



## RELIABILITY PANEL AEMC

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Our ref: REL0072

1 August 2019

Mr John Pierce  
Chairman  
Australian Energy Market Commission  
201 Elizabeth Street, Sydney NSW 2000  
By email: [john.pierce@aemc.gov.au](mailto:john.pierce@aemc.gov.au)

Dear Mr Pierce,

### **National Electricity Rules: Rule change request – Transparency of unserved energy**

The Reliability Panel (the Panel) has completed a review of the definition of unserved energy. As part of the review, the Panel consulted with stakeholders on whether the current definition of unserved energy for the purposes of the reliability standard established under Chapter 3 of the National Electricity Rules (NER) is still fit for purpose. The definition provides guidance on whether or not a particular type of event should be included in or excluded from the calculation, once an incident has occurred. The Panel considered a review of this nature was timely given the energy transformation underway and heightened interest in the reliability of energy supply across the sector.

The Panel concluded that the definition of unserved energy for the purposes of the reliability standard is broadly fit for purpose for the existing national electricity market environment. Nonetheless, the Panel identified several improvement opportunities regarding:

- transparency of the unserved energy calculation
- clarity of the framework that underpins the calculation.

Accordingly, the Panel submits this rule change request, including a proposed rule, to the AEMC for its consideration under section 91 of the National Electricity Law (NEL). The proposed rule seeks to increase transparency of unserved energy calculation and clarify the definition of unserved energy for the purposes of the reliability standard by amending clauses 3.9.3C and 3.9.3D of the NER.

The enclosed rule change request sets out a statement of the issues being addressed by the proposed rule, a description of the proposed rule, and our consideration of how the proposed rule promotes the National Electricity Objective. The Panel has also explained the costs and benefits of the proposed rule.

Yours sincerely

Charles Popple  
Chair, Reliability Panel



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### **Rule change proposal**

### **Transparency of unserved energy**

### **Amendments to the National Electricity Rules - Chapter 3**

**August 2019**

#### **Panel members**

Charles Pople (Chairman), AEMC Commissioner

Trevor Armstrong, Chief Operating Officer, Ausgrid

Stephen Clark, Technical and Economic Lead – Project Marinus, TasNetworks

Mark Collette, Executive - Customer, EnergyAustralia

Kathy Danaher, Chief Financial Officer and Executive Director, Sun Metals

Gavin Dufty, Manager Policy and Research, St Vincent de Paul Society, Victoria

John Titchen, Managing Director, Goldwind Australia

Chris Murphy, Strategic Advisor, Meridian Energy; General Manager - Energy Market

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Damien Sanford, Chief Operations Officer, AEMO

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## 1. Introduction

This rule change request has been prepared by the Reliability Panel (the Panel) regarding:

- clause 3.9.3C of the National Electricity Rules (NER), which provides guidance on which events should be included in and excluded from the definition of unserved energy for the purposes of the reliability standard
- clause 3.9.3D of the NER, which requires AEMO to set out how it implements the reliability standard in its day-to-day operations.

If adopted, the proposed rule change would clarify what counts towards unserved energy for the purposes of the reliability standard. The proposed change would also promote transparency with regards to how unserved energy is calculated after involuntary load shedding has occurred.

### 1.1 The Reliability Panel

The Panel is a specialist panel established by the Australian Energy Market Commission (AEMC) in accordance with section 38 of the National Electricity Law (NEL) and the NER. The Panel comprises industry and consumer representatives as well as a representative of the Australian Energy Market Operator (AEMO). The Panel has specific responsibilities under the NER to set standards and guidelines and also in relation to monitoring, reviewing and reporting on the safety, security and reliability of the national electricity system. The Panel also undertakes reviews and advises the AEMC at its request.

### 1.2 Rule change proponent

AEMC Reliability Panel  
PO Box A2449  
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### 1.3 Scope of proposed rules

The rule change request proposes changes to two key areas, aimed at improving information provision, clarity and transparency around how unserved energy is calculated:

- Transparency of unserved energy calculation. The rule change request proposes to require AEMO to provide more information on how it calculates unserved energy. This requirement would be implemented through AEMO's *Reliability Standard Implementation Guidelines*, which explain how AEMO implements the reliability standard.
- Clarity of the unserved energy framework. The rule change request proposes the introduction of a principle to guide AEMO when allocating events to unserved energy in order to better reflect the purpose of unserved energy, as an enhancement of the current framework. This would provide additional guidance on what should be included and excluded from the calculation, even if not prescribed in the NER. The Panel also proposes to clarify some minor aspects of the definition of unserved energy to remove ambiguity.



