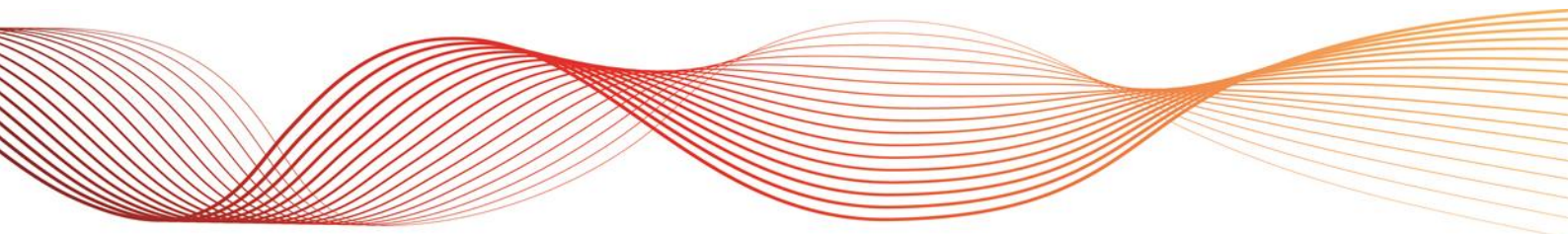




# RELIABILITY STANDARD IMPLEMENTATION GUIDELINES

FINAL REPORT AND DETERMINATION

Published: **15 August 2017**





# NOTICE OF FINAL DETERMINATION – RELIABILITY STANDARD IMPLEMENTATION GUIDELINES

## National Electricity Rules – Rule 8.9

### Date of Notice: 15 August 2017

This notice informs the *Reliability Panel*, all *Registered Participants* and *interested parties* (Consulted Persons) that AEMO has completed its consultation to amend the Reliability Standard Implementation Guidelines.

This consultation was conducted under clause 3.9.3D (a) and (c) of the National Electricity Rules (NER), in accordance with the *Rules* consultation requirements detailed in rule 8.9 of the NER.

### Determination and Publication

AEMO's final determination is to make the Reliability Standard Implementation Guidelines in the form published on the AEMO website. The Guidelines are published on AEMO's website at: <http://www.aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines-Consultation>

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## EXECUTIVE SUMMARY

The publication of this Final Report and Determination (Final Report) concludes the *Rules* consultation process conducted by AEMO to consider proposed amendments to the *reliability standard implementation guidelines* (RSIG or Guidelines) under the National Electricity Rules (Rules).

These Guidelines set out how AEMO implements the *reliability standard* and the approach and assumptions used. The *reliability standard* for *generation* and *inter-regional transmission elements* measures the effectiveness, or sufficiency, of installed capacity to meet demand, and targets no more than 0.002% of expected unserved energy (USE) for any region in any financial year.

AEMO is redeveloping its Medium Term Projected Assessment of System Adequacy (MTPASA) methodology to make sure it is fit for purpose in future, recognising that the National Electricity Market (NEM) is evolving with more intermittent generation being installed. Specifically, AEMO is focusing on how MT PASA is used to report potential reliability standard breaches. In 2016, AEMO engaged Ernst & Young (EY) to review and recommend improvements to the MT PASA methodology. EY identified the need to replace the existing methodology with a probabilistic approach that can better capture the intermittent generation impacts on supply adequacy, amongst other improvements.

AEMO is committed to improving the MT PASA methodology to more accurately assess potential *reliability standard* breaches in the next two years. Improvements to the MT PASA methodology, related to the reliability assessment, therefore require these Guidelines to be amended.

