AEMC

RULE

Australian Energy Market Commission

OPTIONS PAPER

ENHANCEMENT TO THE RELIABILITY AND EMERGENCY RESERVE TRADER

PROPONENT

Australian Energy Market Operator

18 OCTOBER 2018

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.

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1 INTRODUCTION

1.1 What is the RERT?

The RERT is an existing intervention mechanism that allows AEMO to contract for additional reserves such as generation or demand response that is not otherwise available in the market. It is an important part of the regulatory framework, allowing AEMO to use a safety net at times when a supply shortfall is forecast, or, where practicable, to maintain power system security. These additional reserves are commonly referred to as "emergency reserves" or "strategic reserves" as they may only be used as a last resort to avoid unnecessary blackouts, typically during periods when the demand and supply balance is tight, for example, summer.

There are three types of RERT based on how much time AEMO has to procure the RERT prior to the shortfalls being projected to occur:[1]

- long-notice RERT - between nine months' and ten weeks' notice of a projected reserve shortfall
- medium-notice RERT - between ten and one week's notice of a projected reserve shortfall
- short-notice RERT - between seven days' and three hours' notice of a projected reserve shortfall

Prior to 2017, AEMO had only entered into RERT contracts three times and it had never been dispatched. This changed last year, when AEMO entered into a number of reserve contracts, most recently in June 2018. AEMO also dispatched the RERT twice - once in November 2017 and once in January 2018. AEMO is currently in the process of procuring reserve contracts for the upcoming 2018-19 summer.

Some form of mechanism that allows the operator to contract for reserves has existed since the start of the NEM and has underpinned the high levels of reliability experienced in the NEM.

Having a safety net that underpins reliable electricity supply in the NEM is important; however, it does carry direct and indirect costs. The direct costs of the RERT last summer have been in the order of tens of millions. The indirect costs are due to the distortionary effects the RERT can have on market outcomes. For example, if a generator who would otherwise have been participating in the wholesale market withdrew in order to offer their capacity to the RERT instead. This could lead to increased costs to consumers - both from the costs of the RERT, as well as higher wholesale prices resulting from a reduction in supply.

The RERT has been designed to minimise these costs. A more fulsome description of the RERT mechanism can be found in chapter 2 of this paper.

1 The NER does not prescribe different notice periods for procuring reserves within the permitted nine month period. Rather the NER provides for such notice periods to be prescribed in the RERT guidelines developed and published by the Reliability Panel.

1.2 History of enhancing the RERT

This section sets out the recent history of enhancing the RERT in the NEM.

1.2.1 AEMO's views on strategic reserves

In August 2017, AEMO set up an expert advisory panel of senior energy leaders to help AEMO deliver key initiatives. The subject of discussions at the first two expert panel meetings was the design of a strategic reserve mechanism. The design developed through this process of an enhanced RERT is the subject of this rule change request.

1.2.2 Reinstatement of the long-notice RERT

On 9 March 2018, AEMO submitted a rule change request that sought to extend the period allowed for AEMO to contract for reserves ahead of a projected shortfall, in effect, reinstating the long-notice RERT. The AEMC considered this an urgent rule and so progressed it under an expedited process, making the final rule on 21 June 2018.

The final rule increased the lead time available for AEMO to procure out-of-market reserves through the RERT, to nine months ahead of a projected shortfall, effectively reinstating the long-notice RERT. This has allowed AEMO to procure reserves under the long-notice RERT for the 2018-19 summer.

In the final determination for that rule change request, the Commission noted that while the potential of the mechanism to distort outcomes remains unchanged since the Commission considered similar issues in 2016, several conditions in the market have changed since then, including the changing generation mix and the ARENA-AEMO RERT trial, which has demonstrated the existence of resources, primarily demand response, capable of participating in the RERT.[2] The trial also found that a longer lead time is required for these types of reserves, e.g. to install relevant equipment. This was confirmed through stakeholder feedback to the reinstatement of the long-notice RERT rule change.

Further, the Commission considered that to the extent that the RERT is required, having more resources able to participate in the RERT through a longer procurement lead time may improve the efficiency of the procurement process. This may put downward pressure on the direct costs of the RERT, if it is needed.

1.2.3 Enhancement to the RERT rule change request

At the same time as the above rule change request was submitted,[3] AEMO also submitted a second rule change request proposing broader changes to the RERT framework, including: an increase in the amount of time AEMO has to enter into RERT contracts prior to projected shortfalls to one year (and beyond in some circumstances), taking into account a broader risk assessment framework when procuring the RERT and the standardisation of RERT products.

2 AEMC, National Electricity Amendement (Reinstatement of long-notice Reliability and Emergency Reserve Trader) Rule 2018, Rule Determination, 21 June 2018.

3 That is, to reinstate the long-notice RERT.

AEMO considers that these broader changes to the RERT framework will help manage the risk of shortfalls in light of greater uncertainty and a tightening supply-demand balance.

This is the subject of this rule change request and this options paper.

