AMENDMENTS TO RELIABILITY STANDARD IMPLEMENTATION GUIDELINES AND VARIOUS AEMO PROCEDURES

ISSUES PAPER

Published: **May 2020**

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EXECUTIVE SUMMARY

The publication of this Issues Paper commences the first stage of the Rules consultation process conducted by AEMO on proposed amendments to the reliability standard implementation guidelines (RSIG or Guidelines), the Energy Adequacy Assessment Projection (EAAP) guidelines, the Medium Term Projected Assessment of System Adequacy (MT PASA) Process description and the Spot Market Operations Timetable.

AEMO has prepared this Issues Paper to inform the industry of changes to how AEMO implements the reliability standard, driven by:

- Updates to the Procedure for the Exercise of Reliability and Emergency Reserve Trader.
- The introduction of the National Electricity Amendment (Improving transparency and extended duration of MT PASA) Rule 2020 No. 1.
- Anticipated changes required with introduction of Interim Reliability Measure which is currently in draft form.

This document details the impact of these changes on the following AEMO publications:

- Reliability Standard Implementation Guidelines (RSIG or Guidelines).
- MT PASA Process description
- EAAP guidelines
- Spot Market Operations Timetable.

The changes to the above publications, and the EAAP Guidelines, also include various minor improvements to the underlying processes, and ongoing efforts to ensure consistent methodologies and assumptions are applied.

Stakeholders are invited to submit written responses on the proposed changes identified in this paper and the proposed amendments to the guidelines, process description and timetable by **5.00 pm (Australian Eastern Standard time) on 29 June 2020**, in accordance with the Notice of First Stage of Consultation published with this paper.

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1. STAKEHOLDER CONSULTATION PROCESS

AEMO is consulting on proposed changes to the Reliability Standard Implementation Guidelines (RSIG), the Energy Adequacy Assessment Projection Guidelines (EAAP Guidelines), MT PASA process description and the Spot Market Operations Timetable in accordance with the Rules consultation process in rule 8.9.

Note that there is a glossary of terms used in this Issues Paper at Appendix A.

AEMO's indicative timeline for this consultation is outlined below. Dates may be adjusted depending on the number and complexity of issues raised in submissions and any meetings with stakeholders.

Deliverable	Indicative date
Issues Paper published	25 May 2020
Discussion with Reliability Panel	16 June 2020
Submissions due on Issues Paper	29 June 2020
Draft Report published	20 July 2020
Submissions due on Draft Report	3 August 2020
Final Report published	31 August 2020

Prior to the submissions due date, stakeholders can request a meeting with AEMO to discuss the issues and proposed changes raised in this Issues Paper.

BACKGROUND

1.1 Context for this consultation

Changes to AEMO's practice, to the Rules and to MT PASA and RERT procedures need to be reflected in the RSIG:

- AEMO's 'Enhancement to the Reliability and Emergency Reserve Trader' procedure changes were effective 2 March 2020[1] and note that the Electricity Statement of Opportunities (ESOO) may inform AEMO's procurement of RERT contracts.
- A final rule determination of the National Electricity Amendment (Improving transparency and extended duration of MT PASA) Rule 2020 No. 1 occurred on 20 February 2020[2]. According to the original rule change submission, the changes were designed to:
  - improve transparency of the MT PASA process, reduce asymmetry of generation availability information in the market, and extend the period generation availability is published from two to three years.
  - better inform the market at a granular level on projected assessments of reliability and generation availability, and will likely result in participants making more effective and efficient decisions in how they interact with the market.

This document details the impact of these changes on the following AEMO publications:

- RSIG.
- MT PASA Process description.
- spot market operations timetable

The RSIG has also been amended to reflect the implementation of the draft amendments to the Rules related to the Interim Reliability Measure[3].

In addition to the two main changes noted above, AEMO has taken the opportunity to update the publications and the EAAP Guidelines with:

- Various minor improvements to the underlying processes, including ongoing efforts to ensure consistent methodologies and assumptions are applied.
- Updated references to input data sources or associated methodology documentation.

AEMO seeks feedback on any of these proposed changes.

[1] https://www.aemo.com.au/consultations/current-and-closed-consultations/enhancements-to-rert-rule-change-update-to-procedures

[2] https://ris.pmc.gov.au/2020/02/24/national-electricity-amendment-improving-transparency-and-extending-duration-mt-pasa-rule

[3] Further details can be found at http://coagenergycouncil.gov.au/publications/consultation-draft-national-electricity-amendment-interim-reliability-measure-rule-2020

2. PROPOSED AMENDMENTS TO THE RELIABILITY STANDARD IMPLEMENTATION GUIDELINES

The RSIG outline the various approaches and assumptions used to evaluate the market against the reliability standard, and are made under clause 3.9.3D of the National Electricity Rules (NER).

