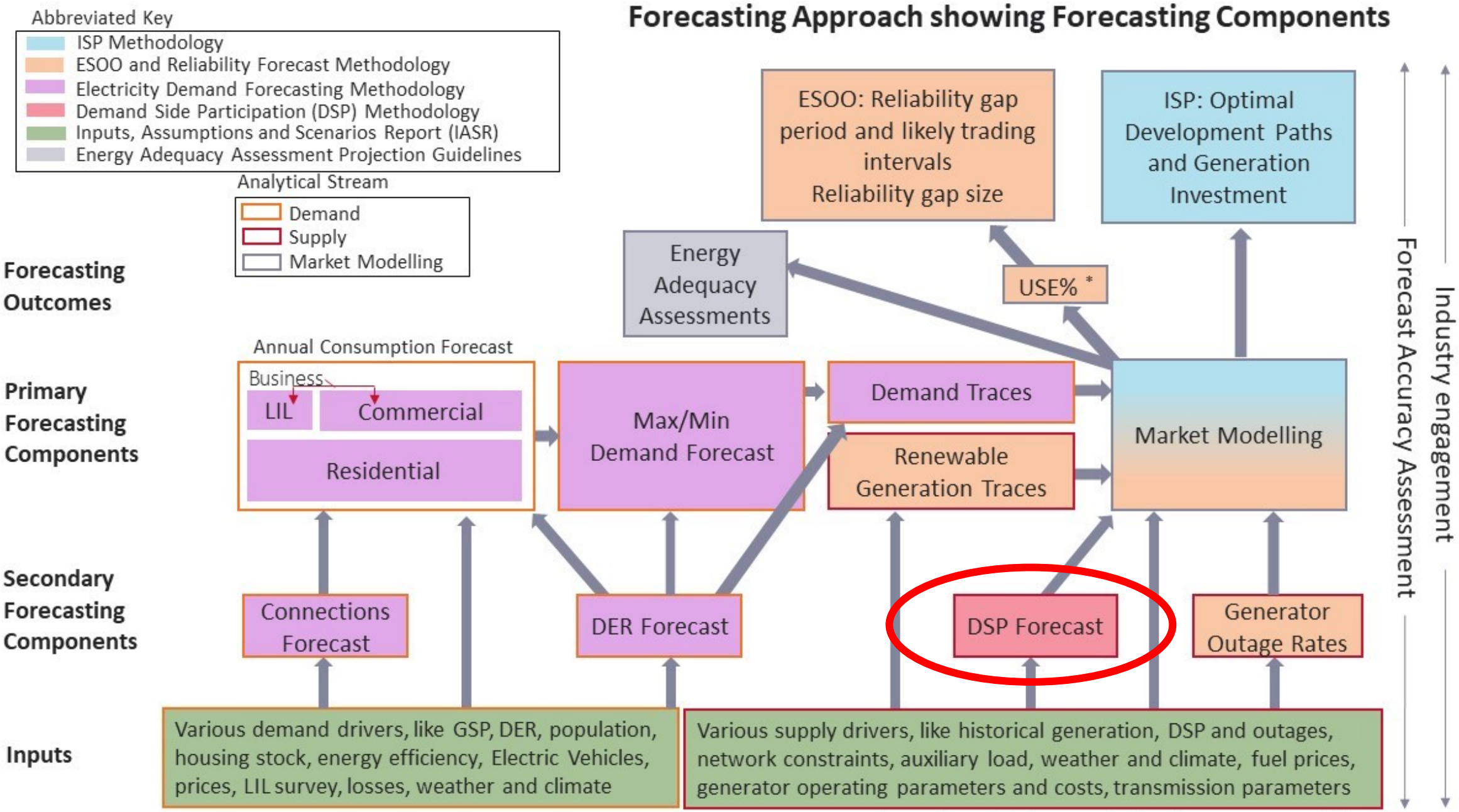
Purpose and agenda

The purpose of this presentation is to *consult* with the FRG on the draft Demand Side Participation (DSP) forecast for the 2023 Electricity Statement of Opportunities (ESOO).