AEMO began the first stage of consultation on the Guidelines on 30 March 2017. An Issues Paper outlined how AEMO proposed to implement EY's recommendations and sought feedback on outstanding issues for resolution. Key developments following the stage one and two consultations are summarised below:

- AEMO has released the MT PASA Process Description document which provides further details on the proposed MT PASA redevelopment.
- After taking into account feedback from the submissions and internal testing, AEMO will continue to run MT PASA on a weekly basis.
- AEMO will continue to investigate the ways to obtain the most accurate information on annual energy constraints and auxiliary loads.
- AEMO will publish estimates of interconnector capabilities in the presence of outages from modelling outputs. Interconnector capabilities under system normal conditions will be provided in the form of a separate report. AEMO will also provide further information to participants to aid interpretation of constraints.
- Due to analytical challenges, AEMO will seek a rule change to modify 3.7.2(f)(5A) and (5B) to remove consideration of network constraints when reporting energy constrained and unconstrained capacity. The impact of network constraints on *dispatch* of *generation* or *load*, will continue to be identified and quantified as part of the reliability assessment to satisfy clause 3.7.2(f)(6).

AEMO's final determination is to **amend** the ***reliability standard implementation guidelines*** in the form published with this Final Report and Determination. These Guidelines will become effective on TBD.



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# 1. STAKEHOLDER CONSULTATION PROCESS

As required by clause 3.9.3D(c) of the NER, AEMO is consulting on proposed amendments to the *reliability standard implementation guidelines* (RSIG or Guidelines) in accordance with the *Rules* consultation process in rule 8.9.

The table below outlines the consultation steps undertaken by AEMO:

Deliverable	Indicative date
Notice of first stage consultation released	Thursday 30 March 2017
First stage submissions closed	Wednesday 10 May 2017
Draft Report & Notice of second stage consultation published	Friday 16 June 2017
Submissions due on Draft Report	Monday 3 July 2017
Final Report published	Tuesday 15 August 2017

The publication of this Final Report marks the completion of the consultation.

Note that there is a glossary of terms used in this Final Report at **Appendix A**. A list of publications is included at **Appendix B**.

## 2. BACKGROUND

### 2.1 NER requirements

The Guidelines are made under clause 3.9.3D (a) of the *Rules*. They outline how AEMO will implement the *reliability standard*. AEMO is required to amend the Guidelines in accordance with the *Rules consultation procedures*.

AEMO's Guideline amendments relate to redevelopment of the Medium Term Projected Assessment of System Adequacy (MT PASA) process.

### 2.2 Context for this consultation

The *reliability standard* is a measure of the effectiveness, or sufficiency, of generation and inter-regional transmission to meet demand. It is defined in clause 3.9.3C of the *Rules* as the maximum expected *unserved energy* (USE), in a *region* of 0.002% of the total *energy* demanded in that *region* for a given *financial year*.

MT PASA assesses the adequacy of expected electricity supply to meet demand across a two-year horizon through regular assessment of any projected failure to meet the *reliability standard*. The MT PASA process includes collection of accurate information, analysis and disclosure of power system security and predicted supply reliability that helps *Registered Participants* make decisions about supply, demand and transmission network outages for two years ahead.

To meet the requirements under clause 3.7.2 of the *Rules*, MT PASA incorporates two separate functions:

1. A high frequency three-hourly information service that gives a regional breakdown of the supply situation over the two-year horizon, taking into account participant submissions.
2. A weekly assessment of system reliability, including provision of information on demand, supply and network conditions.

In 2016, AEMO began a review of MT PASA as part of continuous improvement and to ensure the process used to assess the *reliability standard* was robust in light of the accelerated rate of industry change. External consultants, Ernst & Young (EY), were engaged to assess whether current MT PASA processes were fit for purpose and provide a suite of recommendations to remediate gaps.

EY recommended that AEMO should implement the MT PASA reliability assessment using a probabilistic modelling approach to better capture the impact of stochastic inputs such as demand, generation outages or availability of intermittent generation:

- The current MT PASA process is predominantly a deterministic approach, relying on sporadically precomputed minimum reserve levels to capture *inter-regional* reserve sharing capability, network system normal constraints, and generation forced outage probabilities.
- The *reliability standard* is probabilistic, and it is therefore appropriate to capture the distribution of outcomes under a range of possible supply and demand conditions, including intermittent generation availability, when determining the expected level of USE.

EY also recommended changes to modelling frequency, approach, input assumptions and outputs used to implement the reliability standard<sup>1</sup>.

### 2.3 First stage consultation

AEMO issued a Notice of First Stage Consultation on **30 March 2017** with an Issues Paper and the Guidelines Draft. The Issues Paper discussed the proposed changes to the Guidelines, and other aspects of the MT PASA redevelopment.