The RSIG has been amended to align with AEMO's update to the Procedure for the Exercise of Reliability and Emergency Reserve Trader (RERT)[4], and to better reflect the methodologies AEMO uses in the ESOO, MT PASA and EAAP. The RSIG has also been amended to reflect the changes needed to implement the interim reliability measure if it is implemented in its draft form.

Key changes include:

- Updating descriptions of how AEMO uses the ESOO to implement the reliability standard. The ESOO is used as an input in the RERT procurement process and forms the basis of the Reliability Forecast as part of the Retailer Reliability Obligation (RRO). The use of the ESOO to indicate whether RERT will be required was reflected in the update to the Procedure for the Exercise of RERT. Removing some descriptions of the details of RERT procurement which are related to rule changes rather than the process AEMO uses in implementing the reliability standard.
- Clarifying the methodology description, including:
  - Changed description of planned outages in the ESOO from being scheduled and optimised during low demand periods, to the current approach of assuming they are scheduled at times of surplus supply. AEMO no longer models planned outages as these are assumed to be moved if they risk unserved energy (USE).
  - Described the approach to the inclusion of auxiliary load in ESOO, MT PASA and EAAP modelling.
  - Described the differences in approach used in modelling constraint equations and intermittent generation between EAAP and MT PASA.
- Detailing how AEMO will determine whether the interim reliability measure has been exceeded. The RSIG also adjusts the actions able to be taken by AEMO to reflect that AEMO may enter into contracts for interim reliability reserves if the measure is exceeded.
- Clarifying, and outlining proposed improvements to, the methodology related to modelling wind and solar generation. The updated RSIG clarifies that historical generation will not always be used where available, but rather where the use of historical generation is most appropriate. AEMO currently uses historical generation data to model many existing wind generators. However, for a number of reasons including increased levels of curtailment due to low prices or transmission constraints, and the potential impact of high wind or high temperature cut-outs, AEMO is moving toward a method which more heavily relies on meteorological data, which is converted to expected generation using the best available information. AEMO will consult on any fundamental change in the way intermittent generators are modelled across AEMO's various forecasting functions.
- Clarifying that at least eight reference years will be used in conducting reliability assessments through the ESOO, EAAP and MTPASA.
- Noting that AEMO may supplement historical outage rate assessments with forward-looking assessments provided by participants. This information may be requested for some generators such as in cases where deteriorating performance is observed.
- Documenting AEMO's considerations when determining whether an update to the ESOO or MT PASA is required based on a change in an underlying assumption.

[4] Consultation details available at: https://www.aemo.com.au/consultations/current-and-closed-consultations/enhancements-to-rert-rule-change-update-to-procedures

- Updating links to references and links that have changed name or moved.

3. PROPOSED AMENDMENTS TO THE MT PASA PROCESS DESCRIPTION AND THE SPOT MARKET OPERATIONS TIMETABLE

MT PASA assesses the adequacy of expected electricity supply to meet demand across the two-year horizon through regular assessment of any projected failure to meet the reliability standard. This assists Registered Participants and other stakeholders making decisions about supply, demand and transmission network outages over that period.

The MT PASA Process Description documents information collection, analysis and disclosure of power system security and predicted supply reliability.

The National Electricity Amendment (Improving transparency and extending duration of MT PASA) Rule 2020 No. 1[5] has been approved. To comply with this rule change AEMO needs to make several modifications to the MT PASA process. The sections below summarise and discuss the various amendments to reflect this rule change and/or to generally improve the clarity of the document.

The MT PASA rule change will also require minor changes to AEMO's Spot Market Operations Timetable to reflect the extension of generator's obligations to provide PASA availability and AEMO's data publishing responsibilities from 24 to 36 months. These changes will be provided in draft form at the time of publishing of this consultation's draft determination. The changes required will include:

- Update the requirement for participants to submit data for MT PASA to be "up to 36 months" instead of 24 months. This is due to the new requirement on scheduled generating units.
- Adding an additional row which describes the outputs related to aggregate PASA availability for each region and generating unit PASA availability published in the REGIONAVAILABILITY and the new DUIDAVAILABILITY reports. This covers a period of 36 months as per the rule change.

