AEMC

RULE

Australian Energy Market Commission

RULE DETERMINATION

NATIONAL ELECTRICITY AMENDMENT (TRANSPARENCY OF UNSERVED ENERGY CALCULATION) RULE 2020

PROPONENT
Reliability Panel

19 NOVEMBER 2020

INQUIRIES

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ABOUT THE AEMC

The AEMC reports to the Council of Australian Governments (COAG) through the COAG Energy Council. We have two functions. We make and amend the national electricity, gas and energy retail rules and conduct independent reviews for the COAG Energy Council.

SUMMARY

1 The Australian Energy Market Commission (AEMC or Commission) has made a final determination to improve the transparency of the unserved energy calculation and the clarity of the framework that underpins the calculation.

2 This follows the Reliability Panel (the Panel or proponent) submitting a rule change request to the AEMC on 1 August 2019 identifying several improvements that could be made to the definition of unserved energy.

3 The final rule is a more preferable rule. The Commission has made some drafting changes to the rule suggested by the Reliability Panel in order to improve the clarity of the policy intent, but in substance it is the same as that proposed.

4 The final rule makes amendments to clauses 3.9.3C and 3.9.3D of the National Electricity Rules (NER) that can be categorised under the following changes:

- Changes to clauses 3.9.3D of the NER to require the Australian Energy Market Operator (AEMO) to set out, through the *reliability standard implementation guideline* (RSIG), the method for calculating unserved energy in accordance with clause 3.9.3C, including how the amount of energy demanded in the relevant region is determined.[1]
- Inclusion in the NER of a purpose statement for the definition of unserved energy, to assist stakeholders and AEMO with the definition's interpretation.
- Minor drafting changes to clause 3.9.3C(b)(1) and clause3.9.3C(b)(2) to make it clearer that the intent of the clauses is to *include* unserved energy that results from power system reliability incidents, and *exclude* unserved energy that results from power system security incidents.
- Deleting protected events from clause 3.9.3C(b)(2)(i) of the NER, as it is already captured by non-credible contingency events, clarifying that multiple 'contingency events' are in fact multiple 'credible contingency events', and clarifying that 'non-credible contingency events' include both single and multiple non-credible contingency events.

5 The Commission considers that a principles-based approach to determining unserved energy *ex post* is the most robust method to increase transparency in the national electricity market (NEM). This approach will increase transparency around the determination of unserved energy *ex post*, and is likely to remain robust as the power system transitions. The Commission has considered whether a more prescriptive approach may deliver benefits. The Commission considers this not to be preferential due to the risks of unintended consequences arising from 'locking in' types of events to be considered as unserved energy as the power system transitions. This may result in reporting arrangements that may not be appropriate. Therefore, the Commission considers that the approach in the final rule improves transparency and information provision, while balancing it against how to keep the framework flexible and adaptable over time.

1 More information on the RSIG, and the guideline itself, can be found at https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines

6 Having regard to the issues raised in the rule change request and during consultation, the Commission is satisfied that the final rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO) for the following reasons:

- The rule makes the inputs into and method for calculating unserved energy more transparent, equipping market participants with more information to support improved decision-making.
- The rule provides improved clarity as to how to interpret the unserved energy definition and what events are or are not included in the backward-looking unserved energy metric, therefore enhancing the integrity of the reliability standard and promoting signals for efficient investment in generation and demand response infrastructure.
- The rule change can be implemented at minimal cost by AEMO.

7 The Commission adopted an expedited process in considering this rule change request as it considered that the proposed rules were unlikely to have a significant impact on the national electricity market, gas market, or the regulation of pipeline services. No objections to using this process were received. The Commission received seven written submissions to this process, which have been taken into account.

8 The transitional arrangements will commence immediately upon publication on 19 November 2020. Under these arrangements, AEMO will have until 17 December 2020 to update the RSIG to take into account the Amending Rule, and may do so without following the usual Rules consultation procedures. The remainder of the rule — namely the main operative provisions amending clauses 3.9.3C and 3.9.3D — will then commence on 17 December 2020.

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1 RELIABILITY PANEL'S RULE CHANGE REQUEST

1.1 The rule change request

On 1 August 2019, the Reliability Panel (Panel or proponent) made a request to the Australian Energy Market Commission (AEMC or Commission) to make a rule that sought to improve the:

- **transparency** of the unserved energy calculation — by requiring AEMO to provide more information on how it calculates unserved energy.
- **clarity** of the unserved energy framework — by introducing a principle to guide AEMO when allocating events to unserved energy in order to better reflect the purpose of unserved energy.

The Panel proposed to achieve this by amending clauses 3.9.3C and 3.9.3D of the National Electricity Rules (NER).

1.2 Panel's review of definition of unserved energy

The Panel's development of a rule change request followed the Panel undertaking a *Review of the definition of unserved energy,* to progress a recommendation made by the AEMC in its *Reliability Frameworks Review.*[2]

The Panel's final report was published on 1 August 2019.[3] During the review the Panel consulted with stakeholders on whether the current definition of unserved energy for the purposes of the reliability standard under Chapter 3 of the NER was still fit for purpose.

While the Panel concluded that the definition of unserved energy for the purposes of the reliability standard was broadly fit for the purpose, it also identified several improvement opportunities regarding the:

1. transparency of the unserved energy calculation
2. clarity of the unserved energy framework.

It is important to note that the scope of the Panel's review — and so the focus of this request — focused on what events should be included or excluded from the definition of wholesale unserved energy in the NER for the purposes of determining whether the reliability standard is met, in an *ex post* basis. The appropriateness of the reliability standard and how it is operationalised was out of scope of the Panel's review, given at the time it was being considered by the AEMC through its consideration of AEMO's *Enhancement to the Reliability and Emergency Reserve Trader* (RERT) rule change.[4]

2 AEMC, *Reliability Frameworks Review*, final report, 26 July 2018.
3 Reliability Panel, *Definition of unserved energy review*, final report, 1 August 2019.
4 AEMC, *Enhancement to the Reliability and Emergency Reserve Trader*, final determination, 2 May 2019.

1.3 Current arrangements

1.3.1 Unserved energy

In the national electricity market (NEM), the concept of unserved energy is applied to measure any supply interruptions consumers may experience from generation and interconnection inadequacy.

Under existing arrangements, clause 3.9.3C of the NER sets out the unserved energy framework. 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.[5]

Unserved energy measures the amount of customer demand that cannot be supplied within a region of the NEM due to a shortage of generation, demand-side participation, or interconnector capacity. It describes the amount of wholesale unserved energy — as opposed to interruptions from networks (e.g. faults in the distribution and transmission elements). Unserved energy is:

- *forecast* on an *ex ante* basis for the purposes of the reliability frameworks in the NEM, and
- *calculated* on an *ex post* basis for the purposes of reviewing how well the power system is operating.

This is discussed further below.

BOX 1: UNSERVED ENERGY

There are two key definitions of unserved energy in the current framework:

1. **The reliability standard:** This is designed to reflect generation and interconnection adequacy to supply electricity, and signals to the market when and where more generation is needed, based on a trade-off made on behalf of consumers as to the appropriate level of reliability. The reliability standard currently targets 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.
2. **The Interim Reliability Measure:** This was more recently introduced into the regulatory framework. The interim reliability measure[i] for generation and inter- regional transmission elements in the national electricity market is a maximum expected unserved energy in a region of 0.0006% of the total energy demanded in that region for a given financial year. This was developed as part of the Energy Security Board's (ESB) work to improve the reliability (resource adequacy) of the electricity system through interim measures.

5 Contingency events are disturbances that pose a risk to, and uncertainty in, the stable and secure operation of the power system. Contingency events are defined in the NER as events affecting the power system which AEMO expects would likely involve the failure or removal from operational service of one or more generating units and/or transmission elements (as set out in Clause 4.2.3(a) of the NER).

