AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Energy Adequacy Assessment Projection

November 2021

Important notice

PURPOSE

The purpose of this publication is to make available to market participants and other interested persons an analysis that quantifies the impact of energy constraints on energy availability over a 24-month period under a range of scenarios.

AEMO publishes the Energy Adequacy Assessment Projection in accordance with rule 3.7C of the National Electricity Rules. This publication is generally based on information available to AEMO as at 5 November 2021 unless otherwise indicated.

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VERSION CONTROL

Version	Release date	Changes
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Executive summary

The Energy Adequacy Assessment Projection (EAAP) forecasts electricity supply reliability in the National Electricity Market (NEM) over a two-year outlook period. The EAAP complements AEMO's other reliability assessments, such as the Medium Term Projected Assessment of System Adequacy (MT PASA) and the Electricity Statement of Opportunities (ESOO), with a primary focus on the impact of energy constraints on reliability in the next two years.

Potential energy constraints include, but are not limited to, water availability, for hydro generation and as cooling water for thermal generation during drought conditions, and constraints on fuel supply for thermal generators.

For water availability, the EAAP considers three different rainfall scenarios:

- Low rainfall – based on rainfall between 1 July 2006 and 30 June 2007 for all regions except New South Wales. New South Wales is based on rainfall between 1 June 2006 and 31 May 2007.
- Short-term average rainfall – based on the average rainfall recorded over the past 10 years.
- Long-term average rainfall – based on the average rainfall recorded over the past 50 years, or the longest period for which rainfall data is available, if less than 50 years.

All electricity consumption and demand assumptions used in the EAAP are consistent with the 2021 ESOO[1], which predicts softening of annual maximum demand outcomes over the next five years.

Key insights

Based on the information provided by participants, this November 2021 EAAP highlights that:

- Drought conditions, should they emerge, are unlikely to significantly affect reliability in the coming summer, as shown by outcomes under the low rainfall scenario.
- Energy limitations supplied by some thermal generators related to fuel supply have no impact on the level of projected unserved energy (USE) observed in any region in the next two years.

The above findings suggest that there is sufficient flexibility remaining for energy-limited resources to be used effectively to avoid shortfalls at times of high demand.

The November 2021 EAAP incorporates the latest information about supply capacity, including new information provided by participants on generator commissioning schedules in the Generation Information update[2] published 15 October 2021 and latest MT PASA availabilities on 5 November 2021.

The 2021 EAAP scenarios forecast no exceedance of the reliability standard[3] or the Interim Reliability Measure (IRM)[4] in any region in the next two years. While expected USE remains below the reliability standard, some risks of load shedding remain, particularly if peak demands reach 10% probability of exceedance (POE)[5] levels and coincide with low renewable generation, or prolonged generation outages occur.

[1] At https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2021/2021-nem-esoo.pdf?la=en.

[2] See Generation Information, published 15 October 2021 at https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information.

[3] The reliability standard is a maximum expected USE of 0.002% of total energy consumption in any region in any financial year.

[4] The IRM is a maximum expected USE of 0.0006% of total energy consumption in any region in any financial year.

[5] POE is the probability a forecast will be met or exceeded. The 10% POE forecast is mathematically expected to be met or exceeded once in 10 years and represents demand under more extreme weather conditions than a 50% POE forecast.

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1. Introduction

The Energy Adequacy Assessment Projection (EAAP) report provides information on the impact of potential energy constraints on supply adequacy in the National Electricity Market (NEM) across the two-year study period. Potential energy constraints include, but are not limited to, the impact of depleted water storages during drought conditions and constraints on fuel supply or cooling water available for thermal generation.

For this report, AEMO calculated expected unserved energy (USE) for each region under three rainfall scenarios and assessed this projected USE against the reliability standard and the Interim Reliability Measure (IRM). The reliability standard is a maximum expected USE of 0.002% of total energy consumption in any region in any financial year. The IRM is a maximum expected USE of 0.0006% of total energy consumption in any region in any financial year and is included for completeness.