3.1 Clarifications and updates

Proposed MT PASA Process Description amendments include general process clarifications and updates to references and links that have changed name or moved.

This includes clarification on how AEMO calculates intermittent generation traces where historical generation data is unavailable or unsuitable.

The document also clarifies AEMO's approach to the inclusion of auxiliary loads. The demand inputs used by AEMO in the reliability run are on a "sent-out" basis, but are adjusted by the auxiliary load that occurs within the simulation which is dependent on the generator dispatch in each interval.

Where appropriate, AEMO has generalised references to other documents and processes such that the MT PASA process description remains correct when other changes occur.

3.2 Changes in the MT PASA methodology

The updated document details AEMO's adjustment to the POE weightings which are applied to weight the unserved energy outcomes from the 10% and 50% POE simulations. Consistent with the approach used in the ESOO, AEMO has changed the weighting applied to the 50% POE simulations to reflect that the unserved energy expected in the 90% POE outcomes will be immaterial.

[5] https://www.aemc.gov.au/rule-changes/improving-transparency-and-extending-duration-mt-pasa

The most significant change in the MT PASA methodology is the provision of additional information about the daily maximum demands. The existing approach to meet the requirement in 3.7.2(f)(1) is maintained, but is expanded as follows:

- Non-scheduled generation is subtracted from the demand traces to more clearly meet the requirement in 3.7.2(f)(1) which requires publication of peak load values that are net of non-scheduled generation. These values are on an as-generated basis to better match actual demand published by AEMO.
- For the daily peak demand values published under 3.7.2(f)(1), scheduled loads are considered off at time of peak if storage based, and considered on if large industrial loads. The possible reduction in demand from large industrial loads during high price events, including wholesale demand response, is captured in AEMO's demand side participation forecast.
- The calculations and publishing of the 10% probability of exceedance (POE) peak load, the most probable peak load and the maximum and minimum values of the forecasts (to meet the new clause 3.7.2(f)(1A)) are all reflective of the actual demand traces used in MT PASA. These new values improve the transparency of the assessment, as they reflect the range of values in the actual demand traces used in the MT PASA reliability run, as opposed to the values published in 3.7.2(f)(1), which are not reflective of any of the inputs used in MT PASA..

3.3 Medium Term PASA Inputs

The process description clarifies that in accordance with the rule change (Rule 2020 No. 1), generators are required to provide the expected daily MW capacity of each scheduled generating unit for the next 36 months, updated from 24 months.

The process description provides details around the inclusion of generation projects with a commitment to construct or install[6] in MT PASA. This is not a change in process as MT PASA has always included these generators but has been added for clarity.

3.4 Medium Term PASA outputs

The rule change (Rule 2020 No. 1) includes additional information that AEMO is required to provide under clause 3.7.2(f)(1A). AEMO must prepare and publish the maximum and minimum values of daily demand forecasts under both 10% POE and most probable peak demand conditions. This clause specifically refers to the input forecasts produced under 3.7.2(c)(1) and the calculated values are therefore reflective of the actual demand traces used in MT PASA.

To meet the publication requirement, AEMO has added several new fields to the published three-hourly report (all on an as-generated basis and excluding contribution from non-scheduled generation):

- DEMAND10MAX – calculated as the maximum across the 10% POE maximum daily demands.
- DEMAND10MIN – calculated as the minimum across the 10% POE maximum daily demands.
- DEMAND50MAX – calculated as the maximum across the 50% POE maximum daily demands.
- DEMAND50MIN – calculated as the minimum across the 50% POE maximum daily demands.

Other changes made to reflect the rule change include:

- PASA availability will now also be published at a unit level (as per the new clause 3.7.2(f)(5)).

[6] Information on the criteria used by AEMO to classify projects as committed can be found at https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-forecasting-and-planning/forecasting-and-planning-data/generation-information

- Availability will also be published for 36 months instead of 24 months due to the increased time period that generation availability must be provided by generators.
- Demand values published in the REGIONRESULT table will now be published on a 'as-generated' basis. This is to make it consistent with other demand data that is published by MT PASA.
- The DEMAND10 and DEMAND50 values published in the MTPASA_REGIONAVAILABILITY report are net of the contribution from non-scheduled generation.