Note: More information on the Interim Reliability Measure can be found here: http://www.coagenergycouncil.gov.au/reliability-and-security-measures/interim-reliability-measures#:~:text=The%20National%20Electricity%20Amendment%20(Interim,to%20no%20more%20than%200.0006%25.

1.3.2 Unserved energy and its use

Forecasting of unserved energy

AEMO is required by the NER to publish various materials which provide information to market participants — and any other interested parties — on forecast unserved energy across different time periods. These calculations occur — by definition — ahead of time.

AEMO, through its forecasting processes, operationalises the reliability standard by modelling and projecting when the market is not going to meet the reliability standard in the lead-up to real-time. It does this across a number of timeframes, from years ahead of real-time, up until real-time, through the various Electricity Statement of Opportunities (ESOO), Projected assessment of system (PASA) and pre-dispatch processes. For example, the ESOO incorporates a reliability assessment against the reliability standard defined in the clause 3.9.3C of the NER and AEMO's Reliability Forecast under the Retailer Reliability Obligation (RRO), and now against the Interim Reliability Measures.

Calculation of actual unserved energy

AEMO also calculates how much actual unserved energy (i.e. how much demand went unmet due to a lack of generation, demand response or interconnection capacity) was observed in each region on an *ex post* basis. This information is used in both the ESB's Health of the NEM report, as well as the Panel's *Annual Market Performance Review*, to monitor the performance of the power system. By definition, this calculation is a backward-looking exercise.

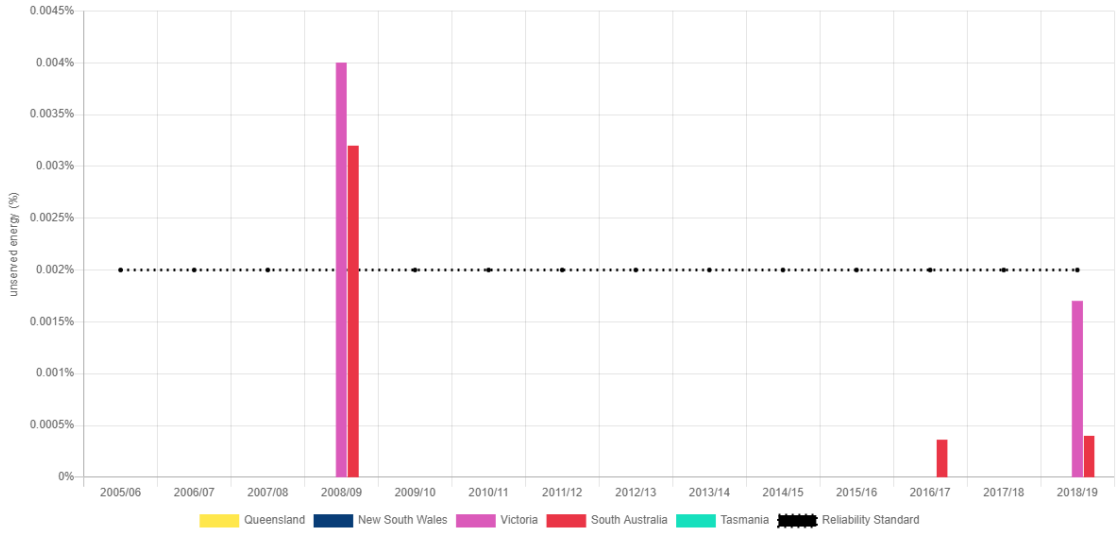
To do this, AEMO uses the definition of unserved energy to assess which types of events should be included or excluded (listed in the NER in a non-exhaustive manner), which then informs AEMO's calculation of unserved energy for the purposes of the reliability standard.

Each individual instance of unserved energy is published by AEMO in their *Power System Operating Incident Reports* (under clause 4.8.15 of the NER).[6]

The *ex post* figure in aggregate is published each year in the two reports referred to above. Figure 1.1 presents information on the 2018-19 financial year, as set out in the Panel's *Annual Market Performance Review 2019*.

6 See AEMO's website to find the reports: https://aemo.com.au/en/energy-systems/electricity/national-electricity-market-nem/nem-events-and-reports/power-system-operating-incident-reports

Figure 1.1: Unserved energy in the NEM



Source: AEMC Annual Market Performance Review, 2019.

Differences in forward-looking and backward-looking calculation

The backwards-looking calculation process for unserved energy is different to the forecasting process of unserved energy operationalised by AEMO in its forecasting of unserved energy.

This rule change request is focused on the transparency and clarity of the *ex post* assessment of unserved energy. It is not concerned with broader considerations, such as the matters relating to forward-looking metrics, discussed above.

1.4 Rationale for the rule change request

In the rule change request, the Reliability Panel raised three key issues with the current *ex post* unserved energy framework. The Panel considers that:

1. there is limited transparency of the actual process AEMO undertakes when calculating unserved energy
2. there is a lack of clarity on how to interpret the unserved energy framework
3. some aspects of the definition of unserved energy could be clarified.

Limited transparency of the unserved energy calculation

To calculate unserved energy for the purposes of the reliability standard,[7] AEMO divides, per region, the number of Megawatt hours (MWh) shed in a financial year due to reliability causes, as determined under clause 3.9.3C(b) of the NER, by the amount of energy

7 It is important to note that this rule change was submitted prior to the development and implementation of the ESB's Interim Reliability Measure on 19 August 2020. As such, the Interim Reliability Measure was not considered by the Panel at the time the rule change was submitted, and therefore discussion cited in this section will not refer to the Interim Reliability Measure. However, throughout this final determination, the Commission has sought to consider the issues in light of the Interim Reliability Measure being in place — given it is based on unserved energy.

demanded. The NER does not require AEMO to develop any particular methodology and is not prescriptive with regard to the calculation.

The Panel noted that there is a lack of transparency about the calculation. In particular, there is limited visibility as to the type of demand used in the process of this calculation and how AEMO interprets clause 3.9.3C(b) of the NER to determine the type of reliability events that contribute to the load shedding figure.[8]

The Panel considered these arrangements to be inconsistent with the rest of the information provision requirements relevant to how AEMO operationalises the reliability standard.

Lack of clarity in the framework

The Panel also considered that clause 3.9.3C of the NER, which sets out the unserved energy framework and provides guidance as to which incidents should be included in or excluded from the calculation, is ambiguous and unclear as to how it should be interpreted. Further, the clause provides examples, but is not exhaustive, of the events which must or must not be included in the calculation of unserved energy.[9]

The Panel noted that clause 3.9.3C is prescriptive with respect to a series of events to be included and excluded, but is not exhaustive in terms of the types of events that are to be recognised in this way. The Panel was of the view that 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 count towards unserved energy and how this flexibility should be interpreted. This could cause confusion for market participants.[10]

Definitional inconsistencies that are unclear

The third issue identified by the Panel refers to clause 3.9.3C(b)(2)(i), which in their view included definitional inconsistencies, stating 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. The Panel noted that:

- protected events are in fact a subset of non-credible contingency events,
- the term 'multiple contingency events' already includes 'multiple credible contingency events' and 'multiple non-credible contingency events.'[11]

The Panel considered that some of these terms used in clause 3.9.3C(b)(2)(i) are redundant.

8 Reliability Panel, *Transparency of unserved energy calculation*, rule change request, August 2019. p. 7.
9 Ibid, p. 9.
10 Ibid, p. 7.
11 Ibid, p. 10.

