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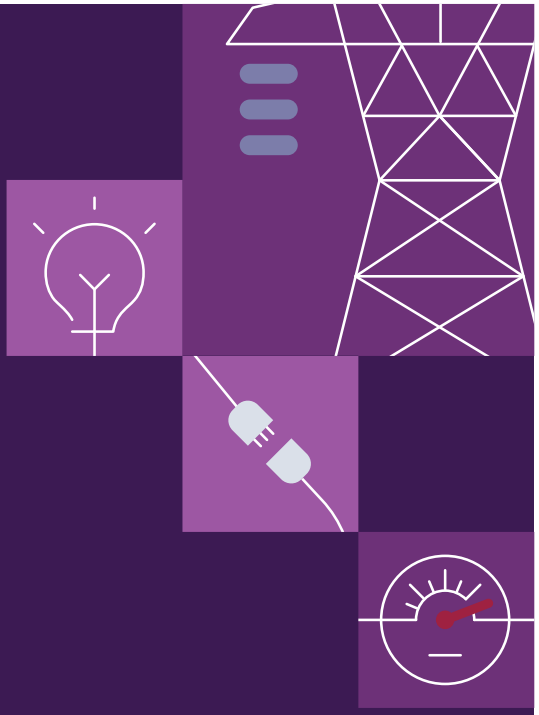

ST PASA Procedures and related documents

Consultation paper - Standard consultation for the National Electricity Market

Published: 3 September 2024

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Australian Energy Market Operator Ltd ABN 94 072 010 327

Explanatory statement and consultation notice

This consultation paper commences the first stage of the standard consultation procedure conducted by AEMO under National Electricity Rules (**NER**) 11.149.1, on a proposal to develop and publish procedures for the short term projected assessment of system adequacy (**ST PASA**) process (**Procedures**). The standard rules consultation procedure is described in NER 8.9.2.

The *National Electricity Amendment (Updating Short Term PASA) Rule 2022*[1] (**Amending Rule**) requires AEMO to develop and publish the Procedures in accordance with NER 3.7.3 as in force from 31 July 2025, when Schedule 1 of the Amending Rule commences (**new NER 3.7.3**).

The Amending Rule will introduce a principles-based framework, linked to a PASA objective, to guide AEMO's administration of ST PASA. Other changes introduced by the Amending Rule include a requirement for AEMO to publish availability information for individual scheduled resources, and amended definitions of PASA availability and energy constraints.

AEMO proposes that the initial Procedures will broadly reflect the content covered by the existing Short Term PASA Process Description[2], updated to address the information requirements of new NER 3.7.3.

The Amending Rule will, in due course, facilitate the implementation of AEMO's ST PASA Replacement Project. As that project has been delayed beyond its original implementation date, the proposed initial Procedures will not materially change the operation and administration of ST PASA other than in relation to the new information requirements.

This consultation also covers minor consequential amendments to the Reliability Standard Implementation Guideline (**RSIG**), the Spot Market Operations Timetable and SO_OP_3705: Short Term Reserve Management.

The detailed sections of this consultation paper include more information on the proposal and AEMO's reasons for making it. AEMO intends to provide the suggested draft of the new Procedures at the draft report stage of this consultation.

Consultation notice

AEMO is now consulting on this proposal and invites written submissions from interested persons on the issues identified in this paper to NEMReform@aemo.com.au by 5:00pm (Melbourne time) on **Tuesday 1 Ocotber 2024.**

Submissions may make alternative or additional proposals you consider may better meet the objectives of this consultation and the national electricity objective in section 7 of the National Electricity Law. Please include supporting reasons.

Before making a submission, please read and take note of AEMO's consultation submission guidelines, which can be found at https://aemo.com.au/consultations. Subject to those guidelines, submissions will be published on AEMO's website.

[1] The Amending Rule as made and all AEMC consultation materials are available on the AEMC's website at https://www.aemc.gov.au/rule-changes/updating-short-term-pasa

[2] AEMO, Short Term PASA Process Description, 21 June 2016. Available at: https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-reliability/projected-assessment-of-system-adequacy

Please identify any parts of your submission that you wish to remain confidential, and explain why. AEMO may still publish that information if it does not consider it to be confidential, but will consult with you before doing so. Material identified as confidential may be given less weight in the decision-making process than material that is published.

Submissions received after the closing date and time will not be valid, and AEMO is not obliged to consider them. Any late submissions should explain the reason for lateness and the detriment to you if AEMO does not consider your submission.