- Today's Agenda includes:
  - DSP definition
  - DSP Information data collection summary
  - DSP calculation update
  - Wholesale Demand Response analysis
  - Other adjustments, network DSP
  - Next steps

Timing	Relevant topic	Responsible
Dec 22	2022 Forecast Accuracy Report and consultation on 2022 Forecast Improvement Plan	Stakeholders, AEMO
Dec 22 – Feb 22	Inputs, Assumptions and Scenarios Report consultation	Stakeholders, AEMO
Today	**FRG presentation and discussion on draft DSP forecasts**	**AEMO, FRG**
End Aug	2023 ESOO publication	AEMO

Forecasting Approach showing Forecasting Components



See AEMO's Forecasting Approach

DSP and Virtual Power Plants in AEMO's modelling

AEMO models a wide range of demand flexibility. There is a risk of double counting, so AEMO's modelling is designed to minimise the risk of that and only include demand flexibility once.

Figure 67 Flexible demand sources included in AEMO's DSP forecast

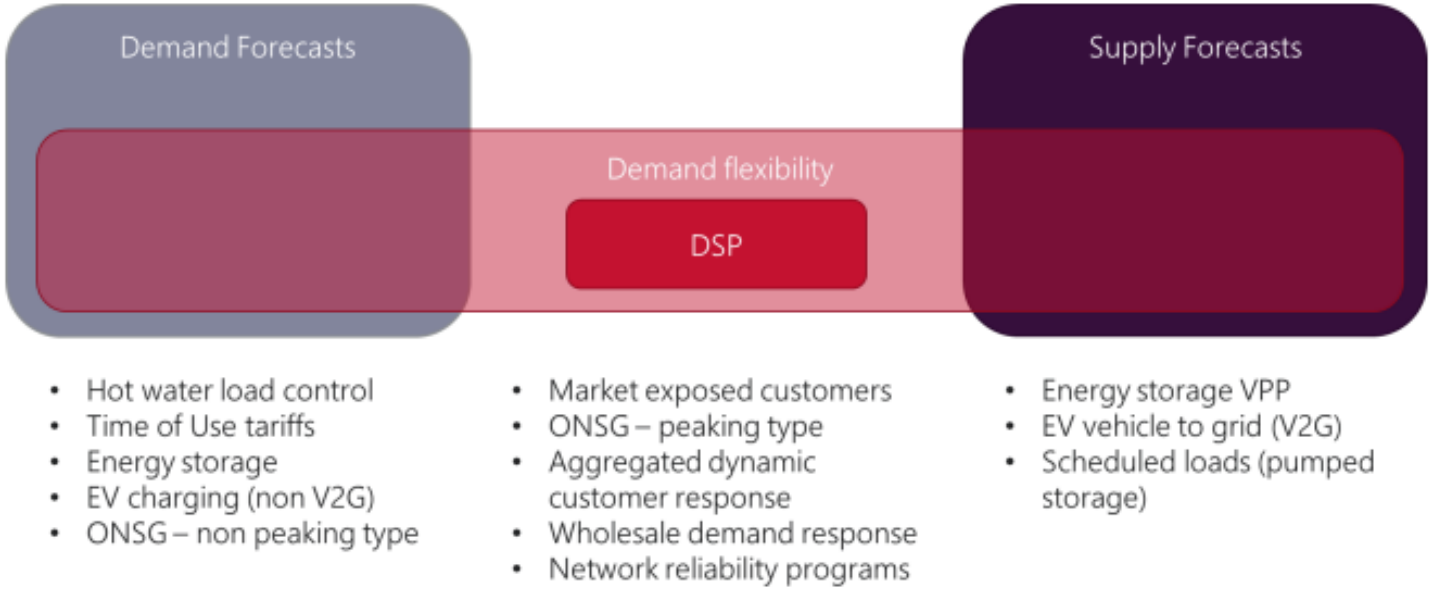


Figure from: https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2022/2022-electricity-statement-of-opportunities.pdf

DSP and VPP in AEMO's modelling

AEMO's demand forecasts project max/min demand in the absence of DSP, RERT and any unserved energy. Demand flexibility that is done daily regardless of external factors will be included in the demand though.