1.5 Solutions proposed in the rule change request

The Panel proposed changes to clauses 3.9.3C and 3.9.3D of the NER. These included:

- Amending clause 3.9.3D of the NER to require AEMO to set out, through the *reliability standard implementation guidelines* (RSIG),[12] the method for calculating unserved energy in accordance with clause 3.9.3C, including how the amount of energy demanded in the relevant region is determined.
- Including in clause 3.9.3C of the NER a purpose statement for the definition of unserved energy, to assist stakeholders and AEMO with the definition's interpretation. The principle proposed by the Panel would aim to clarify that, for the purpose of the unserved energy calculation, only events which the market would be expected to plan for through investment in generation and inter-regional transmission elements should be included, while all other events should be excluded.
- Making minor drafting changes to clauses 3.9.3C(b)(1) and 3.9.3C(b)(2) to make it clearer that the intent of the clauses is to *include* unserved energy that results from power system reliability incidents, and exclude unserved energy that results from power system security incidents.
- Deleting protected events from clause 3.9.3C(b)(2)(i) of the NER, as it is already captured by non-credible contingency events, clarifying that multiple 'contingency events' are in fact multiple 'credible contingency events', and clarifying that 'non-credible contingency events' include both single and multiple non-credible contingency events.

1.5.1 Proposed transitional provisions

The Panel also proposed a transitional measure to be in place for the first update of the RSIG to incorporate the *ex post* unserved calculation, which would allow AEMO to update the RSIG once without the need for consultation in order to set out how it currently calculates unserved energy.

After this, AEMO would be required to update the RSIG by consulting with stakeholders through the rules' consultation procedures.

1.6 The rule making process

On 24 September 2020, the Commission published a notice advising of its commencement of the rule making process and consultation in respect of the rule change request.[13] A consultation paper identifying specific issues for consultation was also published. Submissions closed on 22 October 2020.

The Commission considered that the rule change request was a request for a non-controversial rule as defined in s. 96 of the National Electricity Law (NEL). Accordingly, the Commission commenced an expedited rule change process, subject to any written requests not to do so. The closing date for receipt of written requests was 8 October 2020.

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12 More information on the RSIG, and the guideline itself, can be found at https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Reliability-Standard-Implementation-Guidelines

13 This notice was published under s. 95 of the NEL.

No objections to the expedited rule change process were received. Accordingly, the rule change request was considered under an expedited process.[14]

The Commission received seven submissions. These issues are discussed and responded to in the relevant sections of this final rule determination.

14 Section 96 of the NEL.

2 FINAL RULE DETERMINATION

This chapter outlines:

- the Commission's final rule determination
- the rule making test for changes to the NER
- the more preferable rule test
- the assessment framework for considering the rule change request
- the Commission's consideration of the final rule against the national electricity objective

2.1 The Commission's final rule determination

The Commission's final rule determination is to make a more preferable final rule to address the issues identified by the Panel in their rule change request. The Commission has made some drafting changes to the rule suggested by the Reliability Panel in order to improve the clarity of the policy intent, but in substance it is the same as that was proposed.

The more preferable final rule made by the Commission is published with this final rule determination. The key features of the more preferable rule are set out below. The Commission's reasons for making this final rule determination are set out in 2.4, with further detail provided in chapters 3 to 5.

Key features of the more preferable rule

The key features of the more preferable rule are:

- Amend clause 3.9.3D of the NER to require AEMO to set out, through the RSIG the method for calculating unserved energy in accordance with clause 3.9.3C, including how of the amount of energy demanded in the relevant region is determined.
- Include in the NER a purpose statement for the definition of unserved energy, to assist stakeholders and AEMO with the interpretation of clause 3.9.3C(b).
- Minor drafting changes to clauses 3.9.3C(b)(1) and 3.9.3C(b)(2) to make it clearer that the intent of the clauses is to *include* unserved energy that results from power system reliability incidents, and *exclude* unserved energy that results from power system security incidents.
- Delete protected events from clause 3.9.3C(b)(2)(i) of the NER, as it is already captured by non-credible contingency events, clarifying that multiple 'contingency events' are in fact multiple 'credible contingency events', and clarifying that 'non-credible contingency events' include both single and multiple non-credible contingency events.

The final rule is a more preferable rule because it adjusts the purpose statement proposed by the Reliability Panel to better assist AEMO in the allocation of lost load to unserved energy. The Commission is satisfied that the more preferable rule will or is likely to better contribute to the achievement of the national electricity objective given it will further promote transparency and clarity of how unserved energy is calculated.

The Commission considered all issues raised by stakeholders in submissions, which are discussed and responded to throughout this final rule determination.

Further information on the legal requirements for making this final rule determination is set out in Appendix A.

2.2 Rule making test

2.2.1 Achieving the NEO

Under the NEL the Commission may only make a rule if it is satisfied that the rule will, or is likely to, contribute to the achievement of the national electricity objective (NEO).[15] This is the decision-making framework that the Commission must apply.

The NEO is:[16]

> 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.

2.2.2 Making a more preferable rule

Under s. 91A of the NEL, the Commission may make a rule that is different (including materially different) to a proposed rule (a more preferable rule) if it is satisfied that, having regard to the issue or issues raised in the rule change request, the more preferable rule will or is likely to better contribute to the achievement of the NEO.

In this instance, the Commission has made a more preferable rule. The reasons for this are summarised below.

2.2.3 Making a differential rule

Under the Northern Territory legislation adopting the NEL, the Commission may make a differential rule if, having regard to any relevant MCE statement of policy principles, a different rule will, or is likely to, better contribute to the achievement of the NEO than a uniform rule. A differential rule is a rule that:

- varies in its term as between:
  - the national electricity system, and
  - one or more, or all, of the local electricity systems, or
- does not have effect with respect to one or more of those systems, but is not a jurisdictional derogation, participant derogation or rule that has effect with respect to an adoptive jurisdiction for the purpose of s. 91(8) of the NEL.

15 Section 88 of the NEL.
16 Section 7 of the NEL.

As the rule relates to parts of the NER that currently do not apply in the Northern Territory, the Commission has not assessed the rule against the additional elements required by the Northern Territory legislation.[17]

2.3 Assessment framework

In assessing the rule change request against the NEO the Commission has considered the following principles:

Efficient investment in, and operation of, energy resources

- Do the proposed changes better inform the integrity of the reliability standard, and promote signals for efficient investment in generation and demand response infrastructure?
- Do they improve the efficiency of operation of the NEM, leading to improved reliability and lower prices?
- Does the rule change improve market signals that promote allocative efficiency by capturing unserved energy caused only by the wholesale generation and interconnection element of the electricity supply chain?

Promoting transparency

- Do the improvements to the transparency of unserved energy calculation inform market frameworks that inform investment and operational decisions in the way it intends?
- Are market participants and consumers set to benefit from the increase in transparency?

Regulatory and administrative burden

- Are the costs associated with the proposed changes to the RSIG offset by the benefits of having increased clarity and transparency?

2.4 Summary of reasons

Having regard to the issues raised in the rule change request and during consultation, the Commission is satisfied that the more preferable final rule will, or is likely to, better contribute to the achievement of the NEO for the following reasons:

- The rule makes the inputs into and method for calculating unserved energy more transparent, equipping market participants with more information to support improved decision-making.
- The rule provides improved clarity as to how to interpret the unserved energy definition and what events are or are not included in the backward-looking unserved energy metric, therefore enhancing the integrity of the reliability standard and promoting signals for efficient investment in generation and demand response infrastructure.
- The rule change can be implemented at minimal cost by AEMO.

17 From 1 July 2016, the NER, as amended from time to time, apply in the NT, subject to derogations set out in regulations made under the NT legislation adopting the NEL. Under those regulations, only certain parts of the NER have been adopted in the NT. (See the AEMC website for the NER that applies in the NT.) National Electricity (Northern Territory) (National Uniform Legislation) Act 2015.