Interested persons can request a meeting with AEMO to discuss any particularly complex, sensitive or confidential matters relating to the proposal. Please refer to NER 8.9.1(k). Meeting requests must be received by the end of the submission period and include reasons for the request. We will try to accommodate reasonable meeting requests but, where appropriate, we may hold joint meetings with other stakeholders or convene a meeting with a broader industry group. Subject to confidentiality restrictions, AEMO will publish a summary of matters discussed at stakeholder meetings.

Figures

1. Stakeholder consultation process

AEMO is consulting on the initial 'ST PASA procedures' (**Procedures**) to be established under National Electricity Rules (**NER**) 11.149.1 (**proposal**). The Procedures will take effect from 31 July 2025 in accordance with the *National Electricity Amendment (Updating Short Term PASA) Rule 2022*[3] (**Amending Rule**). Consultation on the proposal will be conducted in accordance with the standard rules consultation procedure in NER 8.9.2.

The proposal also covers consequential changes to the following documents, which are required as a result of the Amending Rule and the proposed Procedures:

- Reliability standard implementation guidelines (**RSIG**).
- SO_OP_3703: Short term reserve management.
- Spot market operations timetable.

Note that this consultation paper uses terms defined in the NER (as amended by the Amending Rule), which are intended to have the same meanings. There is a glossary of additional terms and abbreviations in Appendix A.

AEMO's indicative process and timeline for this consultation are outlined below. Future dates may be adjusted and additional steps may be included if necessary, as the consultation progresses.

Consultation steps	Dates
Generator recall workshop	4 July 2024 (completed)
Feedback from stakeholders on generator recall workshop	19 July 2024 (completed)
Procedure consultation workshop	24 July 2024 (completed)
Feedback from stakeholders on Procedure consultation workshop	9 August 2024 (completed)
Consultation paper published	3 September 2024 (completed with this publication)
Submissions due on consultation paper	1 October 2024
Draft report published, including draft Procedures and marked up consequential amendments to other impacted documents	28 October 2024
Submissions due on draft report	2 December 2024
Final report and documents published	10 February 2025

A summary of feedback from the generator recall workshop has been published on AEMO's ST PASA Replacement Project webpage[4]. Stakeholder feedback from the procedure consultation workshop is summarised in Appendix C.

[3] https://www.aemc.gov.au/rule-changes/updating-short-term-pasa

https://www.aemo.com.au/initiatives/trials-and-initiatives/st-pasa-replacement-project

2. Background

2.1. Context for this consultation

The AEMC made the Amending Rule in May 2022. From 31 July 2025, the Amending Rule will replace the existing short term PASA provisions in the NER with a more principles-based framework. It will also revise the definitions of 'energy constraint' and 'PASA availability', which relate to some of the information provided by market participants as inputs to the short term PASA.

The Amending Rule requires AEMO to develop and publish the Procedures by 30 April 2025[5].

This consultation paper sets out AEMO's proposal on the content of the Procedures, in accordance with NER 3.7.3 as replaced by the Amending Rule (**new NER 3.7.3**). The proposal also outlines minor consequential amendments that will be required for three other AEMO published documents as a result of the Amending Rule and the Procedures.

2.2. NER requirements

The PASA (projected assessment of system adequacy) is a forecast of the overall balance of supply and demand and reserves for electricity.

The NER requires AEMO to prepare and publish the PASA in two time frames:

- Short term (ST) PASA covers 6 trading days from end of the trading day covered by most recent pre-dispatch schedule with a half hourly resolution; and
- Medium term (MT) PASA covers 24 months from the Sunday after the day of publication with a daily resolution.

For ST PASA, AEMO uses the inputs from registered participants and information produced by its own systems to forecast reliability and security conditions up to seven days ahead of real time. The Amending Rule provides a certain amount of flexibility to redevelop and update the information in the ST PASA in a way that best meets the 'PASA objective' in NER 3.7.1(b):

> *The PASA is a comprehensive program of information collection, analysis and disclosure of medium term and short term system security and reliability of supply prospects so that Registered Participants are properly informed to enable them to make decisions about supply, demand and outages of transmission networks in respect of periods up to 2 years in advance (or up to 3 years in advance, where specified).*

The Procedures are to include the following elements described in new NER 3.7.3(c):

- How AEMO will prepare inputs for the ST PASA, which must reflect the following factors, informed by relevant information submitted by registered participants[6];
  - forecast load and unscheduled generation, taking into account forecasting uncertainties;
  - forecast availability of scheduled resources, including any applicable constraints;

[5] NER 11.149.1.

