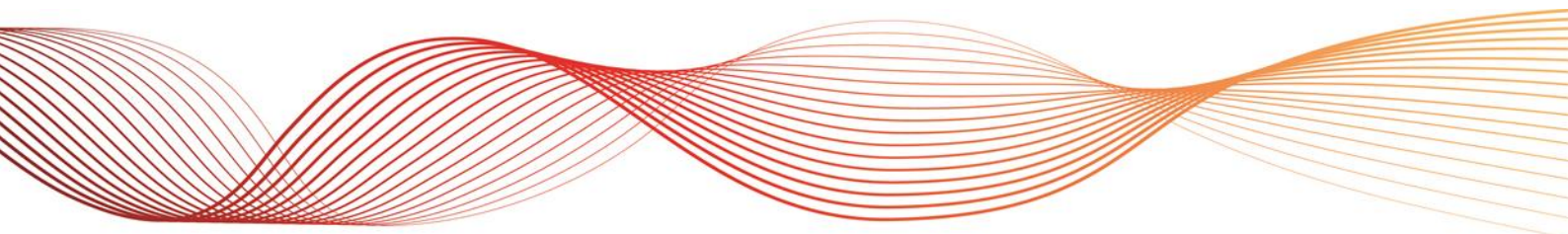


SOUTH AUSTRALIAN DEMAND FORECASTS

SOUTH AUSTRALIAN ADVISORY FUNCTIONS

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IMPORTANT NOTICE

Purpose

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The purpose of this report is to provide insights into operational consumption and demand forecasts in the South Australian region of the National Electricity Market (NEM).

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1. PURPOSE AND KEY FINDINGS

This report summarises South Australia's electricity demand forecasts from the 2015 National Electricity Forecasting Report (NEFR¹).

1.1 KEY FINDINGS

In the medium term (2014–15 to 2024–25), operational consumption is forecast to decline in line with the trend set in 2010–11. This decline is due to lower residential and commercial consumption as a result of high uptake in rooftop photovoltaic² (PV).

In the short term however (2014–15 to 2017–18), AEMO forecasts an increase in operational consumption driven by a recovery in industrials, mainly due to the Port Pirie smelter redevelopment returning it to pre-2014 consumption levels.

AEMO has forecast minimum demand (MinD) for the first time, to investigate the impact of rooftop PV on the daily load profile. This provides useful information on network usage, which can inform further studies to evaluate operational implications. For South Australia by the end of 2024–25, continued uptake of PV could result in distribution customers in aggregate being net generators to the grid, at certain times.

1.2 Annual operational consumption and maximum demand definitions

This report presents annual operational consumption and maximum demand (MD) for historical results, estimates, and forecasts. Both annual operational consumption and MD include all large industrial consumption, residential and commercial consumption³, and transmission losses.

Further:

- Annual operational consumption is the electrical energy supplied by scheduled, semi-scheduled, and significant non-scheduled generating units, less the electrical energy supplied by small non-scheduled generation.
- MD is “as-generated” data, measured at each generating unit terminal, and represents its entire output.
- A probability of exceedance (POE) refers to the likelihood that a maximum demand or minimum demand forecast will be met or exceeded.

The various probabilities (generally 90%, 50%, and 10% POE) provide a range of possibilities for analysts to determine a realistic range of power system and market outcomes.

For any given season, a 10% POE MD projection is expected to be exceeded, on average, one year in 10, and a 50% POE maximum demand projection is expected to be exceeded, on average, five years in 10 (or one year in two).

¹ Available: <http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report>. Viewed: 25 June 2015.

² A system comprising one or more photovoltaic panels, installed on a residential or commercial building rooftop to convert sunlight into electricity.

³ Residential and commercial forecasts include light industrial loads.

2. OPERATIONAL CONSUMPTION

Per capita consumption is forecast to continue to decline, with population growth keeping operational consumption relatively flat throughout the long term outlook period.

AEMO forecasts an increase in operational consumption in the short term, driven by a recovery in industrials, mainly due to Port Pirie smelter returning to pre-2014 levels of consumption following redevelopment of the facility.

In the medium term (2014–15 to 2024–25), operational consumption is forecast to decline, due to the decrease in residential and commercial consumption as a result of high uptake of rooftop PV.