2.5 Implementation of the final rule

The transitional arrangements will commence immediately upon publication on 19 November 2020. Under these arrangements, AEMO will have until 17 December 2020 to update the RSIG to take into account the Amending Rule, and may do so without following the usual Rules consultation procedures. The remainder of the rule — namely the main operative provisions amending clauses 3.9.3C and 3.9.3D — will then commence on 17 December 2020.

3 TRANSPARENCY OF THE UNSERVED ENERGY CALCULATION

3.1 Reliability Panel's view

In its rule change request, and as a result of its analysis and stakeholder input through its Review, the Reliability Panel expressed concern that there is lack of transparency about how unserved energy is calculated. In particular, the limited visibility as to the type of demand used in the process of this calculation and how AEMO interprets clause 3.9.3C(b) of the NER to determine the type of reliability events that contribute to the load shedding figure.[18] The Panel considered these arrangements to be inconsistent with the rest of the information provision requirements relevant to how AEMO operationalises the reliability standard.

The Panel was of the view 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, and the level of public interest in the reliability standard and system reliability generally.

It proposed amending clause 3.9.3D of the NER to require AEMO to set out, through the RSIG, the method for calculating unserved energy in accordance with clause 3.9.3C, including how the amount of energy demanded in the relevant region is determined.

3.2 Stakeholder views

3.2.1 General views on transparency of the unserved energy calculation

All stakeholders that provided a submission to the consultation paper were generally supportive of the rule change's intention to make the method for calculating unserved energy in each region more transparent. The Energy Users Association of Australia (EUAA), Ergon Energy Queensland, Major Energy Users (MEU) and the Public Interest Advocacy Centre (PIAC) explicitly stated their support for changes to the NER that improved the transparency, consistency and usability of the unserved energy calculation.[19]

The Australian Energy Council (AEC) noted their support for achieving improved transparency of the unserved energy calculation by laying out less prescriptive principles in the rules, while also expressing support for the detailed approach for determining unserver energy being described in the RSIG.[20] The AEC noted instances where improved transparency of the unserved energy calculation would benefit the market, such as inconsistency in reporting between AEMO and the Reliability Panel relating to unserved energy instances on 24 and 25 January 2019.

No stakeholders were not supportive of the Reliability Panel's overall direction towards making AEMO's calculations more accessible.

18 Reliability Panel, *Transparency of unserved energy calculation*, rule change request, August 2019. p. 7.
19 Submissions to consultation paper: EUAA, p. 1; Ergon Energy Queensland, p. 1; MEU, p. 2; PIAC, p. 1.
20 AEC, *submission to the consultation paper*, p. 1.

However, three stakeholders suggested that the rule change should revert to a standard process in their stakeholder submissions. EUAA and Major Energy Users noted how the current reform packages underway in the NEM have placed high demands on market participants and consumer advocates, making it difficult to fully examine the rule change prior to when objections to the expedited process were due.[21] These stakeholders, as well as ERM Power, were of the view that the issues were not uncontentious and should be addressed under the full AEMC process, or at least, include a draft determination.[22]

3.2.2 Stakeholder suggestions of additional requirements

Stakeholders made a variety of suggestions to support increased transparency of the unserved energy calculation beyond what was proposed by the Reliability Panel. These suggestions are discussed below.

Reporting unserved energy avoided through intervention

The AEC noted the current rules do not anticipate reporting of the unserved energy avoided by interventions and that it seems unlikely that AEMO would report this without an explicit expectation. Therefore, the AEC recommended the RSIG to also outline a method for estimating unserved energy avoided by reliability interventions.[23]

Reporting unserved energy on a per-event basis

Three stakeholders suggested requiring reporting of unserved energy in a more granular level through the RSIG on a per-event basis.

Major Energy Users and CS Energy noted that increased transparency could be provided by reporting unserved energy for each event and a consolidated unserved energy for the reporting period, while ERM Power indicated the inclusion of a requirement to report details of load shedding on a trading interval basis.[24]

Aligning actual and forecast unserved energy reporting

Some stakeholders expressed interest in introducing a requirement to ensure the calculation of actual unserved energy aligns with the ways unserved energy is utilised in forecast calculations. EUAA, CS Energy, Major Energy Users and ERM Power all noted that any inconsistency between the two calculations could undermine the value of the information, and could lead to inefficient and costly decisions, which would ultimately be borne by consumers.[25] In addition, ERM Power noted the example of "Energy Adequacy Assessment Projects" in AEMO's *Electricity Statement of Opportunities*, and its inclusion of unplanned outages of intra-regional transmission network elements (which would be excluded under the actual calculation) as an example of this misalignment.[26]

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21 Submissions to consultation paper: MEU, p. 2; EUAA, p. 1.
22 ERM Power, *submission to consultation paper*, p. 8.
23 AEC, *submission to consultation paper*, p. 2.
24 Submissions to consultation paper: MEU, p. 2; CS Energy, p. 3; ERM Power, p. 5.
25 Submissions to consultation paper: EUAA, p. 1; CS Energy p. 4; MEU, p. 2; ERM Power, p. 6.
26 ERM Power, *submission to consultation paper*, p. 7.

Requiring inclusion in AMPR

ERM Power recommended that any report prepared by AEMO in accordance with sub-clause 4.8.15(cb) should be subject to review and inclusion by the Reliability Panel as part of the *Annual Market Review Report* (AMPR) prepared in accordance with clause 8.8.1 of the NER.[27]

3.2.3 Stakeholder suggestions on implementation arrangements

A number of stakeholders commented on the transitional arrangements proposed for updating the RSIG. The Panel proposed that AEMO could update the RSIG to set out how it calculates unserved energy, without the need for any consultation.

Ergon Energy Queensland expressed their support for the proposed implementation arrangements, noting it to be appropriate to include transitional measures to ensure AEMO has sufficient time to finalise the wording prior to the final updates to the RSIG being published.[28]

On the other hand, CS Energy, ERM Power and Major Energy Users expressed concern regarding the approach to consultation when implementing the arrangements.[29]

ERM Power noted that as the rule change does not seek to implement a particular methodology or prescriptive determination with regard to the calculation of unserved energy in the NER, the initial update should be via an amended rule consultation process.[30]

CS Energy acknowledged the measures would allow AEMO to update the RSIG in a timely manner. However, it expressed concern that the next opportunity to consult could be up to four years away. Instead, CS Energy recommended the initial update to occur with one round of consultation, or that the update to the RSIG via the transitional arrangements is not considered a review for the purposes of clause 3.9.3D, ensuring current timelines for review processes are not altered.[31]

3.3 Analysis

3.3.1 Analysis of need for increased transparency

The calculation of unserved energy on an *ex post* basis helps to measure the effectiveness of the wholesale energy markets' ability to deliver reliable supply to consumers. Therefore, it is important to:

- include load shedding that is due to wholesale market outcomes (i.e. insufficient capacity available to a region)
- exclude unmet load due to other causes such as network reliability and power system security events as other frameworks are used to assess the effectiveness of these arrangements.

27 ERM Power, *submission to consultation paper*, p. 5.
28 Ergon Energy Queensland, *submission to consultation paper*, p. 1.
29 Submissions to consultation paper: CS Energy, p. 3; ERM Power, p. 2; MEU, p. 1.
30 ERM Power, *submission to consultation paper*, p. 2.
31 CS Energy, *submission to consultation paper*, p. 3.

The Commission therefore considers that it would be helpful to have increased transparency about how unserved energy is calculated in order to promote the above outcomes and assessments. However, the Commission also notes that it is hard to prescribe exactly what is unserved energy and what is not in the NER.

Calculating unserved energy requires a case by case assessment of what happened on the power system at a particular point in time. Therefore, having increased prescription in the NER on how to calculate unserved energy could actually decrease clarity. In the extreme, this could mean that something was classified as unserved energy when it shouldn't be. For that reason, the Commission has determined to make the proposed changes to require AEMO to set out in the RSIG how unserved energy will be calculated. This will still allow AEMO flexibility when calculating unserved energy, as they apply their expertise and power system knowledge to a particular event.