<sup>1</sup>Ernst and Young's report can be found on AEMO's website: <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data/Market-Management-System-MMS/Projected-Assessment-of-System-Adequacy>

AEMO received two written submissions in the first stage of consultation. AEMO also discussed the proposed changes at the following meetings/forums:

Meeting/Forum	Date
Reliability Panel Meeting	Wednesday 8 March 2017
National Electricity Market (NEM) Wholesale Consultative Forum	Wednesday 29 March 2017
Forecasting & Planning Reference Group	Tuesday 18 April 2017

Copies of all written submissions and minutes of meetings and issues raised in forums (excluding any confidential information) have been published on AEMO website at:

<https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Other-meetings/Forecasting-and-Planning-Reference-Group>

<https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Wholesale-meetings/NEM-Wholesale-Consultative-Forum>

<http://aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines-Consultation>

## 2.4 Second stage consultation

AEMO issued a [Notice of Second Stage Consultation](#) on **16 June 2017** with a draft report and determination and draft Guidelines.

The draft Guidelines and Report proposed:

- An amended MT PASA Process Description document.
- A weekly probabilistic Reliability Run.
- An additional Loss of Load Probability run.
- AEMO would seek further information from participants through voluntary or regulatory means about annual energy constraints and auxiliary loads.

AEMO received three submissions for the second stage of consultation. AEMO also discussed the proposed changes at the following meetings/forums:

Meeting/Forum	Date
Forecasting and Planning Reference Group	Tuesday 23 May 2017
Reliability Panel Meeting	Monday 5 June 2017
MT PASA Stakeholder Workshop	Wednesday 14 June 2017

Copies of all written submissions, minutes of meetings and issues raised in forums (excluding any confidential information) have been published on AEMO's website at:

<https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Other-meetings/Forecasting-and-Planning-Reference-Group>

<https://www.aemo.com.au/Stakeholder-Consultation/Industry-forums-and-working-groups/Wholesale-meetings/NEM-Wholesale-Consultative-Forum>

<http://aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines-Consultation>



### 3. SUMMARY OF MATERIAL ISSUES

The key material issues arising from the proposal and raised by Consulted Persons are summarised in the following table:

No.	Issue	Raised by
1.	Change to probabilistic modelling process	AEMO
2.	Additional information from participants	AGL, Energy Australia, ERM Power
3.	Frequency of regular runs and conditions for ad hoc runs	AEMO
4.	Use of information reported through 3.7.2(f)(6)(i),(iv),(v)	ERM Power
5.	Granular reporting of aggregate generation capacity	Energy Australia, ERM Power, AEMO
6.	Transparency and access to data	AEMO
7.	Reference years	AEMO
8.	Selection of POE Demand Curves	ERM Power

A detailed summary of issues raised by Consulted Persons in submissions and at meetings/forums, together with AEMO's responses, is contained in Sections 4 and 5.



## 4. DISCUSSION OF MATERIAL ISSUES

### 4.1 Change to probabilistic modelling process

#### 4.1.1 Issue summary and submissions

AEMO sought feedback on whether the proposed probabilistic modelling approach would provide sufficient information to implement the *reliability standard* and adequate information for planning purposes, outage scheduling and for considering whether AEMO should enter into *Reliability and Emergency Reserve Trader (RERT)* contracts.

Submissions were supportive of the approach at stage one, contingent on provision of further details on the modelling methodology.

#### 4.1.2 AEMO's assessment

Prior to stage two consultation, AEMO provided further details on the modelling process via an updated MT PASA Process Description document.

No further submissions were received on this issue in the stage two consultation.

#### 4.1.3 AEMO's conclusion

AEMO will implement the *reliability standard* through a probabilistic MT PASA methodology from November 2017.

Further details on MT PASA modelling runs can be found in the MT PASA Process Description document.