1.3 Purpose of this options paper

The RERT framework is an inter-related one, with each element and its associated design choice, affecting the design choices and parameters for other elements, and so ultimately affect the costs of reserves that need to be met by consumers. The Commission therefore considers it is beneficial to test some of the potential design options for the key elements of the RERT with stakeholders in order to get stakeholder views on these, prior to making a draft determination for this rule change request.

There has also been significant stakeholder interest in this rule change request - 25 submissions were made to the consultation paper alone, and the Commission has had numerous meetings with other interested stakeholders. This is in a large part due to the fact that the RERT framework imposes costs on consumers. The current framework, with the RERT procurement trigger being based on the reliability standard[4], is designed to balance the benefits to consumers of having reliable electricity supply against the costs associated with increasing levels of reliability in the NEM. The appropriateness of the reliability standard and these trade-offs will be considered through this rule change. If the trade-offs are not effectively balanced then consumers will end up paying more or not have an appropriate level of reliability.

This options paper sets out three ways in which the procurement trigger for the RERT could be set, and the associated implications for the procurement volume. The Commission is interested in stakeholder feedback on these options. This will assist the Commission in considering whether the enhancements to the RERT are consistent with the broader reliability framework, and will contribute to the National Electricity Objective (NEO).

1.4 Scope of options paper

This options paper focuses on the options for how the RERT procurement trigger and procurement volume could be designed or specified.

Three options for the procurement trigger, along with the associated procurement volume and governance considerations, are presented for stakeholder consideration. The Commission is interested in stakeholder feedback on these matters in order to make a decision on these elements, prior to progressing to a draft determination.

As outlined in Figure 1.1 there are a number of elements to this rule change that are not addressed in this options paper. These elements are important aspects of the RERT framework, and will be explored in detail by the Commission in the draft determination. Stakeholders may wish to comment on how options for the procurement trigger and volume

4 And where relevant, power system security.

impact on these other design elements of the RERT. This feedback will be incorporated into the draft determination, which is due on 31 January 2019.

As can be seen below, the appropriateness of the reliability standard is in scope of this rule change. The Commission has outlined its approach to how it will consider this issue in the development of the draft determination (see chapter 4). There will be two key inputs that will be important in assisting the Commission consider the appropriateness of the reliability standard:

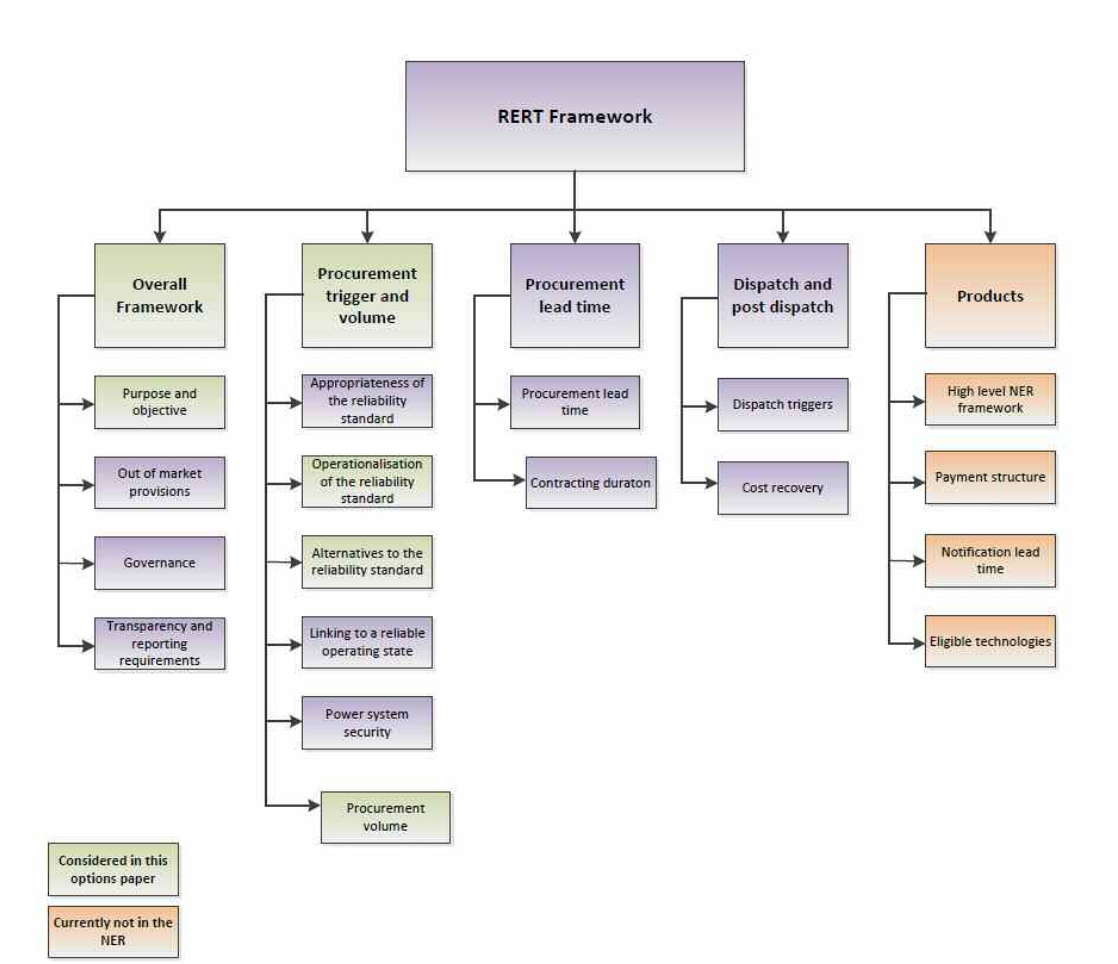
- Advice from the Reliability Panel - Given the role of the Reliability Panel in reviewing and providing advice on the reliability standard and settings to the AEMC every four years,[5] the Commission wrote to the Panel to seek its views on the appropriateness of the reliability standard as a procurement trigger for the RERT.[6] This advice was received on 28 September 2018. The letter requesting the advice as well as the advice itself can be found on the AEMC website.
- AEMO views on the current reliability standard - The Commission understands that AEMO is in the process of refining its views on the appropriateness of the reliability standard, including incorporating more recent analysis and information and considering how it works in the current environment where tail events are become more extreme. These views will be available in mid-November 2018. A stakeholder workshop on this rule change will be held in mid-November 2018 and will provide AEMO an opportunity to present to stakeholders, so that stakeholders can take account of AEMO's views when they submit to this option paper.