The Commission notes that the AEC observed the difference in unserved energy calculated for the load shedding events on 24 and 25 January 2019 in Victoria between that reported in AEMO's P*ower System Incident Report*[32] and the Panel's *Annual Market Performance Review* 2019.[33]

In that incident report, while a USE number was not reported, AEMO set out that the reliability standard of 0.002% unserved energy was exceeded in Victoria as a result of these events. However, when the Panel reported on this incident, the Panel's analysis of AEMO's data showed that there was unserved energy of 0.0017% in Victoria; and 0.0004% in South Australia.

The AEMC understands that this difference occurs from AEMO applying the pain-sharing arrangements[34] — and calculating that 75 per cent of the load shedding need on 24 January 2019 was to be met by Victoria; and 25 per cent by South Australia. This meant that the reliability standard was ultimately not breached.

The Commission notes that while these changes in reporting of information are not ideal, it is also related to the fact that more information about power system incidents are discovered over time. Notwithstanding this, the Commission does consider that there is a need to improve the transparency of how unserved energy is calculated in order to better assist stakeholders and policy-makers with their understanding of what is happening on the power system.

The Commission also notes that some stakeholders have suggested that issues considered should be considered through the full AEMC process. The Commission understands the pressures that those in the industry — particularly those representing consumer interests — are under at the current time, as well as the significant interest that stakeholders have in maintaining affordability of outcomes. This is a key consideration in any matter to do with reliability.

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32 See: https://www.aemo.com.au/-/media/Files/Electricity/NEM/Market_Notices_and_Events/Power_System_Incident_Reports/2019/Load-Shedding-in-VIC-on-24-and-25-January-2019.pdf

33 Reliability Panel, *Annual Market Performance Review 2019*, March 2020, p. 59.

34 Reliability Panel, *Guidelines for management of electricity supply shortfall events*, December 2009.

The Commission undertook additional stakeholder consultation with these stakeholders to better understand their concerns. The Commission considers that the outcomes of this rule change promote transparency in the NEM by making it clearer how the *ex post* calculation of unserved energy occurs. Other key issues about reliability raised by stakeholders will be more fulsomely considered through other processes, such as the ESB's 2025 market design process and the upcoming Panel's *Reliability Standards and Settings Review.*

3.3.2 Analysis of stakeholder suggestions of additional requirements

Reporting unserved energy avoided through intervention

The AEC suggested that the RSIG outline a method for estimating unserved energy avoided by reliability events. The Commission notes that while this could contribute to greater transparency, it would likely also be a challenging task given it would require a number of assumptions to be considered and made. It would also impose costs on AEMO.

On balance, the Commission has concluded that AEMO should not be required to report unserved energy avoided through intervention. Doing so would likely require changes to clause 3.20.6(g) which sets out how AEMO is to report and publish on the RERT at the end of the financial year. Making changes to these clauses over an expedited time frame on an issue not raised in the consultation paper is out of scope for this rule change.

If stakeholders consider this would be useful, then it is open to stakeholders to suggest this to AEMO.

Reporting unserved energy on a per-event basis

Major Energy Users and CS Energy suggested that unserved energy could be reported on a more granular level on a per-event basis. Similar to above, the Commission considers that while this could contribute to greater levels of transparency, it can be a challenging task. It would also involve costs, as the AEMC understands that this would require an increase in resourcing and modelling capability by AEMO.

The Commission also understands that while reporting on unserved energy occurring per event may be more straightforward for lost load incidents linked with Reliability and Emergency Reserve Trader (RERT)[35] events, it would be more complex for other interventions, such as directions and instructions. The Commission also reflects that the changing USE numbers for the 24 and 25 January 2019 incidents suggest that as more is learned about a particular power system event, more information is available. To require AEMO to publish USE on a per event basis, may actually result in decreased clarity, rather than increasing understanding.

Finally, the Commission has also considered ERM Power's suggestion that a requirement should be included to report details of load shedding on a trading interval basis. Doing so would require changes to clause 4.8.15(c) which sets out how AEMO is to publish their power

35 The RERT is an existing mechanism that allows AEMO to contract for emergency reserves, such as generation or demand response, that are out of market. It is an important part of the regulatory framework that AEMO uses as a last resort at times when the market has not provided enough reserves to meet demand. More information can be found here: https://aemo.com.au/en/energy-systems/electricity/emergency-management/reliability-and-emergency-reserve-trader-rert

system incident reports. Making changes to significant clauses in Chapter 4 of the NER over an expedited time frame on an issue not raised in the consultation paper is out of scope for this rule change. For these reasons, the Commission has concluded that AEMO should not be required in the NER to report unserved energy on a per-event basis.

The Commission also notes AEMO could publish two numbers for unserved energy - one that includes interventions and one that does not.[36]

Additionally, the Commission notes that the Panel also recommended that any expansion of the definition to include reliability-related interventions should be examined as part of any review of the reliability standard.[37] The Commission agrees with this, and notes that the Panel is about to shortly commence its next *Review of the Reliability Settings and Standards Review.*

Aligning actual and forecast unserved energy reporting

The Commission has also considered feedback from stakeholders that it would be helpful to introduce a requirement to ensure the calculation of actual unserved energy aligns with the way unserved energy is utilised in forecast calculations. The Commission considers that given it is the same clause that defines both *forecast* and *ex post* calculations, then this should be achieved by AEMO anyway.

Inclusion in AMPR

The Commission agrees with ERM Power that the reports prepared by AEMO should be subject to review and inclusion by the Reliability Panel as part of the AMPR process. In fact, this is already the case, where the terms of reference note that the Panel must consider power system incidents that have occurred in the previous year. Therefore, the Commission does not consider that any changes are required in the NER to give effect to this. It also considers that it is more appropriate for the requirements on the Panel in this respect to be with the other requirements in the terms of reference, rather than being set out in the Rules.

Future work

More generally, the Commission notes that the issues raised by stakeholders are related to broader issues in the reliability and security frameworks. There is a significant amount of upcoming work that the Commission encourages stakeholders to be involved in order to share these views so that the power system continues to evolve and adapt to be fit for purpose given the transition underway, including:

- the ESB's post 2025 market design work
- the AEMC's progression of the Ministerial Forum of Energy Ministers' (formerly COAG Energy Council) rule change on *Enhancing operational resilience in relation to indistinct events,* which covers concepts such as credible contingencies

36 This was suggested by the Panel in its *Definition of Unserved Energy Review Final Report.*

37 Reliability Panel, *Definition of Unserved Energy Review*, final report, August 2019, p. 49.

- the Reliability Panel's *Reliability Standards and Settings Review,* which will review the reliability standard and market settings for the period 2024-2028.

3.3.3 Analysis of implementation arrangements

The Commission acknowledges the concerns of stakeholders that consider AEMO should consult on the amendments to the RSIG before they are finalised.

However, the Commission also considers that the intent of the changes in this rule change are to make the calculation of unserved energy more transparent. The intent is not to alter the way that these processes — such as the inputs into the unserved energy calculation or their granularity — are carried out. The Commission considers that since there is currently no transparency of the calculation, it would be hard for stakeholders to provide input on this at the current time. It would be better for the consultation to occur later once there has been some more experience with the calculation.

The Commission is also conscious that AEMO has a significant amount of implementation work at the moment. Further, AEMO has recently updated the RSIG for more significant changes (the implementation of the interim reliability measure), and it did so with no consultation.

Therefore, the Commission's final rule requires AEMO to update the RSIG to reflect this rule with no consultation. This allows the changes to be implemented and operational prior to summer to better promote transparency over this period.