[6] New NER 3.7.3(h) and (j) set out the information to be provided by relevant registered participants, which may include additional information prescribed by the Procedures

  - forecast network constraints and notified network outages; and
  - any other factors AEMO considers relevant having regard to the PASA objective[7].
- The detailed ST PASA information AEMO will publish to reflect the PASA objective, which must include for each ST PASA resolution period:
  - load forecasts at a range of probability of exceedance levels;
  - forecasts of the available capacity of individual scheduled resources;
  - forecasts of PASA availability of individual scheduled generating units, scheduled bidirectional units, scheduled loads, scheduled network services and wholesale demand response units; and
  - identification and quantification of:
    - any projected violations of power system security;
    - any projected failure to meet the reliability standard as assessed in accordance with the RSIG;
    - any forecast reserve conditions under NER 4.8.4; and
    - when and where network constraints may limit the dispatch of scheduled resources[8].
- The processes or methodologies AEMO will apply to produce the ST PASA information.
- The period to be covered by the ST PASA.
- Any other information that AEMO considers reasonably necessary to implement the PASA objective, having regard to the costs and benefits of collecting the relevant information.

Under the Amending Rule, PASA availability will be redefined to remove the arbitrary 24 hour notice period within which any additional generation could be made available, instead allowing recall periods to be defined in accordance with the RSIG. The revised definition is:

> *For a scheduled generating unit, scheduled bidirectional unit, scheduled load or scheduled network service in a given period, its available physical plant capability (taking ambient weather conditions into account) and any additional physical plant capability that can be made available during that period within a given recall period in accordance with the reliability standard implementation guidelines.*
>
> *For a wholesale demand response unit in a given period, [its] maximum available MW wholesale demand response, including any wholesale demand response that can be made available during that period within a given recall period in accordance with the reliability standard implementation guidelines.*

The definition of energy constraint will also be defined to remove unnecessary prescription relating to the nature of, or reasons for, a constraint, therefore allowing ST PASA to provide more comprehensive information about energy supply adequacy. The revised definition is:

> *A limitation on the quantity of energy (expressed in MWh) that a scheduled generating unit, scheduled bidirectional unit or scheduled load can produce or consume in a specified period.*

[7] The factors are listed in new NER 3.7.3(g)

[8] The mandatory ST PASA inclusions are listed in new NER 3.7.3(k)

2.3. The national electricity objective

Within the specific requirements of the NER applicable to this proposal, AEMO will seek to make a determination that is consistent with the national electricity objective (NEO) and, where considering options, to select the one best aligned with the NEO.

The NEO is expressed in section 7 of the National Electricity Law as:

> to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:
>
> (a) price, quality, safety, reliability and security of supply of electricity; and
>
> (b) the reliability, safety and security of the national electricity system; and
>
> (c) the achievement of targets set by a participating jurisdiction—
>
> (i) for reducing Australia's greenhouse gas emissions; or
>
> (ii) that are likely to contribute to reducing Australia's greenhouse gas emissions.

3. Proposal discussion

3.1. Overview and effect of proposal

AEMO proposes to develop the initial Procedures by using the content of the existing ST PASA Process Description[9] as a base, and updating it to incorporate the requirements of new NER 3.7.3. The material changes resulting from the Amending Rule are:

- Publication of available capacity for scheduled resources at an individual level (by DUID),
- Inclusion in PASA availability of capacity that can be made available on any notice period (shorter or longer than 24 hours) within the next seven days. This will require a change in the input requirements for relevant scheduled resources.

The proposal does not include any material changes to the existing process for the preparation of ST PASA at this stage. AEMO is continuing to progress its ST PASA Replacement Project, and expects that this will lead to more extensive changes to the Procedures. Any further proposed changes will be consulted on in due course.

AEMO considers that this Proposal meets the NEO with respect to reliability and security of supply of electricity and the reliability, safety and security of the national electricity system. AEMO anticipates that the proposal will not involve material costs for market participants, with the only substantive change relating to recall information as contemplated by the revised NER definition of PASA availability. The benefits of this change were discussed in the AEMC's consultation on the Amending Rule.

3.2. Proposed content of Procedures

The sub-sections below describe AEMO's proposal for each element of the Procedures under new NER 3.7.3(c).

3.2.1. How AEMO prepares inputs for ST PASA

AEMO proposes that the Procedures will describe how AEMO prepares the inputs necessary to take account of each of the factors in new NER 3.7.3(g), as outlined below.