From 2009–10 to 2014–15, annual operational consumption has declined by 1,117 GWh. This is primarily due to rising electricity prices, the uptake of rooftop PV and energy efficiency. This equates to an average decline of 1.7% per year over 5 years.

2.1 Key differences between 2015 and 2014 NEFR forecasts

The key differences are:

- Current estimate for 2014–15: The current estimate for 2014–15 annual operational consumption is 12,498 GWh, which is 63 GWh (0.5%) below the 2014 NEFR medium forecast.
- Short-term forecast (2014–15 to 2017–18): The 2015 forecast is an average annual increase of 0.8%, compared to a decline of 0.9% in the 2014 forecasts.

Figure 1 Annual operational consumption forecasts (based on data in Tables 1 and 2)

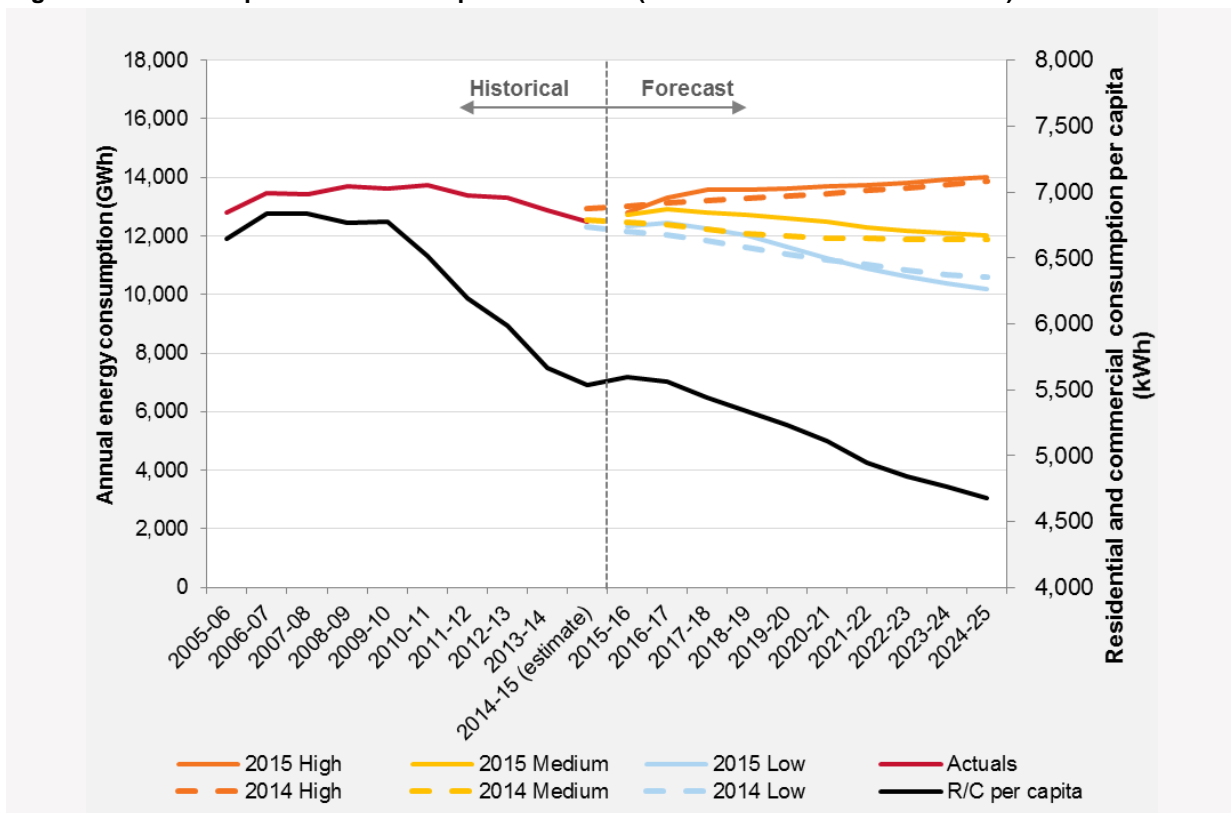
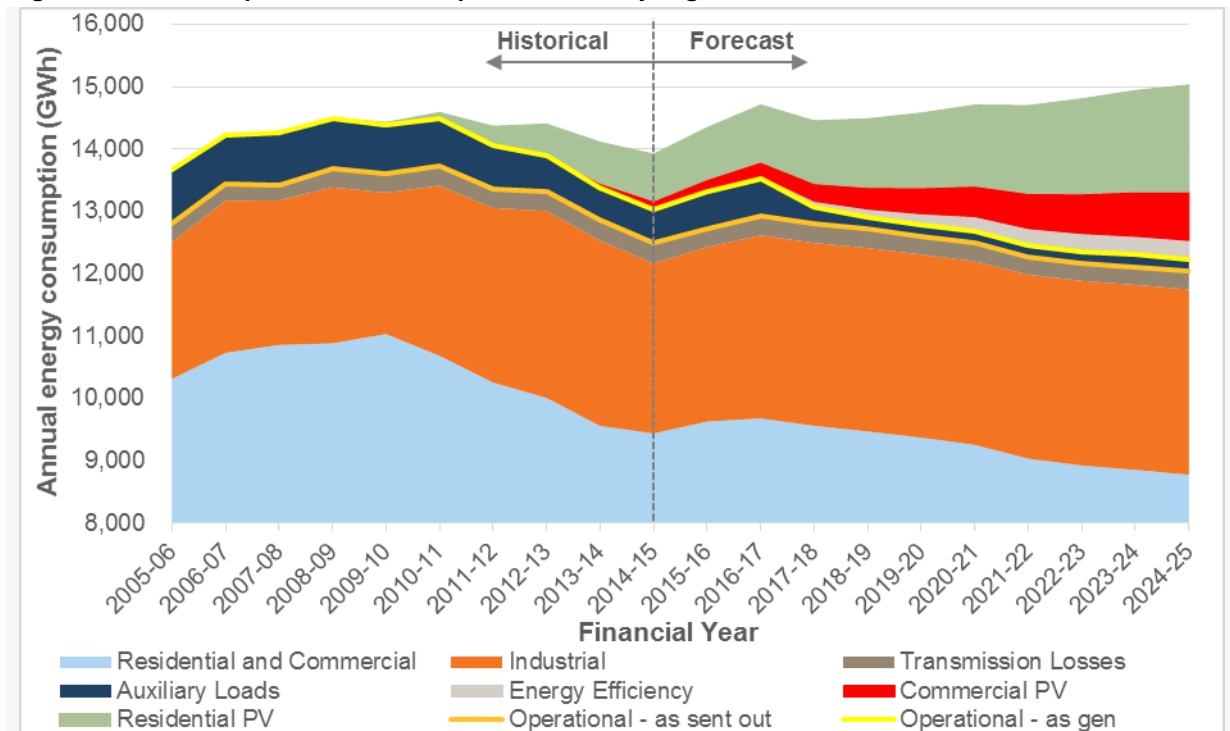