Figure 67 Flexible demand sources included in AEMO's DSP forecast

- Hot water load control
- Time of Use tariffs
- Energy storage
- EV charging (non V2G)
- ONSG – non peaking type

- Market exposed customer
- ONSG – peaking type
- Aggregated dynamic customer response
- Wholesale demand response
- Network reliability programs

- Energy storage VPP
- EV vehicle to grid (V2G)
- Scheduled loads (pumped storage)

Demand flexibility from consumer energy resources are optimised within the supply side. This enables consideration of the need for flexibility, given underlying supply and enables consideration of energy or other operational limits.

Demand flexibility that is used for (extreme) price spikes or reliability signals is modelled as DSP (basically, similar to a peaking generator)

DSP forecasting timeline and process

- Oct-Dec: Review accuracy of last year's DSP forecast
- Nov-Mar: Observe DSP responses during extreme demand events
- April: Collection of DSP Information (DSPI) from all registered participants through the DSPI portal
- May: Undertake analysis of DSP components
- June: Finalise forecast for use in 2023 ESOO

  Extend projection as needed for use in 2024 ISP

Record number of submissions received in the 2023 survey

- Received responses from all NSPs, significant retailers and aggregators (though maybe not from all of their participant ID).
- However, categorising programs in the submissions still not as good as we would like, resulting in:
  - Risk of programs wrongly being included or excluded
  - Additional time spend by AEMO to verify submissions
  - Making it difficult see trends in DSP growth

  - Opportunity to improve categories and wording when consulted on in the second half of this year!

DSP forecast components

- Price driven responses
  - Market exposed sites excluding wholesale demand response (WDR) – from DSPI survey
    - As per definition on slides 4-5.
  - WDR response – from market data (dispatch prices and volumes)

- Reliability response
  - Network DSP – from NSP estimates
  - Additional adjustments, such as
    - Market DSP at reliability events – from ad hoc analysis
    - Policy driven DSP – from policy targets

As per DSP forecast methodology available at:

https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-approach

Price-driven DSP forecast

The following is the estimated response in MW (both summer and winter) for price-responsive DSP based on a historical analysis of responses at different price levels in the three years up to 31 March 2023.

Price	NSW	QLD	SA	TAS	VIC
> 300 $/MWh	0	22	26	0	0
> 500 $/MWh	0	54	40	6	0
> 1000 $/MWh	45	91	40	6	49
> 2500 $/MWh	50	104	40	6	56
> 5000 $/MWh	82	151	43	6	56
> 7500 $/MWh	82	189	48	6	56
2022 Forecast: >$7500/MWh response	48	69	13	17	35

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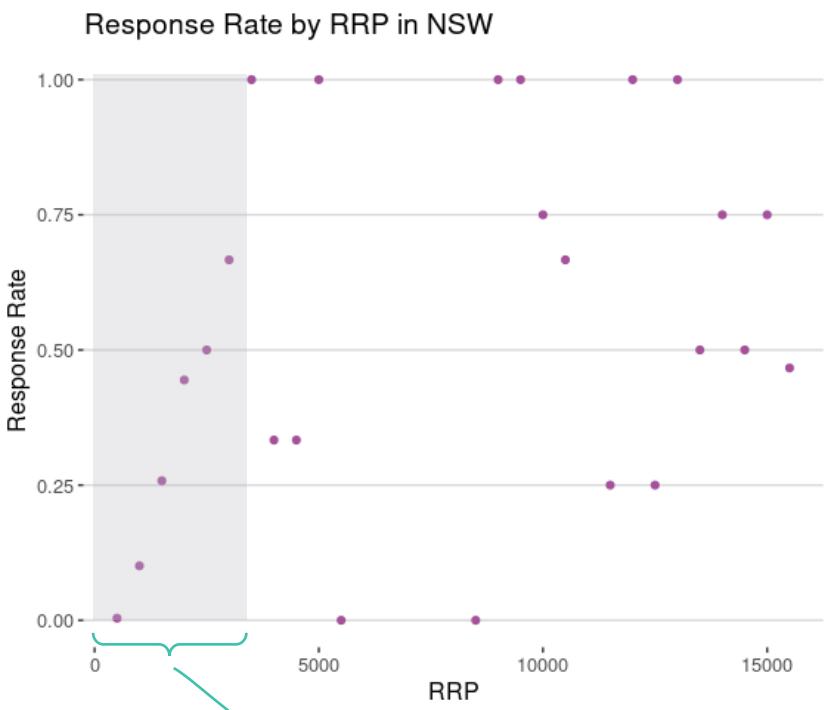
Responses vary significantly between different observations for the same price triggers. The forecast reflects a central estimate (50th percentile) of the historically observed responses.

