Energy Adequacy Assessment Projection

November 2020

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 12 November 2020 unless otherwise indicated.

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ACKNOWLEDGEMENT

AEMO acknowledges the support, co-operation and contribution of market participants in providing data and information used in this publication.

VERSION CONTROL

Version	Release date	Changes
#1	26/11/2020	For publication

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 2020 ESOO[1], which predicts similar or reduced annual maximum demand outcomes compared to previous summers, but also greater uncertainty, due to the unprecedented impacts of COVID-19 on the summer demand profile.

Key insights

Based on the information provided by participants, this November 2020 EAAP highlights that:

- Drought conditions are unlikely to significantly affect reliability in the coming summer, even under low rainfall assumptions.
- 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 2020 EAAP also incorporates updates to supply capacity, including new information provided by participants on generator commissioning schedules. While some Victorian and New South Wales generators are subject to commissioning delays, this has not increased expected USE markedly compared to previous estimates.

The 2020 EAAP scenarios forecast no exceedance of the reliability standard[2] 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)[3] levels and coincide with low renewable generation, or prolonged generation or transmission outages reoccur.

[1] At https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2020/2020-electricity-statement-of-opportunities.pdf.

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

[3] 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. The reliability standard is a maximum expected USE of 0.002% of total energy consumption in any region in any financial year. The interim reliability measure 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[4] (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 interim reliability measure.
- 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 2020 EAAP report, AEMO assessed the potential for USE under three different rainfall scenarios in accordance with the EAAP Guidelines[5]. Each scenario was modelled for the period October 2020 to September 2022. 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[6].
- 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.

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[4] 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.

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

[6] 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 2020 EAAP.

Table 1 Input and methodology documents relevant to the EAAP

Document	Location
2020 EAAP guidelines	https://www.aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/rsig/final-documents/eaap-guidelines.pdf.
2020 Inputs, Assumptions and Scenarios Report	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/2020-forecasting-and-planning-inputs-assumptions-and-scenarios-report-iasr.pdf
2020 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
2020 Electricity Demand Forecasting Methodology Information Paper	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/inputs-assumptions-methodologies/2020/2020-electricity-demand-forecasting-methodology-information-paper.pdf
2020 ESOO and Reliability Forecast Methodology Document	https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2020/esoo-and-reliability-forecast-methodology-document.pdf
2020 Forecast Accuracy Report Methodology	https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2020/forecast-accuracy-report-methodology/forecast-accuracy-reporting-methodology-report-aug-20.pdf
2019 Interim Reliability Forecast Guidelines	https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2019/interim-reliability-forecast-guidelines/interim-reliability-forecast-guidelines.pdf

For the November 2020 EAAP modelling, AEMO:

- Performed 1,000 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 10 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 uses 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 2020 ESOO for the NEM[7]. 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.

New generation commitments have varied since the August 2020 publication of the ESOO, with some commissioning delays this summer and new generation commitments for next summer. The delays are most evident in Victoria and New South Wales, where, in total across the two regions, up to 1,500 megawatts (MW) of wind and solar generation capacity is no longer expected to be available this summer. Due to low contributions of wind and solar generation at times of peak demand, the delays have not resulted in a material impact on expected USE. For more information on new generation commitments used in this EAAP analysis, see the November Generation Information update[8].

The capacity of existing generation is sourced from MT PASA offers submitted in the week beginning 26 October 2020. 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.

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:

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[7] Forecasts are available at http://forecasting.aemo.com.au/. Select ESOO 2020 from Publications at pop-up menu.

[8] See Generation Information, published 12 November 2020 at https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information.

- Static GELF parameters:
  - 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[9] for the details of the GELF parameters.

[9] Available 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 New South Wales, South Australia and Victoria in 2020-21 and 2021-22, particularly under peak demand conditions; however, the level of USE is within the reliability standard.
- The risks identified by the EAAP are largely consistent with those identified by the August 2020 ESOO.
- 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 annual or monthly limits, and if managed effectively provide sufficient flexibility to allow generation to have fuel available at times of tight supply-demand balance.
- In addition to energy limitations, new information on generator commissioning schedules has been incorporated, including wind generation connection delays in Victoria. The impact of the delays on USE has not been material as many forecast USE events occur during low coincident wind conditions across Victoria.

3.1 EAAP results

The reliability assessment indicates that, under all rainfall scenarios, there is some risk of supply interruption in New South Wales, 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 interim reliability measure 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 2020 ESOO[10] and MT PASA[11]. 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.