AEMO implements the reliability standard using forecasts and projections over different timeframes. AEMO uses the following processes that each identify the risk of USE for a slightly different purpose and therefore use slightly different inputs and approaches, further discussed in the Reliability Standard Implementation Guidelines[6] (RSIG):

- Electricity Statement of Opportunities (ESOO) – to provide market information over a 10-year projection to assist planning by existing and potential market participants. The ESOO is also used to implement the IRM.
- EAAP – to forecast USE for energy constrained scenarios over a two-year projection, published at least once every 12 months.
- Medium Term Projected Assessment of System Adequacy (MT PASA) – to forecast USE over a two-year projection, published on a weekly basis based on participants' best expectation of generation availability and outage scheduling.
- Short Term Projected Assessment of System Adequacy (ST PASA) – to forecast capacity reserve over a six-day projection.

1.1 Scenarios

For the November 2021 EAAP report, AEMO assessed the potential for USE under three different rainfall scenarios in accordance with the EAAP Guidelines[7]. Each scenario was modelled for the period October 2021 to September 2023. The three scenarios are:

- Low rainfall – based on rainfall between 1 July 2006 and 30 June 2007 for all regions except New South Wales. New South Wales was based on rainfall between 1 June 2006 and 31 May 2007[8].
- Short-term average rainfall – based on the average rainfall recorded over the past 10 years.
- Long-term average rainfall – based on the average rainfall recorded over the past 50 years, or the longest period for which rainfall data is available, if less than 50 years (depending on the data available to participants).

Information such as natural inflows, energy constraints and the level of hydro storage reservoirs at the start of the EAAP modelling horizon is provided by participants through their Generator Energy Limitation Framework (GELF) submissions for each scenario.

[6] For more on PASA and the RSIG, see https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Market-Management-System-MMS/Projected-Assessment-of-System-Adequacy.

[7] At https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/rsig/final-documents/eaap-guidelines.pdf?la=en.

[8] The inflows into the major hydro schemes in 2006-07 were impacted by severe drought.

2. Methodology and assumptions

The EAAP is based on a probabilistic, time-sequential model that simulates hourly Monte Carlo simulations to determine potential future supply shortfalls for the three rainfall scenarios, taking account of any other energy limitations provided by participants. This model also accounts for uncertainties in generator availability and weather-sensitive demand and supply from intermittent resources. The following documents provide further information on the inputs, assumptions and methodology used in the November 2021 EAAP.

Table 1 Input and methodology documents relevant to the EAAP

Document	Location
EAAP guidelines	https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/rsig/final-documents/eaap-guidelines.pdf
2021 Inputs, Assumptions and Scenarios Report	https://aemo.com.au/-/media/files/major-publications/isp/2021/2021-inputs-assumptions-and-scenarios-report.pdf?la=en
Demand Side Participation Forecast Methodology	https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/demand-side-participation/final/demand-side-participation-forecast-methodology.pdf?la=en&hash=3837C74C356A81FB4F081B84C36059C0
Forecasting Approach - Electricity Demand Forecasting Methodology	https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/electricity-demand-forecasting-methodology/final-stage/electricity-demand-forecasting-methodology.pdf?la=en&hash=C8FB4B327EE1F7B0E4EDD6284E735842
ESOO and Reliability Forecast Methodology Document	https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2021/esoo-and-reliability-forecast-methodology-document.pdf?la=en
Forecast Accuracy Report Methodology	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/accuracy-report/forecast-accuracy-report-2020.pdf?la=en
Reliability Standard Implementation Guidelines	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/rsig/reliability-standard-implementation-guidelines.pdf?la=en&hash=25962F3A27BA7A8754E3C0FD79890B2F

For the November 2021 EAAP modelling, AEMO:

- Performed 1,100 simulations for each rainfall scenario with 10% probability of exceedance (POE) demand traces (the 10% POE simulation case) and with 50% POE demand traces (the 50% POE simulation case).
- Used 11 historical reference years to represent variable patterns of intermittent generation and demand under both the 10% POE and 50% POE simulation cases.
- Assumed zero USE using 90% POE demand traces.

The model used a probability-weighted USE assessment to identify whether expected USE is likely to exceed the reliability standard in each region of the NEM, consistent with the ESOO. Expected USE was derived by applying the following weightings to results from the 10%, 50% and 90% POE demand traces:

- 30.4% for 10% POE.
- 39.2% for 50% POE.
- 30.4% for 90% POE.