## 1.4 Background to the proposed rules

On 26 July 2018, the AEMC published the final report of its *Reliability Frameworks Review*.<sup>1</sup> This report made a series of recommendations to implement and develop mechanisms in the national electricity market (NEM) aimed at supporting reliable outcomes for consumers at lowest cost.

The *Reliability frameworks review* final report concluded that it was worth examining the definition of unserved energy, given the broader changes occurring in the NEM.

Among other things, the Panel is required to monitor, review and report on the performance of the market in terms of reliability of the national electricity system. Further, the Panel has a number of responsibilities that are directly related to unserved energy, specifically:

- under the NER, the Panel has an ongoing and periodic obligation to review and provide advice to the AEMC on the reliability standard, which is a maximum expected unserved energy in a region of 0.002 per cent of the total energy demanded in that region for a given financial year, and market settings every four years, with its most recent review of the reliability standard and settings published in April 2018
- in reviewing the reliability standard and settings, the Panel must comply with the Reliability Standard and Settings Guidelines that it prepares, the most recent of which was published in December 2016 with this version guiding the most recent review of the standards and settings.

Given these functions, the Panel progressed the AEMC's recommendation in its *Review of the definition of unserved energy*, and consulted with stakeholders on whether the current definition of unserved energy for the purposes of the reliability standard in the NER is still fit for purpose.<sup>2</sup>

The Panel explored the opportunities to promote transparency through possible clarification and simplification of the definition of unserved energy for the purposes of the reliability standard. The Panel's review also considered the transparency of the unserved energy calculation.

The definition of unserved energy for the purposes of the reliability standard sets out which types of events should be included or excluded, in a non-exhaustive manner, when allocating supply interruptions to unserved energy for the purposes of the reliability standard, in an ex-post analysis. The review considered what events should be included in or excluded from the definition of wholesale unserved energy in the NER for the purposes of determining whether the reliability standard is met.

The review was completed in July 2019. The Panel concluded that the definition of unserved energy for the purposes of the reliability standard is largely fit for purpose for the existing national electricity market environment. Nonetheless, the Panel identified several

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<sup>1</sup> For more information, see: <https://www.aemc.gov.au/markets-reviews-advice/reliability-frameworks-review>.

<sup>2</sup> For more information see: <https://www.aemc.gov.au/market-reviews-advice/definition-unserved-energy>.



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improvement opportunities, and agreed to submit a rule change request to the AEMC to address the issues identified.

### 1.5 Approach

The Panel identified key areas for promoting transparency and clarity through:

- consultation with stakeholders – the consultation paper was published in April 2019
- analysis of the definition of unserved energy for the purposes of the reliability standard in the NER
- consideration of the existing reliability framework, the role of the reliability standard within the framework and its operationalisation, and
- reflection on operational challenges.

The issues that have been identified are those that:

- create practical challenges when allocating supply interruptions to unserved energy
- lack clarity and transparency in the NER
- do not reflect the policy intent of the NER.



## 2. Issues and proposed solutions

### 2.1 Transparency of unserved energy calculation

#### 2.1.1 Issue

Under existing arrangements, AEMO calculates unserved energy in accordance with clause 3.9.3C(b) of the NER which outlines what events should be included in or excluded from the calculation of wholesale unserved energy. This calculation is then provided to other organisations such as the Panel, for reporting purposes. AEMO also publishes this calculation in its reports.

Specifically, to calculate unserved energy for the purposes of the reliability standard, AEMO divides the number of MWh shed in a financial year due to reliability causes (based on the definition of unserved energy in clause 3.9.3C(b) of the NER) by the total energy demanded from the grid.

$$\text{Unserved energy (\%)} = \frac{\text{MWh shed}}{\text{Energy demanded}} \times 100$$

There is limited visibility of the actual process AEMO undertakes when calculating unserved energy - in particular, which demand is used in the calculation, how the load shedding figure in the numerator is estimated and what it is composed of (i.e. how AEMO interprets clause 3.9.3C(b) of the NER).