Forecast load and unscheduled generation, taking into account forecasting uncertainties

The inputs and adjustments used by AEMO to produce load forecasts (incorporating unscheduled generation), and the methodology applied in the demand forecasting system, are set out in AEMO's power system operating procedure SO_OP_3710 Load Forecasting[10]. This procedure also explains how the statistical model-based forecasts (Australian Wind Energy Forecasting System (AWEFS), Australian Solar Energy Forecasting System (ASEFS) and Australian Solar Energy Forecasting System Phase 2 (ASEFS2)) are used in determining wind, solar and distributed PV (non-scheduled). AWEFS and ASEFS produce generation forecasts for some of the non-scheduled wind and solar generation.

[9] AEMO. 16 March 2012. ST PASA Process Description. https://aemo.com.au/-/media/files/electricity/nem/planning_and_forecasting/pasa/stpasa-process-description.pdf

[10] AEMO. May 2023. SO_OP_3710 Load Forecasting. https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3710-load-forecasting.pdf?la=en

AEMO applies the forecast uncertainty measure (FUM) to adjust Lack of Reserve (LOR) trigger levels used for ST PASA to determine reserve conditions. The method of determining and applying the FUM is explained in AEMO's Reserve Level Declaration Guidelines.

AEMO proposes that the Procedures will reference the processes in the Load Forecasting Procedure and the Reserve Level Declaration Guidelines to account for these factors.

Forecast availability of scheduled resources (other than bidirectional units)

For forecast availability of scheduled and semi-scheduled generating units, wholesale demand response, and scheduled network services, inputs are prepared by applying the following:

- Half-hourly (HH) available capacity, in MW, for both ST PASA and pre-dispatch (PD) PASA timeframes:
  - For scheduled generating units, wholesale demand response and scheduled network services: Lowest bid available capacity over the six trading intervals in each HH.
  - For semi-scheduled generating units: min(Lowest bid available capacity, UIGF).
- Daily energy available, in MWh (for bids that define a daily energy constraint):
  - PD PASA: Daily energy constraint – Dispatched energy since 0400.
  - ST PASA: Daily energy constraint.
- For PD PASA, the remaining daily energy is allocated to the highest demand periods over the remaining periods of the trading day. For ST PASA, daily energy available is allocated to the highest demand periods over the trading day. The Procedures will include an explanation of this process, but no change to the treatment of energy limits is proposed at this stage.
- For both PD PASA and ST PASA the trading day sum(PASA targets)/2 must not exceed the daily energy available.
- For PD PASA, the target must be at least as high as the re-dispatch target from corresponding HH in pre-dispatch run.

Forecast availability of scheduled bidirectional units (BDUs)

For forecast availability of scheduled BDUs, including any applicable constraints, inputs are prepared by applying the following:

- HH available capacity, in MW:
  - PD PASA: Daily energy constrained availability from the corresponding HH in pre-dispatch run

    where daily energy constrained availability = max(0, min (bid available capacity from last trading interval of HH, Pre-dispatch initial energy storage for HH / 2)).
  - ST PASA: Lowest bid available capacity over the six trading intervals in each HH.
- Daily energy available, in MWh:
  - PD PASA: Not applicable (reflected in the half-hourly available capacity)

- ST PASA: Registered Maximum Operational State Of Charge (if participant has opted in for this[11]) else Registered Maximum Storage Capacity.

Forecast network constraints and outages

For forecast network constraints and notified network outages, inputs include:

- Network constraints representing the power transfer capability of the network. The constraint formulation guidelines describe how constraints are implemented for ST PASA[12].
- Network outage schedule as published on AEMO's website, updated every half hour[13].

AEMO's power system operating procedure SO_OP_3718: Outage Assessment[14] explains the process for assessing network outages notified by TNSPs (via submission into the network outage schedule) and the invocation of network constraints.

AEMO is not proposing to specify any additional factors or inputs in the Procedures at this stage, subject to the change relating to capacity recall periods discussed in section 3.2.

3.2.2. Detailed ST PASA information to be published

AEMO proposes that the Procedures will set out the information to be published in the ST PASA, consistent with new NER 3.7.3(k):

- Load forecasts at 10%, 50% and 90% of probability of exceedance levels.
- Forecasts of the available capacity of individual scheduled resources.
- Forecasts of PASA availability of individual scheduled generating units, scheduled bidirectional units, scheduled loads, scheduled network services and wholesale demand response units.
- Identification and quantification of:
  - any projected violations of power system security;
  - any projected failure to meet the reliability standard as assessed in accordance with the reliability standard implementation guidelines;
  - any forecast reserve conditions under clause 4.8.4; and
  - when and where network constraints may limit the dispatch of scheduled resources.