2.1 Electricity demand

AEMO used the electricity demand forecast under the Central scenario from the 2021 ESOO for the NEM[9]. This forecast covered the latest assumptions on:

- Economic and population drivers.
- Behaviour trends in households and business consumers, including assumed COVID-19 impacts.
- Electric vehicle forecasts.
- Current installed capacity and forecast additional capacity from distributed photovoltaic (PV) and energy storage systems.
- Forecast of energy efficiency savings.

2.2 Generation capacity

AEMO's modelling used the latest information on generation commitments in the NEM and included all scheduled and semi-scheduled and significant non-scheduled generation that is either existing or assumed to be committed in the modelling period.

Since the July 2021 Generation Information update, some additional renewable generation has become committed in New South Wales and Queensland, but these do not affect the reliability outcomes. For more information on new generation commitments used in this EAAP analysis, see the October Generation Information update[10].

The capacity of existing generation is sourced from MT PASA offers submitted in the week beginning 31 October 2021. If USE is forecast during periods where the MT PASA offer reflects a planned generator outage, this outage is removed from EAAP, unless specified as inflexible through the participant's GELF submission. The EAAP assessment of USE therefore assumes any planned generation outages that have timing flexibility will be shifted to avoid potential USE.

Since the 2021 ESOO, Mintaro Power Station (73/68 MW[11]) has extended an outage over summer 2021-22 in the MT PASA offers, and is currently expected to be out of service until April 2022. This outage was unknown at the time of ESOO so was not included in the modelling. This change in assumed availability of Mintaro Power Station is the main driver of increase in USE in South Australia compared to the 2021 ESOO.

2.3 Transmission capability

Interconnector information includes, but is not limited to, inter-regional loss factor models and marginal loss factors. Network constraints, which represent technical limits on operating the power system, are expressed as a linear combination of generation and interconnectors, which are constrained to be less than, equal to, or greater than a certain limit. Only network constraints associated with system normal conditions are modelled.

2.4 GELF parameters

The GELF parameters are confidential information submitted by scheduled generators designed to include limitations on resources affecting their ability to supply energy, such as hydro storage (including pump storage), thermal generation fuel supply, cooling water availability, and gas supply. These parameters are classified into two categories:

- Static GELF parameters:

[9] Forecasts are available at http://forecasting.aemo.com.au/. Select ESOO 2021 from Publications at pop-up menu.

[10] At https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information.

[11] Summer Typical (the capability of the generating unit during average summer temperatures)/Summer Peak capacity values for Mintaro used in the 2021 ESOO.

  - Technical specifications of the power stations, such as power station name, type of power station, number of generating units at the power station, and their capacities.
  - Additional components associated with hydro power schemes such as maximum and minimum active reservoir storage, the reservoirs to which the tunnels are connected, water utilisation factor for generation and pumping for each generating unit or for the power station, and reservoir connections (for example, upstream reservoir and downstream reservoir).
- Variable GELF parameters include:
  - Monthly forecast generation capability and monthly capacity profiles to be submitted by non-hydro power stations.
  - Active reservoir storage at the beginning of the study period, monthly inflows to reservoirs during the study period, minimum reservoir level that can be reached in each month of the study period without violating long-term reservoir management policy, and any other limitations on reservoir capacities or levels that should be considered within the study period to be submitted for hydro power schemes.

Please see EAAP Guidelines[12] for the details of the GELF parameters.

[12] At https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/rsig/final-documents/eaap-guidelines.pdf.

3. Results

Key outcomes

- The EAAP forecasts a risk of USE in South Australia and Victoria in 2021-22 and 2022-23, particularly under peak demand conditions; however, the levels of USE are within the reliability standard and the IRM.
- The USE risks identified by the EAAP are slightly larger in South Australia than those identified by the August 2021 ESOO due to the extended outage of Mintaro Power Station, but similar to those reported by MT PASA during November 2021.
- Based on the information provided by participants, low hydro inflows over the next two years would be unlikely to materially affect reliability.
- The limitations on fuel supply that have been provided by participants do not have a significant impact on the level of USE in any region. The fuel limitations submitted by participants are generally over longer periods such as months or years, and if managed effectively these annual or monthly limits provide sufficient flexibility to allow generation to have fuel available at times of tight supply-demand balance.