This is inconsistent with the rest of the information provision requirements with respect to how AEMO operationalises the reliability standard. Specifically, clause 3.9.3D of the NER requires AEMO to set out how it will implement the reliability standard through the Reliability Standard Implementation Guidelines (RSIG).

The Panel, supported by stakeholder submissions to the *Definition of unserved energy* consultation paper, considers there is a lack of transparency about the calculation. The NER do not require AEMO to develop any particular methodology and is not prescriptive with regard to the calculation. This can lead to confusion about exactly what the unserved energy value represents, and may lead to market participants making inappropriate decisions.

#### 2.1.2 Proposal

To promote understanding of, and confidence in AEMO's calculation of unserved energy, the Panel proposes that AEMO should clearly set out how it calculates unserved energy. This would describe:

- how AEMO calculates wholesale unserved energy for the purposes of the reliability standard
- which type of demand it uses
- the implication of using the chosen type of demand on the calculation.

The Panel considers that all unserved energy information and reports should be publicly available given the impact of unserved energy on investments that are passed through to energy consumers, the level of public interest in the reliability standard and system reliability generally.



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Specifically, the Panel proposes to amend clause 3.9.3D of the NER to also require AEMO to set out, through the RSIG:

- the method for calculating *unserved energy* in accordance with clause 3.9.3C, including calculation of the amount of *energy* demanded in the relevant *region*.

The purpose of the RSIG is to explain how AEMO operationalises the reliability standard. Extending the RSIG to cover how this operationalisation works in an ex post manner improves consistency of the information provided by AEMO on the reliability standard.

The Panel is proposing a transitional measure be in place for the first update of the RSIG to incorporate the ex-post unserved calculation. The Panel proposes introducing a transitional measure to allow AEMO to update the RSIG once without the need for consultation in order to set out how it currently calculates unserved energy. This would provide transparency in a timely manner, and simply give AEMO the opportunity to explain its current practice.

Should AEMO wish to change this practice in the future, it would then be required to update the RSIG by consulting with stakeholders through the rules consultation procedures.

## 2.2 Unserved energy framework

### 2.2.1 Lack of clarity on interpretation of the unserved energy framework

#### Issue

Clause 3.9.3C of the NER sets out the unserved energy framework, which is based on the concept of contingency events. The clause provides guidance as to which incidents, primarily based on the concept of contingency events, should be included in, or excluded from, the calculation of unserved energy.

The Panel considers that, as currently worded, clause 3.9.3C is somewhat ambiguous and it is not clear how the clause should be interpreted, particularly with respect to incidents or events that are not captured by examples provided in the clause itself. This can create confusion for market participants.

#### Proposal

To provide more guidance to stakeholders and AEMO, the Panel proposes to include in the NER a purpose statement or principle for the definition of unserved energy, to assist with its interpretation. The Panel considers that this is more preferable to being more prescriptive in the clause, as it would not be practical, nor possible, to prescribe every single type of incident that could occur.

Instead, the principle proposed by the Panel would aim to specify the purpose of the unserved energy calculation to clarify that only events which the market would be expected to plan for through investment in generation and inter-regional transmission elements,<sup>3</sup> should be included, while all other events should be excluded.

The Panel considers that this change, while retaining flexibility, would provide more clarity around the intent of unserved energy calculation.

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<sup>3</sup> Consistent with the reliability standard as defined in Clause 3.9.3C(a) of the NER.





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The Panel proposes adding the following principle to Clause 3.9.3C, such that for the purposes of allocating incidents:

- a *power system reliability* incident is to include only those incidents that AEMO considers would have been avoided through additional investment in *generation* and/or *inter-regional transmission elements*.

### 2.2.2 Lack of clarity on exhaustiveness of the unserved energy framework

#### Issue

Clause 3.9.3C(b) is only prescriptive with respect to a series of events, which it states must or must not be included in the calculation of unserved energy. However, the clause is not exhaustive in terms of the types of events which should or should not be excluded. The clause also refers to the inclusion of power system reliability incidents, and exclusion of power system security incidents.