### 4.2 Additional information from participants

#### 4.2.1 Issue summary and submissions

Under clause 3.7.2(d)<sup>2</sup>, Scheduled Generators or Market Participants are required to provide information on their weekly energy constraints for each scheduled generating unit or scheduled load. The *reliability standard* is assessed over an annual period, but currently no annual constraints are included in the MT PASA process. Longer term energy constraints need to be considered in the new MT PASA process to provide a realistic assessment of annual USE. Assuming maximum weekly energy limits can be sustained for a year, is likely to overestimate annual energy availability. Therefore, additional assumptions around longer term energy constraints are now required.

AEMO sought feedback during the consultation on whether additional information should be provided by participants to more accurately implement the *reliability standard*. In particular, AEMO consulted on whether there was benefit in using annual energy constraint information received through the Generator Energy Limitation Frameworks (GELF) for MT PASA modelling.

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<sup>2</sup> NER clause 3.7.2(d) The following medium term PASA inputs must be submitted by each relevant Scheduled Generator or Market Participant in accordance with the timetable:

(1) PASA availability of each scheduled generating unit, scheduled load or scheduled network service for each day taking into account the ambient weather conditions forecast at the time of the 10% probability of exceedance peak load (in the manner described in the procedure prepared under paragraph (g)); and

(2) Weekly energy constraints applying to each scheduled generating unit or scheduled load.

AEMO has also identified a need to improve the accuracy of auxiliary load assumptions used in the MT PASA process by obtaining information from participants about the proportion of “as generated” output used for auxiliary load.

*AGL Submission: AGL considers placing this requirement on participants to provide this data, which is variable according to load, would be overly onerous and ignores other sources of accurate auxiliary load information... AEMO should be able to calculate auxiliary load data from SCADA and settlement data they hold.*

*Energy Australia Submission: We believe that AEMO already has access to most of this information via generator performance standards and MTPASA capacity and energy submissions. Further, auxiliary load information for generators can be derived by AEMO with information available in the Market Management System... we do not consider this information is required to be part of the Guideline.*

*ERM Power: ERM would like to understand in greater detail how the annual or weekly energy constraint will be implemented. AEMO needs to consider:*

*1 The potential for fuel stockpiles or water storages to fluctuate in the short term to accommodate short term requirements – the actual physical weekly energy constraint may not be as rigid as the current reporting requirement stipulate.*

*2 The generator’s capability over a 6 to 12 month period to replenish stockpiles and storages if minor depletion occurs due to short term weather conditions – is there actually an energy constraint in this case?*

*3 How AEMO proposes to transpose the annual energy constraint to a meeting ½ hour demand in AEMO’s theoretical model – the energy constraint would not generally be a simple average input.*

ERM was also concerned that providing an accurate representation of auxiliary load other than on an average basis would prove difficult: *...it would also be preferable that AEMO maintain MTPASA modelling, input data and output data on the transparent as generated basis.*

#### 4.2.2 AEMO’s assessment

##### Auxiliary Load:

Noting participant feedback, AEMO does not intend to make changes regarding the provision of auxiliary load information for generators in the Guidelines during this consultation, but will continue to explore data availability options.

In the meantime, AEMO will rely on consultant’s assumptions on auxiliary load as a percentage of generation, and will calculate the auxiliary load directly within the MT PASA model as a function of generation dispatch. The demand will be reported to participants on an “as generated” basis.

**Energy Constraints:** AEMO considers that annual fuel or emission restrictions may impact generation availability and this information is an essential input for conducting accurate reliability assessments. ERM Power expressed concerns in its submission about assumptions that may be made regarding energy constraints.

AEMO will be using participant data for energy constraints. Participants should already be aware of the need to take into account stockpiles, storage and any constraints on physical delivery of fuel when reporting on potential energy constraints. Under the Energy Adequacy Assessment Projection (EAAP) Guidelines, energy limitations in a GELF could be due to (but not limited to):

- limitations on a primary energy source (i.e. coal, gas or availability/allocation of water for hydro power generation);
- limitations on power station services (i.e. cooling water, high cooling water temperatures, boiler feed water, etc.); and



- environmental issues, such as emission limits, operation allowed only at specific times of the day/week, etc.