3.1 EAAP results

The reliability assessment indicates that, under all rainfall scenarios, there is some risk of supply interruption in South Australia, and Victoria over the next two years, mainly during peak summer periods. Expected USE in the next two years is not, however, projected to exceed either the reliability standard or the IRM in any region, as shown in Figure 1.

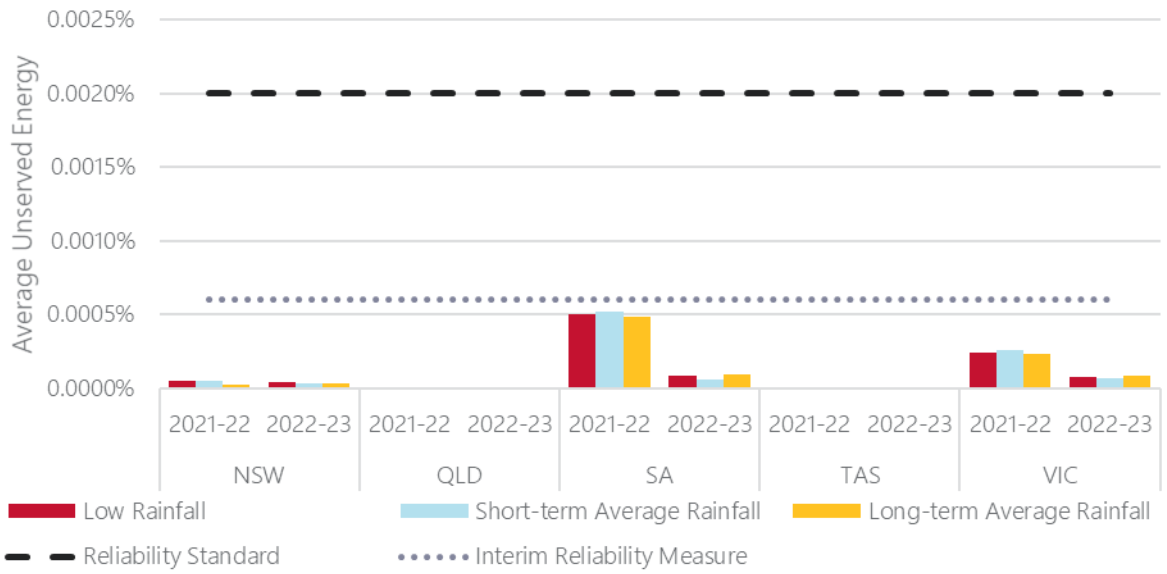
Supply scarcity risk is primarily driven by increased vulnerability to climatic conditions such as extended periods of high temperature, corresponding with low wind or solar availability and unplanned generation outages, as already highlighted in the 2021 ESOO[13] and MT PASA[14]. Drought (and energy constraint more generally) is forecast to have a negligible impact on reliability in the two-year outlook, due to the ability of generators to schedule limited energy resources for use at times of highest demand.

While all rainfall scenarios are reported below, almost all variation observed is attributable to minor variability in simulation iteration outcomes (that is, different combinations of forced outages), not variation in rainfall.

[13] At https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2021/2021-nem-esoo.pdf?la=en.

[14] At https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/projected-assessment-of-system-adequacy.

Figure 1 Forecast USE range across all rainfall scenarios



The energy limitations provided by participants have had no material impact on supply adequacy over the next two years:

- The region with the biggest supply scarcity risk is South Australia, with an expected USE level of 0.0005% in 2021-22 and 0.0001% in 2022-23. The expected USE calculation in South Australia in 2021-22 is slightly higher than that projected in the 2021 ESOO, mainly due to Mintaro Power Station capacity now being unavailable over the 2022-23 summer. The reduction in USE from 2021-22 to 2022-23 is due to a reduction in peak demand, the availability of Mintaro Power Station in 2022-23, and the commitment of new variable renewable capacity.
- Although reliability risks in Victoria still remain under certain conditions, the expected USE level is quite low, with 0.0002% of USE projected in 2021-22. The reduction in USE from 2021-22 to 2022-23 is due to a forecast reduction in peak demand and the commitment of new variable renewable capacity.
- Expected USE in New South Wales, Queensland and Tasmania is negligible, remaining below 0.0001% in both years and under all rainfall scenarios.