It may not be clear to all market participants that clause 3.9.3C(b) of the NER allows for some flexibility in terms of which events counts towards unserved energy and how this flexibility should be interpreted.

The Panel also considers that as currently drafted, the clause is ambiguous with respect to how prescriptive the clause is with respect to the inclusion of power system reliability incidents and exclusion of power system security incidents.

#### Proposal

The Panel considers that the principle proposed in the previous section will help to address interpretation. However, it also considers that further clarification may be required to improve transparency of the clause itself.

The Panel proposes to make it clearer that the intent of the clause is to:

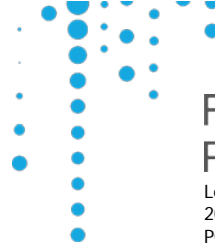
- include unserved energy that results from power system reliability incidents, including those caused by the examples of events provided in the clause
- exclude unserved energy that results from power system security events, including those caused by the examples of events provided in the clause.

Power system security incidents resulting from other causes would also be excluded, while power system reliability incidents resulting from causes not specified in the NER would be included.

For example, the proposed changes make it clearer that simply running out of generation on a hot day, even without any particular incident, would be included as it would be a power system reliability incident and consistent with the proposed principle discussed in the previous section.

The changes would also make it clearer that the distinction is between a wholesale reliability (generation and inter-regional transmission element) issue and other types of interruptions. For example, the proposed changes make it clearer than events with multiple causes could be classified as both power system reliability and security and accounted for accordingly in the calculation (the former would be included, the latter excluded).

Specifically, the Panel is proposing minor drafting changes to clause 3.9.3C(b)(1) and clause 3.9.3C(b)(2) to capture the above intent.



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### 2.3 Other minor changes

Notwithstanding the proposal to introduce a principle to guide interpretation of clause 3.9.3C and other proposed drafting changes in the previous sections, the Panel considers that there is room for clarification of some aspects of the definition of unserved energy. The Panel proposes to amend clause 3.9.3C(b) of the NER as follows.

#### 2.3.1 Issue

Clause 3.9.3C(b)(2)(i) states that unserved energy for the purposes of the reliability standard excludes unserved energy associated with power system security incidents that result from **multiple contingency events, protected events or non-credible contingency events** on a generating unit or an inter-regional transmission element (that may occur concurrently with generating unit or inter-regional transmission element outages).

The Panel notes that protected events are a subset of non-credible contingency events, and their inclusion in this clause is redundant.

Similarly, the term multiple contingency events includes multiple credible contingency events and non-credible contingency events. Multiple non-credible contingency events are already captured in this clause due to the use of plural for non-credible contingency events. It is therefore redundant.

#### 2.3.2 Proposal

The Panel proposes deleting protected events from clause 3.9.3C(b)(2)(i) of the NER, as non-credible contingency events will suffice.

The Panel also proposes clarifying that multiple “contingency events” are in fact multiple “**credible** contingency events” since multiple non-credible contingency events are already captured by the clause.

To remove any ambiguity, the Panel also proposes to clarify that “non-credible contingency events” include both single and multiple non-credible contingency events.



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### 3. Furthering the National Electricity Objective

#### 3.1 Achieving the NEO

The national electricity objective (NEO) is set out in section 7 of the NEL and states:

The objective of this Law is to promote efficient investment in, and efficient operation and use of, electricity services for the long term interest 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.

The Panel considers the proposed rule changes would likely to contribute to the achievement of the NEO by promoting more efficient investment in electricity services for the long term interest of consumers with respect to the price, quality and reliability of supply of electricity, and the reliability of the national electricity system.

The Panel considers that the proposed changes meet the NEO by improving:

- clarity of the definition of unserved energy for the purposes of the reliability standard
- transparency of the calculation of unserved energy, and
- the provision of information to the market in a manner useful to stakeholders.

#### 3.2 Expected benefits and costs

The Panel considers that the benefits of the rule change request outweighs the costs involved, given that the majority of the proposals in this request relate to the clarification of unserved energy definition in the NER.