AEMO proposes that these ST PASA outputs will continue to be published via:

- PD PASA and ST PASA NEM Reports (via Data Interchange) - for market subscribed participants
- Participant Data Model tables (which use these NEM Reports)

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[11] Registration Application for NEM Integrated Resource Provider https://aemo.com.au/-/media/files/electricity/nem/participant_information/registration/2024/registration-application-nem-irp.docx?la=en

[12] AEMO. Constraint Implementation Guidelines Section 3.5. https://aemo.com.au/-/media/files/stakeholder_consultation/consultations/nem-consultations/2023/constraints-implementation-guidelines/final-constraint-implementation-guidelines-v3.pdf?la=en

[13] AEMO. Network Outage Schedule. https://aemo.com.au/energy-systems/electricity/national-electricity-market-nem/data-nem/network-data/network-outage-schedule

[14] AEMO June 2024. SO_OP_3718 Outage Assessment. https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3718-outage-assessment.pdf?la=en

- NEMWeb
- AEMO Web Portal.

Current ST PASA information published

Details of the ST PASA information that AEMO currently publishes is shown in Figure 1.

Figure 1 Current ST PASA information published

REGIONSOLUTION		
RUN_DATETIME	MAXSURPLUSRESERVE	UIGF
INTERVAL_DATETIME	MAXSPARECAPACITY	SEMISCHEDULEDCAPACITY
REGIONID	LORCONDITION	LOR_SEMISCHEDULEDCAPACITY
DEMAND10	AGGREGATECAPACITYAVAILABLE	LCR
DEMAND50	AGGREGATESCHEDULEDLOAD	LCR2
DEMAND90	AGGREGATEPASAAVAILABILITY	FUM
RESERVEREQ	LASTCHANGED	SS_SOLAR_UIGF
CAPACITYREQ	RUNTYPE	SS_WIND_UIGF
ENERGYREQDEMAND50	ENERGYREQDEMAND10	SS_SOLAR_CAPACITY
UNCONSTRAINEDCAPACITY	CALCULATEDLOR1LEVEL	SS_WIND_CAPACITY
CONSTRAINEDCAPACITY	CALCULATEDLOR2LEVEL	SS_SOLAR_CLEARED
NETINTERCHANGEUNDERSCARCITY	MSRNETINTERCHANGEUNDERSCARCITY	SS_WIND_CLEARED
SURPLUSCAPACITY	LORNETINTERCHANGEUNDERSCARCITY	WDR_AVAILABLE
SURPLUSRESERVE	TOTALINTERMITTENTGENERATION	WDR_PASAAVAILABLE
RESERVECONDITION	DEMAND_AND_NONSCHEDGEN	

INTERCONNECTORSOLN
STUDYREGIONID
RUN_DATETIME
INTERVAL_DATETIME
INTERCONNECTORID
CAPACITYMWFLOW
CAPACITYMARGINALVALUE
CAPACITYVIOLATIONDEGREE
CALCULATEDEXPORTLIMIT
CALCULATEDIMPORTLIMIT
LASTCHANGED
RUNTYPE
EXPORTLIMITCONSTRAINTID
IMPORTLIMITCONSTRAINTID

CONSTRAINTSOLUTION
STUDYREGIONID
RUN_DATETIME
INTERVAL_DATETIME
CONSTRAINTID
CAPACITYRHS
CAPACITYMARGINALVALUE
CAPACITYVIOLATIONDEGREE
LASTCHANGED
RUNTYPE

Additional ST PASA information to be published

Consistent with new NER 3.7.3(k), the Procedures will specify that the following ST PASA information will be published in addition to the current ST PASA outputs:

- Forecasts of the available capacity of individual scheduled resources, being scheduled generating units, semi-scheduled generating units, scheduled bidirectional units, scheduled loads, scheduled network services and wholesale demand response units.
- Forecasts of PASA availability of individual scheduled generating units, scheduled bidirectional units, scheduled loads, scheduled network services, wholesale demand response units, which will include availability that can be recalled within a specified period, as discussed in section 3.2.

3.2.3. Processes and methodologies applied to produce ST PASA information

AEMO proposes that the Procedures will reflect the current ST PASA operation and analysis.

AEMO uses a linear programming solver to analyse input data and solve the PASA. The ST PASA system will then publish the outcome.[15] AEMO's actions in response to the outcomes of the ST PASA process are detailed in SO_OP_3703 Short Term Reserve Management.[16] The RSIG provides detailed information on thresholds and actions to be taken when AEMO declares an LOR condition.

AEMO is proposing to discontinue the LRC analysis in the ST PASA process.