The projections show the occurrence of USE is generally in the months of December-March although New South Wales has a low likelihood of small amounts of USE over winter (May-August).

The monthly forecast USE for all regions under the three rainfall scenarios is provided in Appendix A1. Annual USE outcomes are provided in the following tables and in Figure 1.

Table 2 Forecast USE in low rainfall scenario

	2021-22 USE		2022-23 USE	
	(MWh)	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	33	0.0001%	25	< 0.0001%
Queensland	< 1	< 0.0001%	< 1	< 0.0001%
South Australia	59	0.0005%	10	0.0001%
Tasmania	0	-	0	-
Victoria	97	0.0002%	31	0.0001%

Table 3 Forecast USE in short-term average rainfall scenario

	2021-22 USE		2022-23 USE	
	(MWh)	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	32	0.0001%	22	< 0.0001%
Queensland	< 1	< 0.0001%	1	< 0.0001%
South Australia	61	0.0005%	7	0.0001%
Tasmania	0	-	0	-
Victoria	102	0.0003%	28	0.0001%

Table 4 Forecast USE in long-term average rainfall scenario

	2021-22 USE		2022-23 USE	
	(MWh)	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	16	< 0.0001%	23	< 0.0001%
Queensland	< 1	< 0.0001%	1	< 0.0001%
South Australia	57	0.0005%	11	0.0001%
Tasmania	0	-	0	-
Victoria	92	0.0002%	35	0.0001%

3.2 Differences between EAAP, MT PASA, and ESOO

AEMO administers multiple processes to assess NEM reliability against the reliability standard over a two-year planning horizon:

- EAAP, to forecast USE for capacity and energy constrained scenarios, with a particular focus on the impact of water shortages during drought conditions, or thermal generation fuel supply limitations.
- MT PASA, to forecast possible impacts of scheduled generation and transmission outages on reliability.
- The ESOO also provides the two-year horizon but extends to 10 years, and is discussed in Section Error! Reference source not found..

These processes adopt similar modelling approaches, but use slightly different inputs, reflecting their different purposes and frequency of projections. The similarities and differences of the processes are described in more detail in the RSIG[15].

The main differences between EAAP and MT PASA

The EAAP is assessed under a range of predefined energy scenarios and is published at least once every 12 months. It:

- Assumes generation and transmission outages will be rescheduled to avoid load shedding unless participants have indicated that the timing of these outages is inflexible.

[15] At https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/reliability-standard-implementation-guidelines.

- Assumes system normal network conditions, assuming any network outage is rescheduled if need be to avoid capacity shortfalls.

The MT PASA is based on participants' best expectation of generation availability, including some energy limitations, and is published on a weekly basis. It is an operational planning tool that informs market participants of tight supply conditions and allows them to reschedule planned generation outages to avoid potential supply shortfalls. MT PASA incorporates:

- The impact of transmission outages according to the 13-month Network Outage Scheduled (NOS).
- The impact of scheduled generation outages which may be flexible. Generation may be unavailable in MT PASA due to recall times that exceed the required 24 hours but are considered available for the purpose of EAAP.

The MT PASA result at time of EAAP modelling (published on 9 November 2021) shows similar USE as this 2021 EAAP.

The main differences between EAAP and ESOO

The ESOO provides technical and market data that informs the decision-making processes of market participants, new investors, and jurisdictional bodies as they assess opportunities in the NEM over a 10-year outlook period, focusing on information about future supply adequacy. It also provides reliability forecasts for the purposes of the Retailer Reliability Obligation.

The ESOO adopts similar Monte Carlo modelling techniques to EAAP, but uses slightly different inputs to reflect the greater uncertainty inherent in longer-term outlooks. Many of these differences relate to future assumptions on generation availability and capacity, and transmission constraints.