The Panel expects the costs to be small and mainly associated with some minor additional regulatory burden from the extension of the RSIG to incorporate how unserved energy is calculated ex post. No market participant or end-user costs are expected to flow from the proposals.

The proposed changes promote transparency and clarity for market participants in relation to unserved energy definition and calculation, with the additional information provided to market participants flowing through to the investment and operational decisions that they make to underpin reliability in the NEM. The proposal also promotes consistency across the transparency requirements in relation to the reliability standard, and how it is implemented.



## 4. Proposed amendments to NER

### 3. Market Rules

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#### 3.9.3C Reliability standard

- (a) The *reliability standard* for generation and inter-regional transmission elements in the national electricity market is a maximum expected unserved energy (USE) in a region of 0.002% of the total energy demanded in that region for a given financial year.
- (b) For the purposes of paragraph (a) *unserved energy* is to:
- (1) include *unserved energy* ~~associated with~~ that results from power system reliability incidents ~~that result from~~ caused by an event or events that include (but is not limited to):
    - (i) a single *credible contingency event* on a generating unit or an inter-regional transmission element, that may occur concurrently with generating unit or inter-regional transmission element outages; or
    - (ii) delays to the construction or commissioning of new generating units or inter-regional transmission elements, including delays due to industrial action or acts of God; and
  - (2) exclude *unserved energy* ~~associated with~~ that results from power system security incidents caused by an event or events that include (but is not limited to) ~~that result from:~~
    - (i) multiple credible contingency events, ~~protected events or a single non-credible contingency event or multiple~~ non-credible contingency events on a generating unit or an inter-regional transmission element, that may occur concurrently with generating unit or inter-regional transmission element outages;
    - (ii) outages of transmission network or distribution network elements that do not significantly impact the ability to transfer power into the region where the USE occurred; or
    - (iii) industrial action or acts of God at existing generating facilities or inter-regional transmission facilities.
- (c) For the purpose of paragraph (b), a power system reliability incident is to include only those incidents that AEMO considers would have been avoided through additional investment in generation and/or inter-regional transmission elements.



### 3.9.3D Implementation of the reliability standard

- (a) AEMO must develop, publish and amend from time to time *reliability standard implementation guidelines* that set out how AEMO will implement the *reliability standard*.
- (b) The *reliability standard implementation guidelines* must include, without limitation, the approach AEMO will use and the assumptions it will make in relation to:
  - (1) demand for electricity;
  - (2) *reliability* of existing and future *generation*;
  - (3) *intermittent generation*;
  - (4) *energy constraints*;
  - (5) the treatment of extreme weather events; and
  - (6) *network constraints*.
- (b1) In addition to the matters specified in paragraph (b), the *reliability standard implementation guidelines* must set out:
  - (1) the factors that AEMO will consider in determining whether it has an obligation to publish an EAAP under clause 3.7C(d)(2); and
  - (2) the method for calculating unserved energy in accordance with clause 3.9.3C, including calculation of the amount of energy demanded in the relevant region.
- (c) AEMO must develop and amend the *reliability standard implementation guidelines* in consultation with the *Reliability Panel*, *Registered Participants* and other interested persons in accordance with the *Rules consultation procedures*.
- (d) There must be *reliability standard implementation guidelines* in force at all times after the date on which AEMO publishes the first *reliability standard implementation guidelines* under these *Rules*.
- (e) AEMO must review the *reliability standard implementation guidelines* at least once every four years. AEMO must conduct the review in consultation with the *Reliability Panel*, *Registered Participants* and other interested persons in accordance with the *Rules consultation procedures*.

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## 11. Savings and Transitional Rules

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### Part ZZZR [...]

#### 11.11X Rules consequential on the making of the National Electricity Amendment (...) Rule 2020

##### 11.11X.1 Definitions

For the purposes of this rule 11.11X:

**Amending Rule** means the National Electricity Amendment (...) Rule 2020.

##### 11.11X.2 AEMO to update the reliability standard implementation guidelines

- (a) By no later than [...], AEMO must amend and publish the reliability standard implementation guidelines to take into account the Amending Rule.
- (b) For the purpose of paragraph (a), AEMO is not required to amend the reliability standard implementation guidelines in accordance with the Rules consultation procedures.