Further, the Commission notes that there is a requirement in the NER that the RSIG be reviewed regularly (every four years), and encourages stakeholders to participate in the next review of the RSIG with consultation. This rule change does not alter the current time frames over which AEMO is required to conduct their next review with consultation.

3.4 Conclusion

Taking into consideration feedback provided by stakeholders through submissions and further analysis by the project team, the Commission has made a final rule under clause 3.9.3D(b1) to require AEMO to publish in the RSIG their method for calculating unserved energy. The addition reads:

> (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*.

4 THE CLARITY OF THE UNSERVED ENERGY FRAMEWORK

4.1 Reliability Panel's view

In the rule change request, the Reliability Panel considered that clause 3.9.3C of the NER, which sets out the unserved energy framework and provides guidance as to which incidents should be included in or excluded from the calculation, was ambiguous and unclear as to how it should be interpreted. In addition, even though the clause provided examples, it is not exhaustive of the events which must or must not be included in the calculation of unserved energy.[38]

Therefore, the Panel was concerned that 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 count towards unserved energy and how this flexibility should be interpreted and indicated that this could create confusion for market participants.[39]

The rule change request proposed to include in the NER a purpose statement for the definition of unserved energy, to assist stakeholders and AEMO with the definition's interpretation.

The principle proposed by the Panel would aim to clarify that, for the purpose of the unserved energy calculation, only events that could have been avoided through investment in generation and inter-regional transmission elements should be included, while all other events should be excluded.

4.2 Stakeholder views

4.2.1 The wording of the purpose statement

Most comments from stakeholders regarding the clarity of the unserved energy framework were made regarding the wording of the purpose statement. Comments on the issues can be categorised under three key areas, as set out below.

Generation as a 'concept' or as an 'asset'

Most stakeholders were supportive of referring to generation as an 'asset', as opposed to a 'concept', in the purpose statement. This indicated a preference to include demand response in the final wording of the purpose statement. CS Energy, for example, noted that referring to generation as a 'concept' is also likely to give rise to ambiguity, and that they support the purpose statement expressly referring to generation, demand response and inter-regional transmission elements.[40] This sentiment was echoed by both ERM Power and PIAC.[41]

38 Reliability Panel, *Transparency of unserved energy calculation*, rule change request, August 2019, p. 9.
39 Ibid, p. 7.
40 CS Energy, *submission to the consultation paper*, p. 4.
41 Submissions to the consultation paper: ERM Power, p. 4; PIAC, p. 1.

Specifying the statement as 'efficient' investment

ERM Power expressed concern that the purpose statement could result in all instances of involuntary load shedding being classified as unserved energy.[42] In addition, it noted that the purpose statement, as proposed in the rule change request, could be interpreted in the extreme, given all instances of involuntary load shedding could reasonably be expected to be prevented by additional investment.[43]

ERM Power argued that it is unclear whether the market should be expected to plan for low probability events, and that it would be uneconomic for it to do so. As such, ERM Power suggested an alternative purpose statement that suggests AEMO should consider events for the unserved energy calculation that

> *"would have been avoided through **additional efficient** investment in generation, demand response and/or inter-regional transmission elements **and on the basis that the market should have planned for such an event.**"*[44]

This sentiment was supported by both Major Energy Users and EUAA.[45]

Relationship between intra- and inter-regional transmission

Two stakeholders made explicit references to issues that arise as to how the calculation should be worded to avoid inclusion of lost load as part of the unserved energy calculation that arises from constraints or interruptions in intra-regional transmission elements:

- The AEC noted that, in order to avoid confusion, it may be best to refer to lost load that could be avoided via investment in the vicinity of Regional Reference Node.[46]
- Major Energy Users noted that while intra-regional congestion is not allowed for assessment of unserved energy, they can foresee occasions where intra-regional congestion could impact inter-regional limitations which are included in the calculation of unserved energy.[47]

42 ERM Power, *submission to the consultation paper*, p. 3.
43 Ibid. p. 3.
44 Ibid, p. 3.
45 Submissions to the consultation paper: MEU, p. 2; EUAA, p. 1.
46 AEC, *submission to the consultation paper*, p. 2.
47 MEU, *submission to the consultation paper*, p. 2.

4.3 Analysis

The Commission has analysed the views of stakeholders on the clarity of the unserved energy framework under the three key themes identified by stakeholders.

Analysis on generation as a 'concept' or an 'asset'

In the consultation paper,[48] the Commission raised the topic of whether to refer to generation as either a 'concept'[49] or as an 'asset'.[50]

The implication for this was whether there would be a need to include demand response in the purpose statement, so that it is sufficiently clear that lost load ought to be considered unserved energy if it could have been avoided by investment in demand response capability. Taking generation as a concept, the enumeration of demand response would be unnecessary. On the other hand, taking generation as an asset would necessitate its inclusion, given the intention to include it.

The Commission agrees with the points raised by stakeholders that the clarity of the unserved energy framework is improved by specifying that 'generation' in the purpose statement should be considered as consistent with its definition in Chapter 10 of the NER. Therefore, it follows that the Commission agrees that including demand response in the purpose statement is also necessary to reflect the intention to include it as a component of the wholesale reliability sector.

Analysis on the need to specify 'efficient' investment

The Commission understands the concerns put forward by ERM Power, EUAA and Major Energy Users. The Commission shares the view of stakeholders that investment in capacity to meet the needs of the power system should be achieved efficiently, and should be informed by accurate metrics.

However, the Commission is not convinced of the materiality of the point made by ERM Power that all instances of involuntary load shedding could reasonably be expected to be avoided by additional investment in wholesale capability, and is therefore not convinced whether it is necessary to include additional terms in the purpose statement.

The Commission shares the opinion that only events that can be addressed by additional investment in generation, demand response or inter-regional transmission elements should be included, as including others would be costly to consumers and not necessarily provide any benefit to reliability.

However, it considered that clause 3.9.3C(b)(2) of the NER provides enough clarity as to what a power system security event is, and that lost load resulting from these events ought to be excluded from the calculation. It is sufficiently clear that a security event that causes

48 AEMC, *Transparency of unserved energy calculation*, consultation paper, 24 September 2020.

49 If the principle statement refers to generation 'as a concept', it speaks to investment in any measure that may close the unserved energy 'gap' between the energy demanded, and the energy supplied at a wholesale level. Measures capable of closing this gap would include investment in generation assets and interconnection elements that would increase energy supplied, or investment in demand response mechanisms that would reduce the energy demanded.

50 This would be consistent with the Chapter 10 definition for generation, which is described as "The production of electrical power by converting another form of energy in a generating unit".

automatic load shedding, as opposed to scheduled load shedding, is unlikely to be interpreted as capable of being rectified by investment in wholesale capability only.

The Commission considers the concern of stakeholders is derived from an expectation that the unserved energy calculation is at risk of including events that it ought not to include, and that the inclusion of these events in the calculation is likely to far exceed the actual resource adequacy needs of the power system and the amount demanded by the reliability standard.

It is possible stakeholders have conflated the primary objective of the unserved energy metric — to signal periods where supply did not meet demand because of a lack of wholesale reliability — with the investment and policy decisions that the metric is used as an input for.

In the first instance, the Commission considers it important for the unserved energy calculation to capture all reliability incidents — not a portion of them — related to wholesale inadequacy. However, the Commission does not consider it to be the role of the backwards-looking unserved energy metric to differentiate between which reliability events could be addressed efficiently, and which could not. Instead, it is the role of market participants, policy-makers, and consumers to use the metric to inform what investments are and are not efficient. By making the inputs into this calculation transparent, the Commission expects participants will be better equipped to make these decisions.