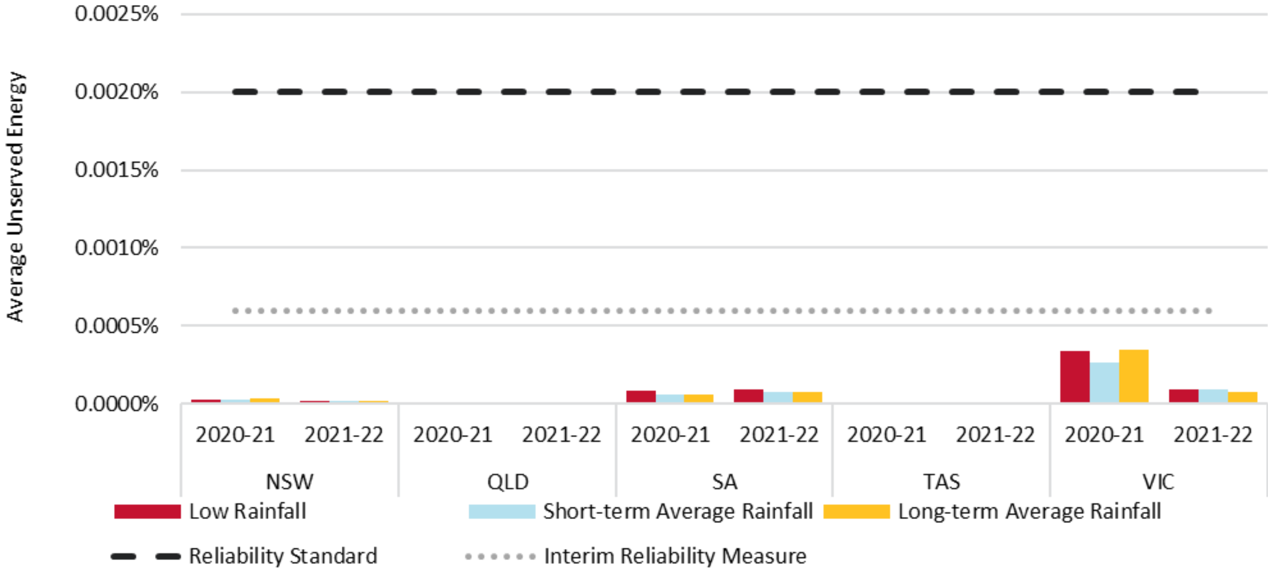
While all rainfall scenarios are reported below, almost all variation observed is attributable to minor variability in simulation iteration outcomes, not variation in rainfall.

The levels of USE projected for summer 2020-21 are similar to those forecast in the 2020 ESOO. The levels of USE projected in the next two years do not exceed the reliability standard or the interim reliability measure in any region, as shown in Figure 1.

[10] At https://www.aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/nem_esoo/2020/2020-electricity-statement-of-opportunities.pdf.

[11] 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 2020 EAAP incorporates new information on new generator commissioning schedules. For New South Wales, generator commissioning delays compared to the 2020 ESOO result in up to 627 MW less available variable renewable energy (VRE) capacity for summer 2020-21. For Victoria, a region with greater supply scarcity risk, generator commissioning delays compared to the 2020 ESOO result in up to 853 MW less available wind capacity for summer 2020-21.

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

- Similar levels of expected USE are observed in New South Wales, South Australia, and Victoria over the next two years, regardless of rainfall scenario.
- The region with the biggest supply scarcity risk is Victoria, with an expected USE level of 0.00035% in 2020-21 and 0.0001% in 2021-22. The reduction in USE from 2020-21 to 2021-22 is due to a minor reduction in peak demand expectation and commitment of new variable renewable generation.
- Expected USE in the other regions 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 with low likelihood of small amounts over winter (June-August) in New South Wales.

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

	2020-21 USE		2021-22 USE	
	(Megawatt hours [MWh])	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	17	< 0.0001%	10	< 0.0001%
Queensland	-	-	-	-
South Australia	10	< 0.0001%	11	< 0.0001%
Tasmania	-	-	-	-
Victoria	143	0.0003%	37	< 0.0001%

Table 3 Forecast USE in short-term average rainfall scenario

	2020-21 USE		2021-22 USE	
	(MWh)	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	16	< 0.0001%	13	< 0.0001%
Queensland	-	-	-	-
South Australia	8	< 0.0001%	9	< 0.0001%
Tasmania	-	-	-	-
Victoria	112	0.0003%	39	0.0001%

Table 4 Forecast USE in long-term average rainfall scenario

	2020-21 USE		2021-22 USE	
	(MWh)	(% of regional demand)	(MWh)	(% of regional demand)
New South Wales	23	< 0.0001%	15	< 0.0001%
Queensland	-	-	0.03	< 0.0001%
South Australia	8	< 0.0001%	10	< 0.0001%
Tasmania	-	-	-	-
Victoria	146	0.0004%	31	< 0.0001%

3.2 Differences between EAAP and MT PASA

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 3.3.