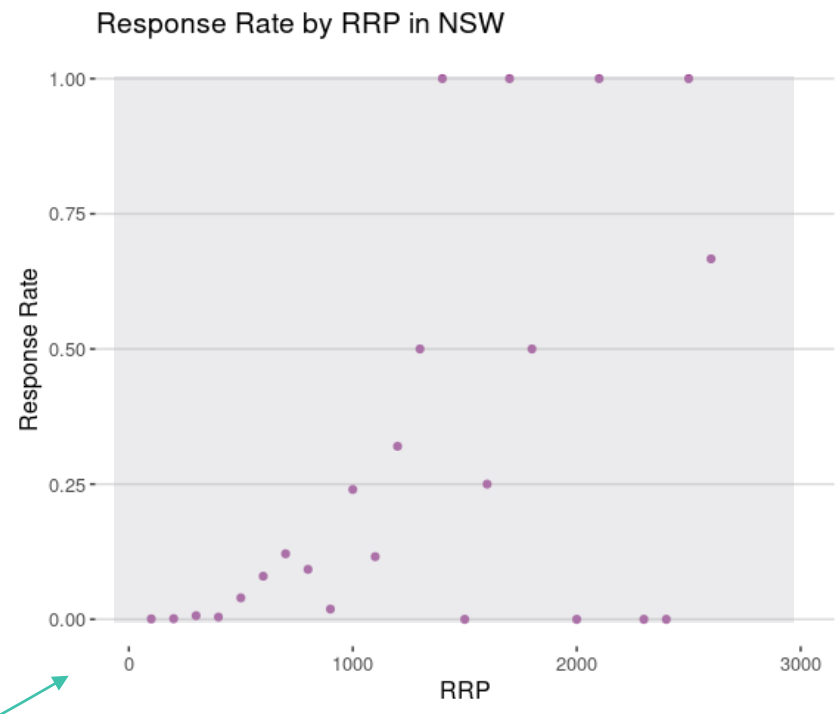
Wholesale Demand Response (WDR) update

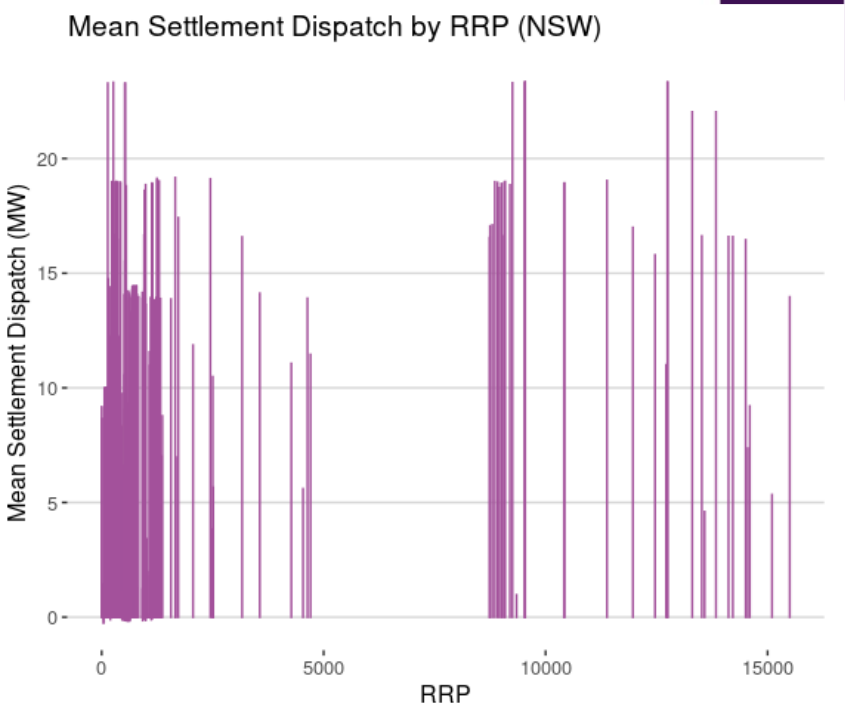
- One registered Demand Response Service Provider (DRSP), coordinating ~60 MW of available capacity.
- NSW and Victoria comprise the majority of capacity, with smaller amounts in Queensland and South Australia.
- Since its commencement, WDR has not been activated in New South Wales or Victoria on peak demand days (WDR occurred in Queensland and South Australia, but for a small volume).
- As the WDR mechanism evolves (more DRSPs, higher capacity, increased breadth across NEM), forecasts will be updated to reflect the latest insights.