Therefore, participants are currently required to take these factors into account when providing GELF energy constraints. AEMO will use the information provided through GELF, generator surveys or any additional voluntary information provided by participants, where appropriate, for MT PASA modelling. The MT PASA Process Document provides information on how AEMO weekly and annual energy constraints are incorporated into the MT PASA modelling.

#### **4.2.3 AEMO's conclusion**

AEMO will use information supplied by participants through weekly MT PASA energy constraints, the GELF and generator surveys to capture annual generation limits in MT PASA modelling.

AEMO will continue to report demand “as generated” for easy comparison against generation availability, and will calculate the auxiliary load within the MT PASA model as a function of generation dispatch. AEMO will use the best quality consultant and stakeholder information that can be accessed to forecast the auxiliary load.

As part of AEMO's continuous improvement, we will continue to explore more effective ways to improve AEMO's assessments through access to more accurate annual constraint and auxiliary load information, and we will continue to consult with stakeholders on this.

### **4.3 Frequency of regular runs and conditions for ad hoc runs**

#### **4.3.1 Issue summary and submissions**

In the stage one consultation, AEMO sought feedback on the frequency of runs and proposed factors, to assess the need for additional runs. Initially, AEMO proposed to change the frequency of MT PASA runs from weekly to monthly due to the amount of computing time required to conduct probabilistic simulations. Feedback received during the consultation also emphasised the need for AEMO to continue to provide updated guidance on the supply and demand outlook more frequently in changing conditions. As a result of this feedback and following preliminary model design and testing, AEMO determined that modelling times were sufficiently fast to continue with weekly reporting.

AEMO will be guided by clause 3.7.2 (b) with regard to publishing additional updated versions of the MT PASA in the event of changes which, in the judgment of AEMO, are materially significant.

#### **4.3.2 AEMO's assessment**

AEMO received no further submissions as part of the stage two consultation regarding the frequency of the MT PASA modelling runs.

#### **4.3.3 AEMO's conclusion**

AEMO will conduct the Reliability Run at least weekly, consistent with current operations.

### **4.4 Use of information on network transfer capabilities and constraints reported through 3.7.2(f)(6)(i),(iv),(v)**

#### **4.4.1 Issue summary and submissions**

As part of this consultation, AEMO took the opportunity to understand participant needs on transfer capabilities and constraints to see whether changes are needed to current information requirements specified in the *Rules*. AEMO notes that Clause 3.7.2(f)(6)(ii) alone directly pertains to the *reliability*

*standard*. The other clauses in 3.7.2(f)(6) relate to projected power system security violations, interconnector transfer capabilities, and binding constraints.

Projecting this information can be problematic. Whether or not a constraint binds, resulting in reduced interconnector limits or generation capability, depends on the conditions of the system at the time. Assumed levels of dispatch, generation or transmission outages, and intermittent generation availability all influence the projections. There is therefore no single point estimate, but rather a range of possible outcomes.

AEMO asked participants to provide feedback on the value of this other information to their businesses, whether the obligation to provide this information is considered an efficient use of AEMO's resources (noting the difficulty in providing accurate information), or if this requirement should be removed from the *Rules* and more relevant information provided.

ERM Power supported the ongoing publication of a weekly run with forecast interconnector limits, based on the inclusion of any planned network outages. In the Draft Report, AEMO stated it would provide information on transfer capabilities with and without network outages through the Constraint Library and Network Outage Scheduler (NOS). In response to the Draft Report, ERM Power provided further feedback on the following:

ERM Power submission: *ERM Power supports the continued provision of network transfer capabilities and constraints...The original intent of inclusion in the MT PASA was to provide less sophisticated participants and more generally interested parties with a plain English output to assist them to understand the potential impact of network outages on interconnector transfer capability.*

During the stakeholder workshop held in June, participants also indicated that presenting the range of possible outcomes from the simulations could be valuable to them.