The USE outcomes in the 2021 ESOO for 2021-22 were similar to those in the EAAP, with minor differences due to the following:

- The ESOO includes consideration for outages relating to inter-regional transmission elements and a more detailed assessment of unplanned, and high impact, low probability outages relating to generators.
- The EAAP includes new information on generator commissioning and retirements.
- The EAAP includes the Mintaro Power Station outage over Summer 2021-22 as per recent MT PASA availability bid submissions.

A1. Detailed results

The tables below show the monthly expected USE in each of the rainfall scenarios modelled.

Table 5 Monthly forecast USE in low rainfall scenario, megawatt hours (MWh)

Month	New South Wales	Queensland	South Australia	Tasmania	Victoria
Oct-21	0.0	0.0	0.0	0.0	0.0
Nov-21	0.0	0.0	0.0	0.0	0.0
Dec-21	4.4	0.0	0.0	0.0	3.0
Jan-22	11.4	0.1	58.1	0.0	85.2
Feb-22	8.9	0.0	0.7	0.0	7.7
Mar-22	0.1	0.0	0.0	0.0	0.7
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	3.3	0.0	0.0	0.0	0.0
Jun-22	1.5	0.0	0.0	0.0	0.0
Jul-22	0.0	0.0	0.0	0.0	0.0
Aug-22	3.6	0.0	0.0	0.0	0.0
Sep-22	0.0	0.0	0.0	0.0	0.0
Oct-22	0.0	0.0	0.0	0.0	0.0
Nov-22	1.1	0.0	0.0	0.0	0.0
Dec-22	1.9	0.0	0.0	0.0	0.3
Jan-23	7.3	0.0	9.4	0.0	20.2
Feb-23	6.7	0.3	0.3	0.0	8.0
Mar-23	0.0	0.0	0.5	0.0	2.2
Apr-23	0.0	0.0	0.0	0.0	0.0
May-23	2.9	0.0	0.0	0.0	0.0
Jun-23	1.6	0.0	0.0	0.0	0.0
Jul-23	2.5	0.0	0.0	0.0	0.0
Aug-23	0.9	0.0	0.0	0.0	0.0
Sep-23	0.0	0.0	0.0	0.0	0.0

Table 6 Monthly forecast USE in short-term average rainfall scenario, MWh

Month	New South Wales	Queensland	South Australia	Tasmania	Victoria
Oct-21	0.0	0.0	0.0	0.0	0.0
Nov-21	0.3	0.0	0.0	0.0	0.0
Dec-21	2.8	0.0	0.0	0.0	4.4
Jan-22	13.0	0.3	60.0	0.0	90.4
Feb-22	6.2	0.0	0.8	0.0	6.1
Mar-22	0.3	0.0	0.0	0.0	0.7
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	2.2	0.0	0.0	0.0	0.0
Jun-22	1.9	0.0	0.0	0.0	0.0
Jul-22	0.3	0.0	0.0	0.0	0.0
Aug-22	5.3	0.0	0.0	0.0	0.0
Sep-22	0.0	0.0	0.0	0.0	0.0
Oct-22	0.0	0.0	0.0	0.0	0.0
Nov-22	1.4	0.0	0.0	0.0	0.0
Dec-22	2.8	0.1	0.0	0.0	0.2
Jan-23	6.6	0.2	6.6	0.0	19.5
Feb-23	2.4	0.4	0.3	0.0	7.1
Mar-23	0.0	0.4	0.2	0.0	1.2
Apr-23	0.0	0.0	0.0	0.0	0.0
May-23	3.2	0.0	0.0	0.0	0.0
Jun-23	1.7	0.0	0.0	0.0	0.0
Jul-23	1.8	0.0	0.0	0.0	0.0
Aug-23	2.5	0.0	0.0	0.0	0.0
Sep-23	0.0	0.0	0.0	0.0	0.0