The Commission is satisfied that existing parameters embedded in the unserved energy definition — the use of the contingency classification framework to determine the difference between reliability and security events — as well as the purpose statement in the final rule provides both sufficient clarity as to how to interpret which events to include in the calculation, while concurrently providing AEMO the flexibility they require to interpret complex events in a transparent manner.

If low probability reliability events were to occur, such as multiple independent credible contingencies[51] that meet the criteria for unserved energy in the final rule, the Commission considers that load shedding that eventuates from this event would be considered unserved energy.

In turn, the Commission expects it would then be the responsibility of AEMO in the publishing of power system incident reports under clause 4.8.15(c) of the NER and the Reliability Panel in the *Annual Market Performance Review* under 8.8.1[52] to contextualise the event and provide detail regarding the probability of the event's occurrence, as per existing reporting obligations.

Participants and policy-makers as part of other regulatory and economic frameworks would then be well positioned to make a decision as to if they should or should not plan for such an event once it has been counted and reviewed.

51 Considered here as a number of otherwise credible contingencies that occur independently together over a short period of time.

52 See clause 8.8.1 of the NER.

Analysis on the relationship between intra- and inter-regional transmission

Noting the Major Energy User's submission, the Commission acknowledges a need to clarify the way intra-regional elements are considered as part of the purpose statement.

As stated previously, the intent of the unserved energy calculation is to calculate the demand that was unmet because of an insufficiency of wholesale capacity only. For example, in an islanded power system with no interconnection, the intent of the unserved energy calculation would be to count only the energy that went unserved due to an inadequacy of generating units or demand response capability to balance demand with supply. Meanwhile, it is possible that constraints on transmission within the region may lead to lost load. However, including this lost load in the unserved energy calculation is problematic. This is because:

- Including this lost load may signal the need for more generation, and not necessarily improved transmission elements. New generation located on the wrong side of the constraint won't alleviate the lost load.
- This may lead to investment in more generation or demand response at a higher cost to consumers with no tangible reliability benefit.

As such, it is preferable for other frameworks to report on and signal for intra-regional transmission adequacy, rather than the unserved energy metric. Examples of these frameworks include the *Reliability Standards and Settings Review*,[53] the determination of protected events,[54] and the Regulatory Investment Test for Transmission (RIT-T) implemented by the Australian Energy Regulator (AER).[55]

However, in an interconnected system, interconnectors transport resource adequacy from generation and demand response from one region into another region. In this scenario, the Commission notes it is likely that some transmission elements that are considered intra-regional are also instrumental in facilitating power flows between load centres in different regions.

Therefore, the intent of the purpose statement, in this regard, should be to ensure that the actual figure of unserved energy reported is not amplified by including lost load from intra-regional elements that:

1. were not facilitating the transfer of active power between regions, and
2. would still occur if a new generating asset or demand response capability were built on the opposite side of the constraint to the load centre experiencing the unserved energy.

As such, the Commission has included in the wording of the purpose statement a recognition of the role that intra-regional elements may have in facilitating inter-regional power transfer. It clearly states the intention to include in the unserved energy calculation instances of lost load that could have been avoided by the provision of more active energy from inter-regional transmission elements, which includes only those transmission elements that ***materially*** *contribute to inter-regional power transfer*.

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53 Reliability Panel, *Reliability standards and settings review 2018*, final report, 30 April 2018.

54 This is described under 8.8.4 of the NER.

55 This is described under 5.15A of the NER.

In the purpose statement, the use of the word 'materially' is to help AEMO and participants distinguish between lost load events triggered by outages on intra-regional elements that occur between demand centres and generation zones **within** regions, from those that occur **between regions.**

For example, a fault or constraint on an intra-regional transmission element leading to lost load between demand centres in Far North Queensland and the majority of the generating capacity in the Central and South West would not be materially contributing to inter-regional power transfer, and there would not be included in the unserved energy calculation.

While this lost load could have been corrected with additional active power, it only would have been rectified if the active power was on the Far North Queensland side of the constraint. As such, to ensure the unserved energy metric remains an accurate reporting tool for reliability issues, and not transmission issues, the purpose statement would ensure this event would not be included in the calculation.

The Commission expects this drafting to provide sufficient clarity as to which incidents on different intra-regional elements should and should not be considered as part of the unserved energy calculation.

4.4 Conclusions

Taking into consideration feedback provided by stakeholders through submissions and further analysis by the project team, the Commission has made a more preferable final rule to introduce a purpose statement in 3.9.3C(c). The purpose statement reads:

> For the purpose of paragraph (b)(1), a "*power system reliability* incident" is an incident that *AEMO* considers would have been avoided only if additional *active energy* had been available to the relevant region or *regions* from *generation*, demand response or inter-regional transmission elements. The reference to *"inter-regional transmission elements"* in this paragraph (c) includes only those *transmission elements* that materially contribute to *inter-regional power transfer.*

5 DEFINITIONAL INCONSISTENCIES

5.1 Reliability Panel's view

The Panel considered that there is scope to clarify some aspects of the definition of unserved energy.

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.[56]

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

The Panel also noted that the term 'multiple contingency events' can refer to multiple **credible** and **non-credible** contingency events. However, the clause already refers to 'non-credible contingency events' in the plural as one of the three types of incident excluded from the unserved energy calculation. A 'multiple **non-credible** contingency event' is a subset of the pluralised 'non-credible contingency events,' which therefore suggests there is scope to clarify the intention of the term 'multiple contingency events.'[57]

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

The Panel also proposed clarifying that multiple 'contingency events' are in fact multiple 'credible contingency events' since multiple non-credible contingency events are already captured by the clause.

Finally, to remove any ambiguity, the Panel proposed to clarify that 'non-credible contingency events' include both single and multiple non-credible contingency events.

5.2 Stakeholder views

Three stakeholders — while not raising any issue with the Reliability Panel's proposal outlined in the previous section — noted a concern with regard to how the unserved energy calculation deals a categorisation of events described as a series of interrelated cascading single credible contingency events. CS Energy, EUAA and ERM Power noted that there is a need to clarify whether these events will be classified as a multiple credible contingency event(s) that are assumed when calculating unserved energy.[58]

The concern is derived from the position whether low probability, unexpected events should be included in the unserved energy calculation if they coincide with other unplanned outages, as opposed to planned outages. ERM Power detailed this point in their submission, where they suggest the intent of the unserved energy definition is to count events "that the market

56 Reliability Panel, *Transparency of unserved energy calculation,* rule change request, August 2019, p. 10.
57 Ibid, p. 10.
58 Submissions to consultation paper: CS Energy, p. 4; EUAA, p. 2; ERM Power, p. 3.

should have been able to plan for..." and suggested it is unreasonable and economically inefficient to expect the market to plan for the wide range of time distant multiple but singularly occurring contingency events that could potentially occur.[59]

5.3 Analysis

The Commission considers the points made by stakeholders come down to whether some types of reliability incidents should be included in the unserved energy calculation, and whether some types of reliability events should not be included.

Stakeholders do not make the point that the example of a "wide range of time distant multiple but singularly occurring contingency events," or "a series of interrelated cascading single credible contingency events" should be considered security events.[60] Rather, they make the point that their irregularity and low probability makes them outliers compared to other reliability events, and therefore distort the robustness of unserved energy calculation as a signal for more conventional reliability events. In turn, this prevents more economically efficient investments and outcomes. In a way, stakeholders 'work backwards' from determining these types of events should not be included, and propose methods for doing so, either by:

1. clarifying these events constitute multiple credible contingency events, or
2. making amendments throughout 3.9.3C that specify unserved energy will only include events which the market should have *planned* for.

The Commission acknowledges that it is true that different objectives can be applied to discerning what type of power system events should and should not contribute towards unserved energy. The choice to include these events or to exclude them will affect the value and purpose of the unserved energy calculation as a metric, what it is used for, the power system need it is identifying, and the investment that it signals for.