3.2.4. Period to be covered by the ST PASA

Under new NER 3.7.3(b), the ST PASA must cover the seven trading days from and including the day of publication, at a resolution of 30 minutes or any shorter period determined by AEMO, to be specified in the procedures.

AEMO proposes that the ST PASA resolution will remain aligned with 30-minute periods, consistent with existing practice. Higher resolution (such as 5 minutes) would not be practical to implement for the exercise on the reliability and emergency reserve trader (RERT) function or other directions, and has not been suggested in AEMO's initial consultation workshops.

AEMO currently produces separate ST PASA and pre-dispatch PASA solutions. While the Amending Rule allows AEMO to combine these two timeframes, the current proposal is to continue to publish two sets of analysis[17].

3.3. ST PASA recall period

ST PASA collects information from a number of sources to provide a forecast of the supply/demand balance on a half hourly basis for a six day period commencing from the end of the trading day covered by the most recent pre-dispatch schedule.

To address the revised definition of PASA availability under the Amending Rule, AEMO proposes that the Procedures will describe an extended input requirement for the notice period (or recall period) within which additional capacity could be made available if required. A recall period should be specified for capacity that can be available within a maximum of 168 hours (7 days), corresponding with the outlook period to be specified in the RSIG.

AEMO proposes that:

- If no recall period is entered, the value will default to zero (that is, available for immediate recall).
- A recall period need not be submitted if the PASA availability of the resource is either equal to its available capacity (all expected to be bid into the market), or zero MW recallable capacity (no capacity within 168 hours).

[15] NER 4.8.4 allows AEMO to declare low reserve and lack of reserve conditions, as specified in the RSIG.

[16] AEMO. SO_OP_3705 Short Term Reserve Management. https://aemo.com.au/-/media/files/electricity/nem/security_and_reliability/power_system_ops/procedures/so_op_3703-short-term-reserve-management.pdf?la=en

[17] AEMO may consider combining ST PASA and PD PASA into a single PASA as part of the Short Term PASA Replacement Project https://www.aemo.com.au/initiatives/trials-and-initiatives/st-pasa-replacement-project

AEMO welcomes submissions on the maximum allowable recall period that should be accepted for ST PASA).

3.4. Requirement for consequential amendments

As part of this consultation AEMO is also proposing consequential amendments to three other published documents as a result of the Amending Rule and the proposed Procedures, as outlined in Table 1.

Table 1 Consequential amendments to other documents

Document	Function	Content to be changed	Effective date
Reliability Standard Implementation Guidelines (RSIG)	Sets out how AEMO will implement the reliability standard (NER 3.93D).	Consistent with the change to the NER definition of 'PASA availability', amend references to "24 hours" to refer to capacity that can be made available in a given timeframe within a 7-day outlook period, based on participant inputs to be made in accordance with the Procedures.	31 July 2025
Spot Market Operations Timetable	Includes the times for submission of PASA inputs and publication of outputs (NER 3.4.3 and new NER 3.7.3)	NER clause references to be updated Amend to include the current pre-dispatch PASA timeframe (which is not required in the timetable)	31 July 2025
SO_OP_3703 Short Term Reserve Management	Provides information on how AEMO manages LRC and LOR declarations based on output of ST PASA and pre-dispatch processes (NER 3.8.14A and 4.10.1).	Amend to align with the new framework and remove LRC analysis	31 July 2025

3.5. Proposed effective date

In accordance with NER 11.149.1, AEMO intends to make the Procedures and consequential changes to other documents by 30 April 2025. The Procedures will have an effective date of 31 July 2025, being the commencement date of new NER 3.7.3 under the Amending Rule.

3.6. Stakeholder feedback

AEMO's draft report and draft Procedures (the next stage of this consultation) will take account of the feedback from AEMO's ST PASA procedure consultation workshop on 24 July 2024, which is summarised in Appendix C. Key areas of focus included:

- Clarity around loads associated with BDUs and pumped storage.
- How energy limits of BDUs are modelled. The Procedures to explain the limitations of the PASA model to use BDU energy limits accurately, especially beyond the pre-dispatch period.
- Confirmation of the publication of unit-level availabilities for all plant.
- How BDUs are modelled in ST PASA.