Table 7 Monthly forecast USE in long-term average rainfall scenario, MWh

Month	New South Wales	Queensland	South Australia	Tasmania	Victoria
Oct-20	0.0	0.0	0.0	0.0	0.0
Nov-20	0.5	0.0	0.0	0.0	0.0
Dec-20	2.9	0.0	0.0	0.0	2.5
Jan-21	5.4	0.1	55.6	0.0	82.2
Feb-21	3.8	0.2	1.3	0.0	7.1
Mar-21	0.0	0.0	0.0	0.0	0.4
Apr-21	0.0	0.0	0.0	0.0	0.0
May-21	0.0	0.0	0.0	0.0	0.0
Jun-21	0.5	0.0	0.0	0.0	0.0
Jul-21	0.0	0.0	0.0	0.0	0.0
Aug-21	2.7	0.0	0.0	0.0	0.0
Sep-21	0.3	0.0	0.0	0.0	0.0
Oct-21	0.0	0.0	0.0	0.0	0.0
Nov-21	0.4	0.0	0.0	0.0	0.0
Dec-21	1.6	0.0	0.0	0.0	0.2
Jan-22	8.0	0.3	10.1	0.0	23.1
Feb-22	6.9	0.5	0.3	0.0	8.7
Mar-22	0.0	0.0	0.3	0.0	2.5
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	0.6	0.0	0.0	0.0	0.0
Jun-22	1.1	0.0	0.0	0.0	0.0
Jul-22	2.4	0.0	0.0	0.0	0.0
Aug-22	2.2	0.0	0.0	0.0	0.0
Sep-22	0.0	0.0	0.0	0.0	0.0

Measures and abbreviations

Measures

Abbreviation	Unit of measure
MW	Megawatts
MWh	Megawatt hours

Abbreviations

Abbreviation	Expanded name
AEMO	Australian Energy Market Operator
EAAP	Energy Adequacy Assessment Projection
ESOO	Electricity Statement of Opportunities
GELF	Generator Energy Limitation Framework
MT PASA	Medium Term Projected Assessment of System Adequacy
NEM	National Electricity Market
NOS	Network Outage Scheduled
POE	Probability of exceedance
PV	Photovoltaic
RSIG	Reliability Standard Implementation Guidelines
ST PASA	Short Term Projected Assessment of System Adequacy
USE	Unserved energy
VRE	Variable renewable energy

Glossary

Term	Definition
Committed projects	Generation that is considered to be proceeding under AEMO's commitment criteria.
Electrical energy	Average electrical power over a time period, multiplied by the length of the time period.
Electrical power	Instantaneous rate at which electrical energy is consumed, generated, or transmitted.
Generating capacity	Amount of capacity (in megawatts [MW]) available for generation.
Generating unit	Power stations may be broken down into separate components known as generating units, and may be considered separately in terms (for example) of dispatch, withdrawal, and maintenance.
Installed capacity	The generating capacity (in megawatts [MW]) of the following (for example): • A single generating unit. • A number of generating units of a particular type or in a particular area. • All of the generating units in a region. Rooftop photovoltaic (PV) installed capacity is the total amount of cumulative rooftop PV capacity installed at any given time.
Interim reliability measure	The measure specified in clause 3.9.3C (a10 of the National Electricity Rules against which the sufficiency of installed capacity to meet demand is assessed for certain purposes. It is defined as the maximum expected USE, as a percentage of total energy demanded, in a region over a financial year. It is currently set at 0.0006%.
Non-scheduled generation	Generation by a generating unit that is not scheduled by AEMO as part of the central dispatch process, and which has been classified as a non-scheduled generating unit in accordance with Chapter 2 of the National Electricity Rules.
Operational electrical consumption	The electrical energy supplied by scheduled, semi-scheduled, and significant non-scheduled generating units, less the electrical energy supplied by small non-scheduled generation.
Probability of exceedance (POE)	The probability, as a percentage, that a maximum demand level will be met or exceeded (for example, due to weather conditions) in a particular period of time. For example, a 10% POE maximum demand for a given season means a 10% probability that the projected level will be met or exceeded – in other words, projected maximum demand levels are expected to be met or exceeded, on average, only one year in 10.
Reliability standard	The standard specified in clause 3.9.3C (a) of the National Electricity Rules against which the sufficiency of installed capacity to meet demand is assessed for certain purposes. It is defined as the maximum expected USE, as a percentage of total energy demanded, allowable in a region over a financial year. It is currently set at 0.002%.
Unserved energy	The amount of energy demanded, but not supplied, in a region determined in accordance with clause 3.9.3C(b) expressed as either a gigawatt hours (GWh) total or as a percentage of total energy demanded in that region.