#### 4.4.2 AEMO's assessment

AEMO will continue to provide the outputs specified in clause 3.7.2(f)(6) as follows:

Reference	Details	AEMO Outputs
i)	Information on any projected <i>violations of power system security</i> .	Provided by reporting any constraint violations assessed across simulations in the Reliability Run
ii)	Any projected failure to meet the <i>reliability standard</i> as assessed in accordance with the <i>reliability standard implementation guidelines</i> .	Assessed via the Reliability Run
iii)	Previously deleted	
iv)	Identification and quantification of forecast <i>interconnector</i> transfer capabilities and the discrepancy between forecast <i>interconnector</i> transfer capabilities and the forecast capacity of the relevant <i>interconnector</i> in the absence of <i>outages</i> on the relevant <i>interconnector</i> only.	AEMO will also provide a range of estimated transfer capabilities from the Reliability Run (with network outages included only). System normal transfer capabilities will be provided through the <a href="#">Interconnector Capability Report</a> . Additional information on constraints are also available through the Constraint Library and NOS.

Reference	Details	AEMO Outputs
v)	Identification and quantification of when and where <i>network constraints</i> may become binding on the <i>dispatch</i> of <i>generation</i> or <i>load</i> .	AEMO will estimate when and where network constraints may become binding, based on the multiple Reliability Run simulations, albeit assuming units are dispatched based on short-run marginal cost bidding. These assumptions will be highlighted in the MT PASA process document.

#### 4.4.3 AEMO's conclusion

AEMO will improve provision of this clause 3.7.2(f)(6) information for our stakeholders by reporting ranges of simulated outcomes, supplemented by “plain English” reports.

Noting that there are difficulties in providing accurate information, AEMO will continue to assess the information value to stakeholders against the cost of estimating the information. AEMO remains interested in understanding the market's changing information needs and will work with stakeholders on this.

## 4.5 Granular reporting of aggregate generation capacity

### 4.5.1 Issue summary and submissions

AEMO sought responses from participants in the Issues Paper about whether more granular reporting of aggregate generation capacity would help participants operate their businesses and promote the national electricity objective (NEO). The reporting could range from merely distinguishing between energy constrained and unconstrained generation to identifying each MT PASA bid by dispatchable unit identifier (DUID).

ERM Power supported a change to allow publication of reported generation availability on a DUID basis. They also asked that AEMO provide *Forecast energy constrained and energy unconstrained generation availability data on an aggregate regional basis – note, this data should not include the impact of network constraints on generation availability as per the current weekly MTPASA*.

ERM Power also noted there was asymmetry of information between large and small participants.

Energy Australia did not support a change down to the DUID level.

AEMO considered that any change to more granular reporting of generation capacity at a DUID level required more substantive responses from participants about how this would promote the NEO.

For the stage two consultation, opinions differed between participants:

EA Submission: EA did not support a change to granular categorisation of bids down to DUID level. EA also noted that while *there may be some level of information asymmetry, we do not consider that this is enough to justify publication of this level of detail by reference to the National Electricity Objective*.

ERM Power Submission: *ERM Power fully supports the proposed rule change to allow publication of reported generation availability on a DUID basis; this will remove a large asymmetry in information between participants often to the detriment of smaller NEM participants and intermediaries. And that this will allow informed choice and risk management by smaller NEM participants and intermediaries resulting in lower prices to consumers than would otherwise be the case if this information asymmetry is allowed to continue.*

#### 4.5.2 AEMO's assessment

Following further assessment of methods for determining the information required in 3.7.2(f)(5A) and (5B), AEMO considers that the debate about whether or not more granular reporting of generation availability data is useful to participants is now secondary to a more fundamental question about how this information, including consideration of network limits, can be reliably calculated.

AEMO considers that it is becoming increasingly difficult to provide aggregate constrained and unconstrained capacity for each region, including consideration of network limits. This is due to the changes in the generation mix and changes to formulation of constraints. Assessing whether a unit may or may not be able to generate continuously at the *PASA availability* now requires complex simulation and further model development, arguably with little improvement to accuracy, and the cost and time required for development does not appear commensurate with the delivered stakeholder value.

In contrast, modified reporting of this information by removing reference to network constraints would require trivial system changes at minimal cost and would deliver value to participants and consumers by allowing more informed risk management.

Accordingly, AEMO intends to propose a rule change to report energy constrained and unconstrained information in the absence of network constraints as an alternative to the current *Rules* obligation. This categorised *PASA availability* information could then be provided through the three hourly report, without the need for complex simulation.