However, the Commission is of the view that the objective of the unserved energy calculation is to include all reliability events that arise from a shortfall in wholesale adequacy, regardless of their likelihood of occurring or how economically efficient they are to rectify. The starting point for defining whether an event should be included or excluded from the calculation of unserved energy is not what type of contingency it was, but rather whether the unserved energy was caused by a reliability or security incident.

It is the task of other frameworks, such as the contingency classification framework, to make determinations whether a type of event or a sequence of events are credible or non-credible, as they are better equipped to make these determinations. Evaluations of economic value are typically processed elsewhere in the NEM, either as part of market participant business cases or through the AER's regulated processes relating to network business proposals.

The Commission endorses the Panel's view put forward in the *Definition of Unserved Energy Review Final Report,* which stated that the current definition provides enough flexibility to

59 ERM Power, *submission to consultation paper*, p. 4.

60 ERM Power, *submissions to consultation paper*, p. 4.

deal with such events by stating that unserved energy, for the purposes of the reliability standard, includes unserved energy associated with power system reliability incidents.[61]

The contingencies outlined in the rule are to guide AEMO when deciding whether an event should be included in or excluded from the calculation of unserved energy, but the list is not exhaustive.

As a rule of thumb, it is true that a single credible contingency is typically seen as being the proxy for reliability events, and appropriately so. However, as the power system transitions and types of contingencies become less distinct, AEMO is provided flexibility by the non-prescriptive nature of the clause to assess these instances on a case by case basis and to allocate lost load to and from the unserved energy calculation accordingly. The rule change seeks to make sure that the manner in which this is done, and the reasons for determining this allocation, are made clear and transparent to stakeholders.

The Commission understands the interest from stakeholders in having more prescriptive language in the unserved energy definition, such as events that should be planned for, or to only include outages that are planned.

However, the Commission is concerned that inclusion of such words (such as 'planned' or 'efficient') detracts from both the intent of the metric to report wholesale redundancy, as well as AEMO's ability to conduct a case by case assessment of what happened on the power system at a particular point in time.

While a more prescriptive approach may definitively allocate types of lost load events from being included or excluded, there is a risk it may have unintended consequences, such as 'locking in' types of events which may grow to be more or less reflective of wholesale resource adequacy over time. This will be particularly relevant as new scenarios of incidents emerge and the system becomes more agile and responsive. In this sense, having increased prescription in the NER on how to calculate unserved energy could actually decrease clarity. In the extreme, this could mean that something was classified as unserved energy when it shouldn't be.

A clear principle-based approach that retains flexibility — backed up by transparent, accessible methodology — is therefore most likely to preserve the veracity of unserved energy as dependable reporting tool. This approach will increase transparency around the determination of unserved energy *ex post* compared to current arrangements, and is likely to remain robust as the power system transitions.

The Commission understands improving transparency and information provision — given the trade-offs with the practicality of operationalising it — remains a work in progress. The upcoming Panel's *Reliability Standards and Settings Review* will allow for further consideration of these issues.

61 Reliability Panel, *Definition of Unserved Energy Review*, final report, 2019, p. 38.

5.4 Conclusions

Regarding the issues discussed in this section, as well as changes recommended by stakeholders, the Commission has made a final rule that adopts the recommendations as they were put forward in the Reliability Panel's rule change request.

Under 3.9.3C(b):

1 (b) For the purposes of paragraph (a) *unserved energy is to:*

2 (1) include *unserved energy* that results from *power system reliability* incidents caused by an event or events that include (but is not limited to):

...

(2) exclude *unserved energy* that results from *power system security* incidents caused by an event or events that include (but is not limited to):

3 (i) multiple *credible contingency events*, a *single non-credible contingency event* or multiple non-credible contingency events on a *generating unit* or an *inter-regional transmission elements,* that may occur concurrently with *generating unit* or *inter-regional transmission element outages;*

ABBREVIATIONS

AEC	Australian Energy Council
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Commission	See AEMC
ESB	Energy Security Board
ESOO	Electricity Statement of Opportunities
EUAA	Energy Users Association of Australia
MCE	Ministerial Council on Energy
MEU	Major Energy Users
MWh	Megawatt hour
MT PASA	Medium-term projected assessment of system
NEL	National Electricity Law
NEO	National electricity objective
PIAC	Public Interest Advocacy Centre
RERT	Reliability and Emergency Reserve Trader
RIT-T	Regulatory Investment Test for Transmission
RRO	Retailer reliability obligation
RSIG	Reliability standard obligation guideline
ST PASA	Short-term projected assessment of system
USE	Unserved energy

A LEGAL REQUIREMENTS UNDER THE NEL

This appendix sets out the relevant legal requirements under the NEL for the AEMC to make this final rule determination.

A.1 Final rule determination

In accordance with s. 102 of the NEL the Commission has made this final rule determination in relation to the rule proposed by the Reliability Panel.

The Commission's reasons for making this final rule determination are set out in section 2.4.

A copy of the more preferable final rule is attached to and published with this final rule determination. Its key features are described in section 2.1.

A.2 Power to make the rule

The Commission is satisfied that the more preferable final rule falls within the subject matter about which the Commission may make rules. The more preferable final rule falls within s. 34(1)(a)(ii) and (iii) of the NEL as it relates to the operation of the NEL and the activities of persons participating in the NEL or involved in the operation of the national electricity system. Further, the more preferable final rule falls within the matters set out in Schedule 1 (item 31) to the NEL as it relates to the calculation or estimation of use of electricity.

A.3 Commission's considerations

In assessing the rule change request the Commission considered:

- powers under the NEL to make the rule
- the rule change request
- submissions received during first round consultation
- the Commission's analysis as to the ways in which the proposed rule will or is likely to, contribute to the NEO

There is no relevant Ministerial Council on Energy (MCE) statement of policy principles for this rule change request.[62]

The Commission may only make a rule that has effect with respect to an adoptive jurisdiction if satisfied that the proposed rule is compatible with the proper performance of AEMO's declared network functions.[63] The more preferable final rule is compatible with AEMO's declared network functions because it is unrelated to those functions and therefore does not affect them.

62 Under s. 33 of the NEL the AEMC must have regard to any relevant MCE statement of policy principles in making a rule. The MCE is referenced in the AEMC's governing legislation and is a legally enduring body comprising the Federal, State and Territory Ministers responsible for energy. On 1 July 2011, the MCE was amalgamated with the Ministerial Council on Mineral and Petroleum Resources. The amalgamated council is now called the COAG Energy Council.

63 Section 91(8) of the NEL.

A.4 Civil penalties

The Commission cannot create new civil penalty provisions. However, it may recommend to the COAG Energy Council (now referred to as the Ministerial Forum of Energy Ministers)[64] that new or existing provisions of the NER be classified as civil penalty provisions.

The final rule does not amend any clauses that are currently classified as civil penalty provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the Ministerial Forum of Energy Ministers (formerly COAG Energy Council) that any of the proposed amendments made by the final rule be classified as civil penalty provisions.

A.5 Conduct provisions

The final rule does not amend any rules that are currently classified as conduct provisions under the NEL or National Electricity (South Australia) Regulations. The Commission does not propose to recommend to the Ministerial Forum of Energy Ministers (formerly COAG Energy Council) that any of the proposed amendments made by the final rule be classified as conduct provisions.

64 On 29 May 2020, the Prime Minister announced the establishment of the National Federation Reform Council and the disbanding of the COAG. New arrangements for the former COAG Energy Council will be finalised following the National Cabinet Review of COAG Councils and Ministerial Forums. The Prime Minister has advised that, while this change is being implemented, former Councils may continue meeting as a Ministerial Forum to progress critical and/or well-developed work.