WDR analysis – response v. Regional Reference Price RRP

Example analysis for New South Wales, looking at responses for different levels of the RRP in 2022/23







2023 WDR forecasts
Average MW response at price triggers

Price ($/MWh)	NSW	VIC	QLD	SA	TAS
>$300	0	0	0	0	0
>$500	0	0	0	0	0
>$1,000	9	3	<1	<1	0
>$2,500	12	7	<1	<1	0
>$5,000	12	7	<1	<1	0
>$7,500	13	7	<1	<1	0
2022 Forecast: (>$7,500)	**15**	**6**	**6**	**2**	**0**

No data available for 2022 forecasts, so Queensland and South Australia were approximated based on Victoria. The 2023 forecasts are based on actual data.

Reliability response – overview

- The reliability response assumes all price-driven DSP from the highest price band as well as additional resources operating during actual lack of reserve (LOR) 2 or 3 events*.
- The additional reliability DSP resources are:
  - Network DSP
  - Additional adjustments
    - Infrequent response generally available in extreme situations only
    - Policy driven DSP

*For the definition, see https://www.aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/%20reserve-level-declarationguidelines.pdf.

Reliability response – estimates

Network DSP:

- Approximately 70 MW in Queensland
- Approximately 45 MW in Victoria

} Programs only available in Summer and excludes loads active in other programs

Additional adjustments:

- **Infrequent DSP**
  - Based on observed responses during LOR 2 and 3 events (excluding RERT) any season.
  - Observations in the last year supports estimates from 2022 forecast are still sound:
    - 242 MW in New South Wales
    - 149 MW in Victoria

- **Policy-driven DSP**
  - Forecast includes the NSW Peak Demand Reduction Scheme, which only contributes during Summer. Updated modelling from NSW government has been used to inform impact in MW:

	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
PDRS forecast (MW)	8	53	161	313	482	668	834

Combined forecast - Summer

Price	NSW	QLD	SA	TAS	VIC
> 300 $/MWh	0	22	26	0	0
> 500 $/MWh	0	54	40	6	0
> 1000 $/MWh	53	91	41	6	52
> 2500 $/MWh	60	105	41	6	63
> 5000 $/MWh	92	152	44	6	63
> 7500 $/MWh	93	189	49	6	63
Reliability response	335	259	49	6	257

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2022 Forecast: Reliability response	290	133	13	17	209

Next steps

- Finalise 2023 ESOO forecast taking onboard any feedback from FRG and additional internal reviews.
- Project growth in DSP out to 2055 as per IASR.

- Any learnings will be feeding into the consultation of the DSP forecast methodology and DSPI guidelines currently planned for second half of 2023.

Appendix

DSP: 2022 Forecast Accuracy Report conclusions

DSP forecast conclusions

Across all high price periods, actual estimated DSP was generally lower than forecast, apart from Queensland, where actuals were above forecast values. For New South Wales and Victoria, that was partly because of less WDR than forecast. In the southern states, the number of periods with prices above the higher price triggers was rather low, meaning that the estimated DSP response may not be statistically significant, and it is therefore not possible to draw any strong conclusions from the observations.

Of the five NEM regions, only Queensland had maximum demand events where prices had reached the upper price triggers. The observed DSP during summer aligned well with the forecast on that day, while there was some evidence of DSP during winter as well, although it cannot be ruled out that the observed reduction in demand was driven by other factors.

AEMO will continue to monitor DSP trends including any growth in WDR.