AEMO believes this proposal will promote the NEO<sup>3</sup> by seeking a better balance between the cost of producing the information and the value achieved from its publication.

This rule change would also provide a greater level of information transparency for participants, supporting recommendations made by EY in its 2016 report:

*“Distinguishing between categories of plant that behave very differently in the published results (particularly controllable plant, wind and solar) is likely to be worthwhile if practical as the distinction is important for planning purposes. In our stakeholder engagement, some participants also expressed interest in AEMO publishing individual generator availability as opposed to regional aggregates. This is likely to be valuable information but may raise confidentiality concerns and would be best handled through the AEMC rule change process as an issue separate to MTPASA reform.”*

#### 4.5.3 AEMO's conclusion

AEMO acknowledges the feedback received from ERM Power and EA.

AEMO believes that the information prescribed by the Rules cannot be accurately calculated, and will become increasingly problematic to estimate as more intermittent generation comes on line. AEMO will move forward with a rule change proposal to remove the network constraint consideration from clauses 3.7.2(f)(5A) and (5B). This would allow publication of energy constrained and unconstrained information in the three hourly report, as requested by some stakeholders.

Network constraints will be included explicitly within the probabilistic reliability assessment, and the impact on reliability will be identified and quantified as outlined in section 4.4.2.

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<sup>3</sup> The National Electricity Objective aims: *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 – price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the national electricity system.*

## 4.6 Transparency and access to data

### 4.6.1 Issue summary and submissions

During the first stage of the consultation, both Energy Australia and ERM Power expressed concerns around potential for reduced transparency and access to data. In response to this, AEMO noted it would continue to publish the three-hourly report in the current format with additional information<sup>4</sup>. AEMO will publish all half-hourly input traces used for MT PASA modelling, including demand, intermittent generation, and demand side participation on its website.

AEMO also provided more detailed information on the MT PASA model runs in the MT PASA Process Description.

AEMO received no further submissions on this issue during the stage two consultation.

### 4.6.2 AEMO's assessment

The MT PASA Process Description provides more detailed information on the MT PASA model runs. AEMO notes it may amend this process document to account for changes to the modelling process that may be made as part of the ongoing model development and testing phase currently underway, and will advise stakeholders of any further changes.

### 4.6.3 AEMO's conclusion

AEMO will continue to publish the three-hourly report as well as input data for modelling purposes.

## 4.7 Reference Years

### 4.7.1 Issue summary and submissions

In its response to the first stage of consultation, ERM Power supported the use of multiple historic reference years to capture weather-related variations in demand and supply. In the submission, it was noted that an increase in the reference years would better represent “the naturally occurring variability in outcomes that are historically observable”. AEMO noted it would continue with its proposed methodology.

### 4.7.2 AEMO's assessment

No further submissions were received in the stage two consultation.

### 4.7.3 AEMO's conclusion

As recommended by EY in its report, AEMO will conduct the MT PASA reliability assessment in the first instance using eight reference years to capture weather related variations in demand and supply in the probabilistic assessment.

## 4.8 Selection of POE Demand Curves

### 4.8.1 Issue summary and submissions

AEMO will use a minimum of 10% Probability of Exceedance (POE) and 50% POE in modelling. Following a stage one submission from ERM Power, AEMO acknowledged there was some merit in

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<sup>4</sup> The MTPASA\_REGIONAVAILABILITY table (part of the three hourly report) will contain information regarding AEMO's obligations under clause 3.7.2 (f) (1-5).



considering other POEs, particularly if USE levels in the 50% POE case are materially above zero, leading to potential overestimation of USE.

ERM provided a further response to this in the second stage of consultation: *Whilst to date the use of 10 and 50% POE demand traces has been sufficient, going forward this may no longer be the case if AEMO is to represent the potential for USE to occur with a reasonable degree of accuracy. We believe a practical step in this regard would be for AEMO to also implement a routine 30% USE demand trace as part of the weekly reliability assessment and adjust the weighting applied to the 10, 30 and 50% POE outcomes accordingly.*

#### **4.8.2 AEMO's assessment**

AEMO recognises that to get a representative distribution of USE, it is useful to look at a range of POE levels. AEMO will use a minimum of 10% POE and 50% POE in modelling and may include additional POE demand traces (for example, 30% POE) if, in AEMO's estimation, this would produce a materially different result.