Table 1 Annual operational consumption actual and forecast for South Australia (GWh)

Actual			Forecast			
		% change	Actual	High	Medium	Low
2009-10	13,614		2014-15 (estimate)	12,498		
2010-11	13,723	0.8%	2015-16		12,811	12,728
2011-12	13,365	-2.6%	2016-17		13,314	12,922
2012-13	13,316	-0.4%	2017-18		13,582	12,797
2013-14	12,868	-3.4%	2018-19		13,595	12,712
2014-15 (estimate)	12,498	-2.9%	2019-20		13,618	12,606
			2020-21		13,712	12,493
			2021-22		13,740	12,275
			2022-23		13,830	12,171
			2023-24		13,939	12,106
			2024-25		14,001	12,034

2.1.1 Annual operational consumption forecast by segment

Figure 2 Annual operational consumption forecast by segment



3. MAXIMUM DEMAND FORECASTS

Rooftop PV is causing MD to shift to later in the day. Rooftop PV generation has already shifted the expected MD time to 6.30 pm. As rooftop PV generation increases, the time of MD shifts later, to 7.30 pm by the end of the NEFR forecast period of 2034-35.

The 10% POE MD is forecast to increase due to an increase in population and gross state product (GSP).

3.1 Key differences between 2015 and 2014 NEFR forecasts

The key differences are:

- The 2014-15 summer MD was 2,872 MW on 7 January 2015, which was 94 MW below the 2014 NEFR 50% POE forecast of 2,966 MW. The 2014–15 summer MD was lower than forecast, as it occurred within the school holiday period and there were cooler maximum temperatures in the preceding days.
- The 10% POE MD is forecast to increase at an annual average rate of 0.4% over the short term (2014–15 to 2017–18) medium scenario forecast, compared to a decline of 0.1% in the 2014 NEFR.

Figure 3 Summer 90%, 50% and 10% POE maximum demand forecasts for South Australia

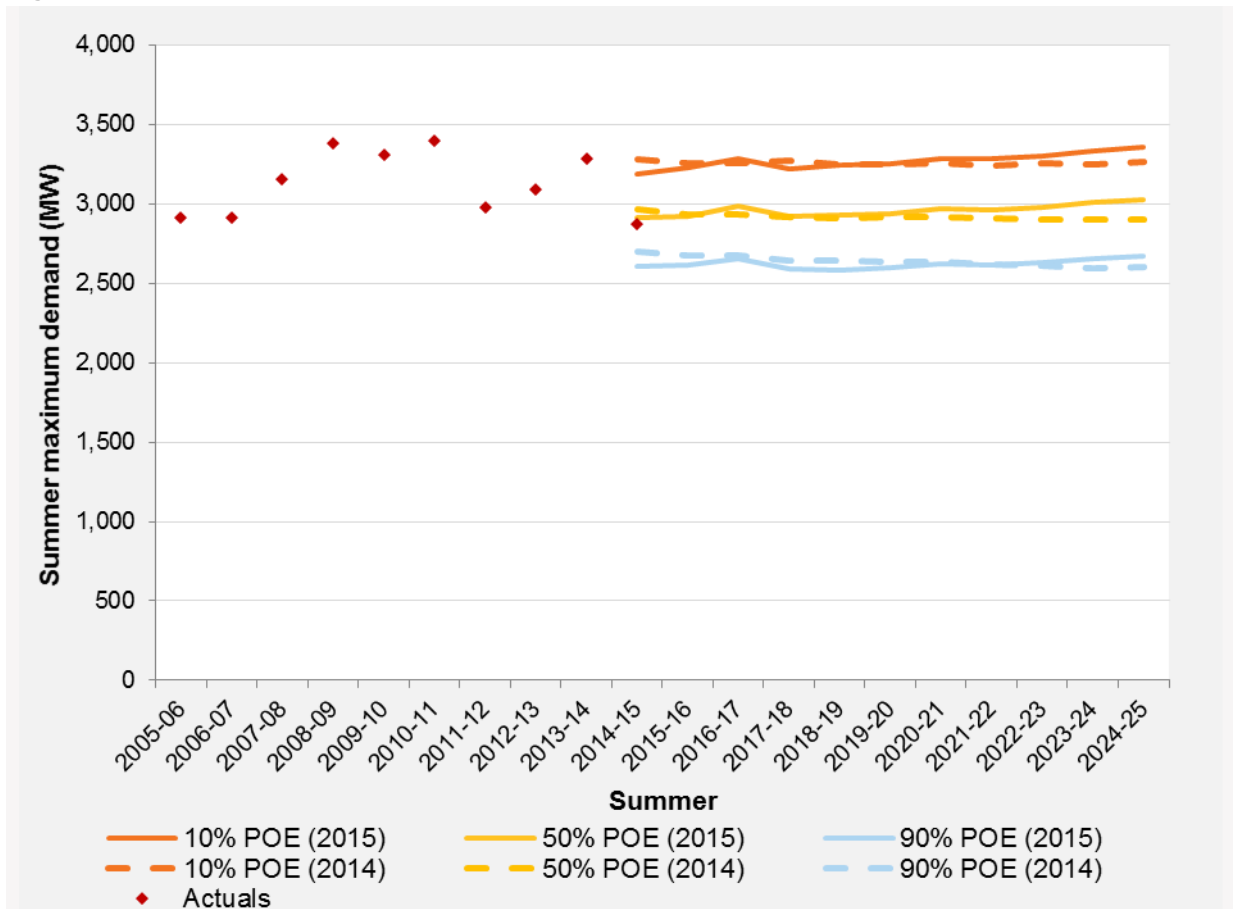
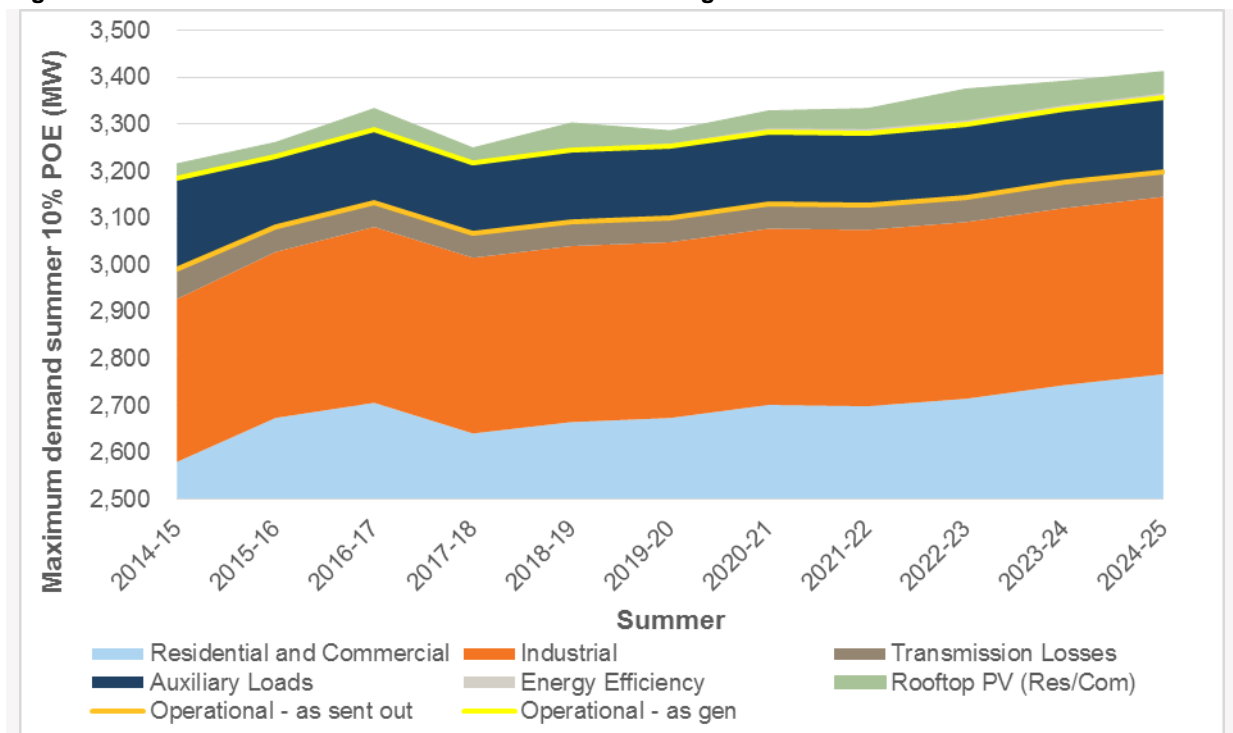