These processes adopt similar modelling approaches, but use slightly different inputs, reflecting their different purposes and frequency of projections. The main difference between EAAP and MT PASA is that the EAAP is assessed under a range of predefined energy scenarios and is published at least once every 12 months, whereas the MT PASA is based on participants' best expectation of generation availability, including some energy limitations, and is published on a weekly basis.

The MT PASA 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. The EAAP, on the other hand, assumes that generation and transmission outages will be rescheduled to avoid load shedding unless participants have indicated that the timing of these outages is inflexible. The similarities and differences of the two processes are described in more detail in the RSIG[12].

The MT PASA result at time of EAAP modelling (published on 10 November 2020) shows similar USE as this 2020 EAAP. However, MT PASA and EAAP have variations of inputs that can drive minor differences in results:

- MT PASA incorporates the impact of transmission outages according to the 13-month Network Outage Scheduled (NOS), while the EAAP model assumes system normal network conditions, assuming any network outage is rescheduled if need be to avoid capacity shortfalls.
- The MT PASA outcomes include the impact of scheduled generation outages which may be flexible. In EAAP modelling, any flexible outages that occur during periods with simulated USE are removed. 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.

3.3 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 similarities and differences of the two processes are described in more detail in the RSIG. The USE outcomes in the 2020 ESOO for 2020-21 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

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

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-20	0.0	0.0	0.0	0.0	0.0
Nov-20	0.0	0.0	0.0	0.0	0.0
Dec-20	7.6	0.0	0.0	0.0	0.4
Jan-21	3.7	0.0	7.4	0.0	121.4
Feb-21	3.8	0.0	2.7	0.0	21.0
Mar-21	0.0	0.0	0.0	0.0	0.0
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	1.5	0.0	0.0	0.0	0.0
Jul-21	0.8	0.0	0.0	0.0	0.0
Aug-21	0.0	0.0	0.0	0.0	0.0
Sep-21	0.0	0.0	0.0	0.0	0.0
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	0.6	0.0	0.0	0.0	0.3
Jan-22	1.8	0.0	10.0	0.0	25.6
Feb-22	2.3	0.0	0.6	0.0	10.7
Mar-22	0.8	0.0	0.0	0.0	0.1
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	0.0	0.0	0.0	0.0	0.0
Jun-22	4.7	0.0	0.0	0.0	0.0
Jul-22	0.0	0.0	0.0	0.0	0.0
Aug-22	0.0	0.0	0.0	0.0	0.0
Sep-22	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-20	0.0	0.0	0.0	0.0	0.0
Nov-20	0.0	0.0	0.0	0.0	0.0
Dec-20	9.3	0.0	0.0	0.0	0.0
Jan-21	2.1	0.0	6.7	0.0	95.7
Feb-21	3.4	0.0	0.8	0.0	15.9
Mar-21	0.0	0.0	0.0	0.0	0.1
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	1.3	0.0	0.0	0.0	0.0
Jul-21	0.2	0.0	0.0	0.0	0.0
Aug-21	0.2	0.0	0.0	0.0	0.0
Sep-21	0.0	0.0	0.0	0.0	0.0
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	1.4	0.0	0.0	0.0	0.3
Jan-22	3.5	0.0	8.5	0.0	29.4
Feb-22	4.2	0.0	0.5	0.0	9.2
Mar-22	0.3	0.0	0.0	0.0	0.2
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	0.0	0.0	0.0	0.0	0.0
Jun-22	3.3	0.0	0.0	0.0	0.0
Jul-22	0.0	0.0	0.0	0.0	0.0
Aug-22	0.0	0.0	0.0	0.0	0.0
Sep-22	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	13.5	0.0	0.0	0.0	0.0
Jan-21	2.9	0.0	6.8	0.0	130.3
Feb-21	4.3	0.0	1.1	0.0	15.1
Mar-21	0.0	0.0	0.0	0.0	0.2
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	0.6	0.0	0.0	0.0	0.0
Jul-21	0.2	0.0	0.0	0.0	0.0
Aug-21	0.7	0.0	0.0	0.0	0.0
Sep-21	0.0	0.0	0.0	0.0	0.0
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	2.0	0.0	0.0	0.0	0.7
Jan-22	2.3	0.0	8.7	0.0	22.4
Feb-22	4.8	0.0	0.7	0.0	7.5
Mar-22	0.0	0.0	0.0	0.0	0.1
Apr-22	0.0	0.0	0.0	0.0	0.0
May-22	0.0	0.0	0.0	0.0	0.0
Jun-22	5.5	0.0	0.0	0.0	0.0
Jul-22	0.0	0.0	0.0	0.0	0.0
Aug-22	0.0	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.