Appendix B lists questions AEMO has prepared for stakeholders to consider for feedback on this consultation paper. AEMO welcomes feedback and suggestions on these questions and any other matters relevant to the content of the Procedures as contemplated by the Amending Rule or other

impacted documents. Submissions must be made by email to NEMReform@aemo.com.au by 5.00pm on **Tuesday 1 October September 2024.**

Appendix A. Glossary

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator Limited
Amending Rule	*National Electricity Amendment (Updating short term PASA) Rule 2022*
BDU	Bidirectional unit
DUID	Dispatchable unit identifier
FUM	Forecast uncertainty measure
HH	Half-hour (30-minute period)
LOR	Lack of reserve
LRC	Low reserve condition
NER	National Electricity Rules[18]
PD PASA	Pre-dispatch projected assessment of system adequacy
Procedures	ST PASA procedures
RSIG	Reliability standard implementation guidelines
ST PASA	Short term projected assessment of system adequacy

[18] NER followed by a number refers to a rule or clause of the National Electricity Rules

Appendix B. Questions for consultation

Questions	Stakeholder response
• Should the ST PASA account for any additional input factors beyond those listed in new NER 3.7.3(g)(1) to (3)? Please outline how any suggested additions would further the PASA objective.	•
• Should the Procedures include any other information, including any additional ST PASA outputs, not canvassed in the consultation paper? Please outline how any suggested additions would further the PASA objective.	•
• Are there any material adverse impacts of the proposal for registered participants, relative to the current ST PASA requirements?	•
• **Is t**he proposed 168-hour maximum recall period appropriate for PASA availability, or should it be longer or shorter?	•
• Are any additional clarifications needed from AEMO about the ST PASA process?	•
• Are there any adverse impacts for particpants if LRC runs are discontinued as proposed?	•
• Do participants have any other observations/comments?	•

Appendix C. Summary of stakeholder feedback from Procedure consultation workshop – 24 July 2024

Stakeholder	Topic/input/output	Stakeholder suggestion	AEMO's response	Next steps
Topic - how AEMO will prepare inputs for the short term PASA				
Shell Energy	FUM	Analysis must be undertaken at different probability weightings to reduce the level of false positive LOR declarations whilst still providing outcomes that reflect when forecasting uncertainty may lead to a genuine LOR outcome. Currently there is little confidence in the FUM process or that it delivers any tangible benefit.	AEMO does not propose changes to the existing process as part of this consultation. The ST PASA Replacement Project will be replacing the FUM with a different process to manage uncertainty.	Separate consultations on the replacement project will be announced in due course.
Energy Australia	FUM	Revisit current setting of FUM to zero after 72 hours	AEMO does not propose changes to the existing process as part of this consultation. The ST PASA Replacement Project will be replacing the FUM with a different process to manage uncertainty.	Separate consultations on the replacement project will be announced in due course.
Shell Energy	Operational Demand Forecast	The methodology needs to be clear that the operational demand and reported generation availability only includes the generation component of a BDU. The schedule load component of a BDU is excluded from the operational demand forecast. This needs to be clear and consistent across all AEMO processes.	Noted.	The Procedures will be clarified as required. This would include clarity around loads by BDUs and pumped storage.
Energy Australia	Weather forecasts	Weather forecasts can materially change over the life of each ST PASA (i.e. 24 hours) making AEMO's projections outdated. Transparency on outages for semi-scheduled plant is particularly important.	Noted.	The Procedures will include publication of unit-level availabilities for all plant.

Stakeholder	Topic/input/output	Stakeholder suggestion	AEMO's response	Next steps
Energy Australia	Interconnector flows	interconnector flows are sometimes not accurate in STPASA, particularly with renewable related constraints impacting interregional flows.	Noted.	No action.
AGL	Constraints	Will constraints be a factor in the supply for or Semi-scheduled units? As renewable energy plays a greater part, and transmission congestion increases, should transmission constraints be considered in a semi-scheduled generators capacity to supply into regional energy demand.	Constraints are applied to both scheduled and semi-scheduled plants in PASA.	Noted.
Topic - the detailed short term PASA information AEMO will publish				
Shell Energy	PASA File data order	Currently the file displays in Date/time then region order. Would it be possible to change this for the LOR analysis component to region then date/time order.	Noted. AEMO is proposing the minimum changes to systems at this stage.	Consider as part of the replacement project.
Topic - the processes or methodologies AEMO will apply to produce the short term PASA information				
Shell Energy	Description of BDU/BESS and Hydro Pumped Storage	Process and methodology documents should be improved to clarify how energy limits are allocated to each half hour. The process and methodology should allocate to the most needed ½ hour periods first and then allocate any residual to the periods where the energy is most likely to provided. The current process which allocates energy to low demand periods is out of touch with what actually happens in the NEM.	Noted. The ST PASA replacement project will use a dispatch model similar to the spot market. No changes are proposed for this consultation.	AEMO will explain how energy limits of BDUs are modelled. The Procedures will also explain the limitations of the PASA model to use BDU energy limits especially beyond the pre-dispatch period.
Shell Energy	Allocation of energy limits to individual half hourly periods	Process and methodology documents should be improved to clarify how energy limits are allocated to each half hour. The process and methodology should allocate to the most needed ½ hour periods first and then allocate any residual to the periods where the energy is most likely to provided.	Noted. The ST PASA replacement project will use a dispatch model similar to the spot market. No changes are proposed for this consultation.	The Procedures will clarify as required.
Shell Energy	Interconnector limits	The document must accurately set out how forecast interconnector limits are calculated and their interaction with forecast generator limits when these interact together in a remote constrained geographical location. At the moment the PASA incorrectly indicates higher interconnector limits than that which will apply in pre-dispatch and at dispatch.	Noted.	The Procedures will clarify as required.
Topic - the period to be covered by the short term PASA				