Finally, other calculations have been added to the MTPASA_REGIONRESULT table to provide participants with more information on generator availability. The additional fields are to meet the new requirement in clause 3.7.2(f)(5B) and show the impact of the random forced outages on the capacity available. The new fields are provided below:

- TOTALAVAILABILEGEN90 – The 90% percentile for total availability (Scheduled) across all iterations and half hours (MW)
- TOTALAVAILABILEGEN50 – The 50% percentile for total availability (Scheduled) across all iterations and half hours (MW).
- TOTALAVAILABILEGEN10 – The 10% percentile for total availability (Scheduled) across all iterations and half hours (MW).
- TOTALAVAILABILEGENMIN – The minimum for total availability (Scheduled) across all iterations and half hours (MW).
- TOTALAVAILABILITYGENMAX – The maximum for total availability (Scheduled) across all iterations and half hours (MW).

The updated process description details all of the new output fields which will be provided once the rule change comes into effect, and also provides an example of an additional visualisation which will be made available.

The MT PASA rule change will also require minor administrative changes to AEMO's Spot Market Operations Timetable to reflect the extension of generator's obligations to provide PASA availability and AEMO's data publishing responsibilities from 24 to 36 months. These changes will be provided in draft form at the time of publishing of this consultation's draft determination.

4. PROPOSED AMENDMENTS TO THE EAAP GUIDELINES

AEMO is required to develop and publish the EAAP Guidelines in accordance with Rule 3.7C.

The EAAP Guidelines have been amended to align with improvements in other AEMO processes, including MT PASA reliability modelling. Other amendments clarify methodology, and update links to references and links that have changed name or moved. The amendments are minor in scope and do not materially impact the methodology for assessing reliability in the EAAP process.

Key changes are:

- Removed the statement that AEMO will only run simulations on the long-term average rainfall scenario if USE is over 0.002% in the short-term average rainfall scenario. AEMO will conduct simulations on all three scenarios (low rainfall, short-term average and long-term average rainfall), at a minimum, in future.
- Removed descriptions of self-dispatch levels and generator ramp rates in the model. These features are no longer implemented in the Generator Energy Limitation Framework *(*GELF) and currently have minimal impact on the implementation of the reliability standard. As models such as the EAAP currently simulate dispatch on a half-hourly granularity and do not consider the impact of factors such as short-term forecast uncertainty, issues related to flexibility and ramping are currently not captured. Future developments in AEMO's forecasting models will be explored to better reflect the increasing reliability risks associated with lack of system flexibility.
- Removed references to Interconnector FOR (Forced outage rates). This is to align with the approached used in MT PASA where unplanned network outages are not modelled. Capturing such outages in these processes would be extremely difficult as it would require changes to constraint sets that are automatically created from AEMO's market systems. Where relevant, the impacts of interconnector FORs are captured in the ESOO.
- Simplified the data on total energy production provided to owners of scheduled generating units or hydro schemes.
- Clarified the current process for deriving the demand traces modelled which are now fully aligned with the approach used in both ESOO and MT PASA. Similarly, the generation modelled (scheduled, semi-scheduled and large non-scheduled) and the approach to incorporating auxiliary load is also now aligned across these three processes.
- Updated naming conventions and links to other processes and documentation.

APPENDIX A. GLOSSARY

The words, phrases and abbreviations in the table below have the meanings set out opposite them when used in these Procedures.

Terms defined in the National Electricity Law and the NER have the same meanings in these Procedures unless otherwise specified in this clause.

Defined terms/Terms defined in the NER are intended to be identified in these Procedures by italicising them, but failure to italicise a defined term does not affect its meaning.

Table 1 Glossary

Term	Definition
AEMO	Australian Energy Market Operator
ASEFS	Australian Solar Energy Forecasting System
AWEFS	Australian Wind Energy Forecasting System
DER	Distributed Energy Resources
DFS	Demand Forecasting System
EAAP	*Energy adequacy assessment projection*
ESOO	Electricity *statement of opportunities*
EV	Electric Vehicles
GELF	*Generator Energy Limitation Framework*
GWh	Gigawatt hours (energy)
LOR	*Lack of reserve*
LRC	*Low reserve* condition
MT PASA	*Medium term PASA*
MW	Megawatt
NEM	National Electricity Market
NER	National Electricity Rules
NSCAS	*Network* Support and Control Ancillary Services
PASA	*Projected assessment of system adequacy process*
POE	Probability of Exceedance
RERT	*Reliability and emergency reserve trader*
RSIG	*Reliability standard implementation guidelines*
ST PASA	*Short term PASA*
USE	*Unserved energy*