Table 2 Summer 90%, 50% and 10% POE maximum demand forecasts for South Australia (MW)

	Actual	90% POE	50% POE	10% POE
2014-15	2,872	2,606	2,916	3,185
2015-16		2,615	2,926	3,232
2016-17		2,653	2,988	3,288
2017-18		2,592	2,922	3,218
2018-19		2,580	2,932	3,245
2019-20		2,601	2,936	3,254
2020-21		2,623	2,973	3,284
2021-22		2,614	2,961	3,282
2022-23		2,633	2,976	3,300
2023-24		2,653	3,007	3,332
2024-25		2,668	3,026	3,357

3.1.1 Summer 10% POE maximum demand forecast by segment

Figure 4 Summer 10% POE maximum demand forecast segments for South Australia



4. MINIMUM DEMAND FORECASTS

AEMO has forecast minimum demand (MinD) for the first time, to investigate the impact of rooftop PV on the daily load profile. This provides useful information on network usage, which can inform further studies to evaluate operational implications.

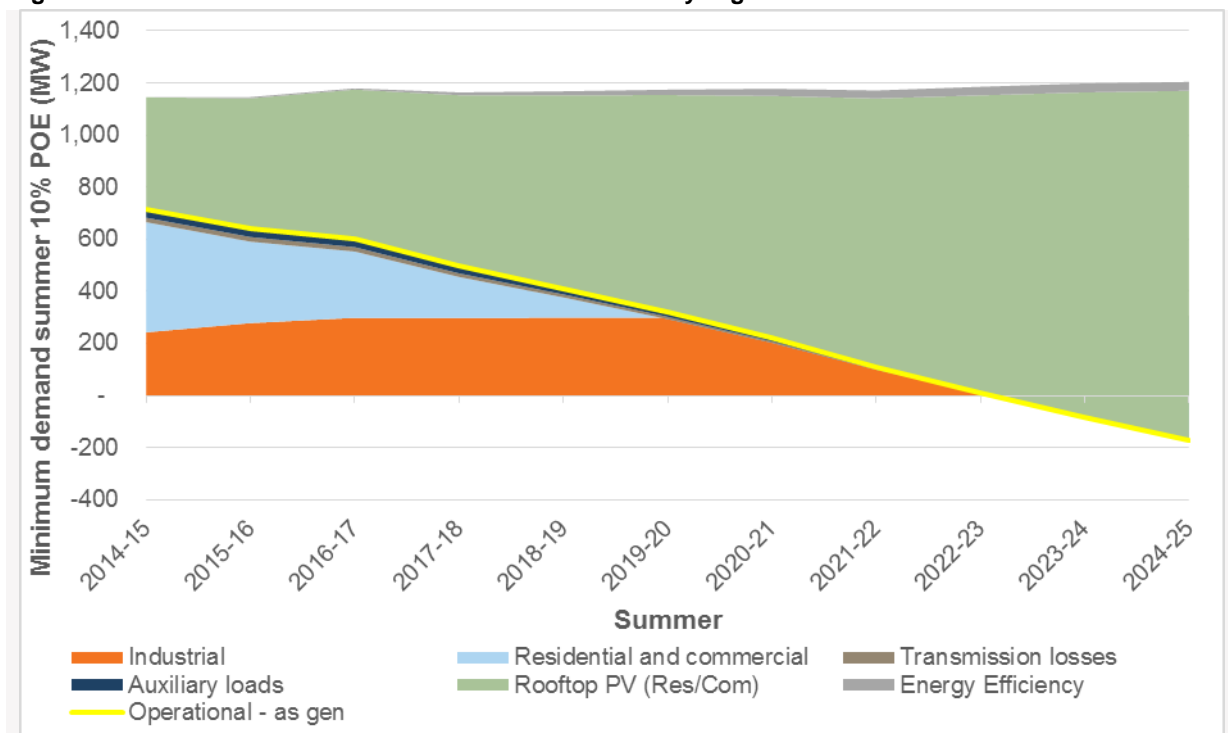
Key insights include:

- Towards the end of the medium-term outlook (2024–25), on 90% POE MinD days, continued uptake of rooftop PV is forecast to offset 100% of demand in South Australia, during midday periods. This results in South Australia distribution customers in aggregate being net generators to the grid. The minimum demand model does not incorporate potential impacts of: export restrictions on rooftop PV generation, potential tariff reform or battery storage.⁴
- 2014–15 summer MinD was 790 MW on 26 December 2014. Together with an estimated rooftop PV generation of 445 MW, this equates to an end user demand of 1,235 MW.

4.1.1 Summer 90% POE minimum demand forecast by segment

The 90% POE MinD is forecast to decline to 496 MW over the short term (2014–15 to 2017–18) medium scenario forecast. Estimated rooftop PV generation is 658 MW by 2017–18 under this scenario.

Figure 5 Summer 90% POE minimum demand forecast by segment



⁴ For more information, refer to *Detailed summary of 2015 electricity forecasts* (section 6.3). Available: <http://www.aemo.com.au/Electricity/Planning/Forecasting/National-Electricity-Forecasting-Report>. Viewed: 30 June 2015.



Measures and Abbreviations

Units of measure

Abbreviation	Unit of measure
GWh	Gigawatt hour
kWh	Kilowatt hour
MW	Megawatt
\$	Australian dollar

Abbreviations

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
GSP	Gross state product
MD	Maximum demand
MinD	Minimum demand
NEFR	National Electricity Forecasting Report
POE	Probability of exceedance
Rooftop PV	Rooftop photovoltaic