Stakeholder	Topic/input/output	Stakeholder suggestion	AEMO's response	Next steps
Shell Energy	Using PASA availability in the analysis and providing information PASA avail info in the PASA file	We recommend the PASA availability should be more transparent and also published via the inclusion of a new PASA Avail Reserve Calculation showing what reserves would be based on submitted recall time.	Noted.	AEMO is not proposing major changes to information in this consultation.
AGL	PASA information presented	There is value in further assessment of how PASA information is presented, the underlying assumptions, and other improvements that could be made	The procedure will explain this in detail.	AEMO is not proposing major changes to information in this consultation.
Energy Australia	Max Availability vs PASA Availability in reserve calculations	AEMO to clarify how it uses Max Availability vs PASA Availability in reserve calculations.	AEMO does not use PASA Availability in reserve calculations. It is used to assist with interventions.	The Procedures will confirm publication of unit-level availabilities for all plant.
AGL	Energy constraints for BDU	Please clarify in the PD PASA timeframe the Daily Energy Constrained Availability for BDU. Also, what is proposed to derive the value from *min (bid Available Capacity from last trading interval of HH, Pre-dispatch Initial Energy Storage for HH / 2)?* And what is the input for 'initial energy storage'?	Noted.	The Procedures will clarify as required.
Topic - any other information				
Shell Energy	LRC analysis	Agee with proposal that the LRC analysis no longer serves any useful purpose. It can also lead to confusion.	Noted.	LRC analysis will be discontinued as proposed.
Murcuria	STPASA table	Suggestion to include semi-scheduled/wind/solar technical availability measure (ie minimum of UPPERMWLIMIT, cluster/element informed availability, and BIDAVAIL) in the STPASA table.	Noted. Some of the information suggested is not used for ST PASA and has not been identified in the new rule.	The Procedures will confirm publication of unit-level availabilities for all plant.
Energy Australia	Assumptions for bidirectional units	Explore AEMO's assumptions around the number and timing of cycles in terms of charge/ discharge profile throughout the day, especially in the lead up to, and during, scarcity or high price events. Additionally, consider complications arising where some batteries cannot discharge or are even forced to charge during peak events due to constraints and local pricing.	Noted. Due to the inherent limitations of the ST PASA modelling, detailed modelling of BDUs reflecting their complex operational patterns is not possible.	AEMO is not proposing major changes to information for this initial stage. The Procedures will explain how BDUs are modelled in ST PASA.

Stakeholder	Topic/input/output	Stakeholder suggestion	AEMO's response	Next steps
Energy Australia	Local/intraregional constraints in STPASA	How does AEMO include constraints in ST PASA and what are taken into account in the calculations?	Noted. AEMO models power transfer capabilities of inter-regional and intra-regional network elements to the extent possible, with some assumptions in some cases.	AEMO is not proposing major changes in this consultation.
AGL	Scheduled loads and BDU loads	Can scheduled loads and BDU loads be included and will PASA extend to the adequacy to meet minimum demands too?	Noted. Minimum demands do not form part of ST PASA. AEMO will consider extending in the ST PASA replacement project.	AEMO is not proposing major changes in this consultation.
AGL	Project scope	AEMO could consider taking the follow approach: Stage 1: simple edits & capturing ideas. Stage 2: what can be done to improve PASA. Stage 3: build.	Noted.	
AGL	Project scope	There are a series of market changes converging over the next 12 months e.g. Integrating price-responsive resources into the NEM AEMC rule change. How will this fit into the PASA process?	NEM Reform activities are being considered as part of the ST PASA Replacement Project.	No action for this specific consultation.