As part of a continuous improvement process, AEMO is considering developing a broader range of POE traces for use in modelling. Further information will be provided when these become available.

#### **4.8.3 AEMO's conclusion**

AEMO will use 10% and 50% POE pending development of new demand traces that will allow a broader range of POE levels to be assessed.



## 5. OTHER MATTERS

Other matters raised in the submissions are presented and discussed in the table below.

No.	Consulted person	Issue	AEMO response
1	EA	<p><b>NOS outages</b></p> <p>Following the second workshop we do consider further improvements could be made to the MTPASA modelling inputs, particularly after discussion regarding the accuracy of information contained within the network outage schedule (NOS). It was made clear that in many cases the NOS data was not accurate much further than one month out from proposed outages. As discussed at that workshop, the inputs into the MTPASA are fundamental to the accuracy of projections. Given the length of time that network service providers are likely to schedule major outages, more emphasis on ensuring the NOS is updated at the earliest opportunity is required. While we understand that some level of flexibility may be required in scheduling outages, a more rigorous process may be necessary to ensure that outages are included in the NOS, and thus available as an input into the MTPASA, as early as possible within the 2-year window the NOS covers.</p>	<p>AEMO has been working with Network Service Providers (NSP) to improve the data going into NOS. Some NSPs submit many months of data, others less. For example in the last 12 months ElectraNet has increased the amount of outages submitted to NOS. AEMO will be conducting a consultation on the Congestion Information Resource in the second half of 2017 where the NOS data will be specifically covered.</p> <p>If EA is able to provide cases (this can be done outside the consultation) where the NOS was inaccurate beyond 1 month we can examine these and determine what the issues are.</p>
2	EA	<p><b>Business Readiness</b></p> <p>Some clarification regarding the proposed methodology for including new generation builds would be useful. We consider that limiting the inclusion of new builds to 'committed' plant results in too short a period for which they are included in the MTPASA. As with the issue of network outages, new generation builds should be added as an input into the MTPASA as close to the beginning of the 2-year window as possible. We appreciate that each project may have widely varied timeframes and stages for completion, however AEMO should be able to provide a set of principles they could use to determine which projects should be included in the MTPASA at the earliest opportunity. Further, it is important to model the impact of these new builds on transmission, especially interconnector flows and limits.</p>	<p>AEMO will only include plant that meet AEMO's commitment criteria and this will be based on the time the plant first becomes operational.</p> <p>AEMO does not consider it appropriate to make assumptions on the readiness or likelihood of plant to be committed in the MT PASA timeframe if AEMO's commitment criteria has not been met.</p>



## 6. FINAL DETERMINATION

Having considered the matters raised in submissions AEMO's final determination is to amend the **Reliability Standard Implementation Guidelines** in the form of **Attachment 1**, in accordance with clause **3.9.3D(a)** and **(c)** of the NER, and amend the MT PASA Process Description in the form of **Attachment 2** in accordance with clause 3.7.2(g) of the NER.



## APPENDIX A - GLOSSARY

Terms defined in the National Electricity Law or the Rules have the same meaning in the final determination unless otherwise specified below. Those terms are intended to be identified by italicising them but failure to italicise does not affect the meaning.

Term or acronym	Meaning
<b>GELF</b>	Generator Energy Limitation Framework
<b>MT PASA</b>	Medium Term Projected Assessment of System Adequacy
<b>NER</b>	National Electricity Rules
<b>NEO</b>	National Electricity Objective
<b>POE</b>	Probability of Exceedance
<b>Reliability Run</b>	MT PASA probabilistic market modelling approach used by AEMO to implement the <i>reliability standard</i>
<b>RSIG</b>	Reliability Standard Implementation Guidelines



## APPENDIX B. ATTACHMENTS

- Attachment 1 – Reliability Standard Implementation Guidelines (Draft)
- Attachment 2 – MT PASA Process Description Document (Draft)