This paper sets out how the appropriateness of the reliability standard will be considered in this rule change going forward. The Commission's views on these matters will be set out in the draft determination, which is due on 31 January 2019, allowing the Commission to take into account the two inputs outlined above.

5 Clause 3.9.3A(d) of the NER.

6 If requested to do so by the AEMC, the Reliability Panel must provide advice to the AEMC in relation to the safety, security and reliability of the national electricity system: s 38(4) of the NEL.

Figure 1.1: Scope of rule change and this options paper



1.5 Rule change process and consultation to date

On 21 June 2018, the Commission published a notice under s.95 of the National Electricity Law (NEL) setting out its decision to commence the rule change process for this rule change request.

A consultation paper accompanied the notice.[7] The Commission received 25 submissions[8] in response to the consultation paper.[9]

On 4 September 2018, the Commission held a technical working group for this project, who provide advice and input into the progression of the rule change request. The technical working group is comprised of a broad range of industry stakeholders (generators, market participants, consumer groups, networks, retailers, major energy users and new technology providers). The technical working group discussed the purpose of the RERT and various procurement options, with its feedback being incorporated into this paper. Discussion notes from the first technical working group meeting are available on the AEMC website.

The next steps for this rule change process are outlined in the table below.

Table 1.1: Milestones for this project

MILESTONE	TIMETABLE
Rule change requests submitted - reinstatement of the long-notice RERT & enhancement to the RERT	9 March 2018
Consultation paper published for reinstatement of the long-notice RERT	26 April 2018
Close of submissions on the reinstatement of the long-notice RERT	31 May 2018
Final determination published - reinstatement of the long-notice RERT	21 June 2018
Consultation paper published for enhancement to the RERT	21 June 2018
Submissions close to consultation paper for the enhancement to the RERT	26 July 2018
Technical working group #1 meeting held[10]	4 September 2018
Publication of options paper	18 October 2018
Public workshop on the options paper & appropriateness of the reliability standard	TBC - mid November
Close of submissions on options paper	29 November 2018

7 AEMC 2018, Enhancement to the Reliability and Emergency Reserve Trader, Consultation Paper, 21 June 2018, Sydney

8 The Energy Users Association submitted a supplementary submission. One confidential supplementary submission was also received.

9 These submissions are available on the project page for this rule change at https://www.aemc.gov.au/rule-changes/enhancement-reliability-and-emergency-reserve-trader

A summary of the submissions to the consultation paper is available at: https://www.aemc.gov.au/news-centre/media-releases/summary-stakeholder-submissions-enhancement-rert-rule-change

10 Other technical working group meetings are expected but have not yet been scheduled.

MILESTONE	TIMETABLE
Draft rule determination	31 January 2019
Close of submissions on draft determination	14 March 2019
Final rule determination	25 April 2019

1.6 Submissions

Written submissions on the rule change request must be lodged with Commission by 29 November 2018 online via the Commission's website, www.aemc.gov.au, using the "lodge a submission" function and selecting the project reference code ERC0237.

The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated.

Where practicable, submissions should be prepared in accordance with the Commission's guidelines for making written submissions on rule change requests.[11] The Commission publishes all submissions on its website, subject to a claim of confidentiality.

All enquiries on this project should be addressed to Sarah-Jane Derby on (02) 8296 7823 or sarah.derby@aemc.gov.au.

1.7 Structure of the options paper

The structure of this options paper is as follows:

- Chapter 2 provide background information on the RERT
- Chapter 3 sets out the assessment framework for this rule change request
- Chapter 4 discusses the appropriateness of the reliability standard
- Chapter 5 details key design features of the RERT
- Chapter 6 outlines three options for the procurement trigger for the RERT.

11 This guideline is available on the Commission's website www.aemc.gov.au.

2 BACKGROUND

This chapter summarises background information to this rule change request to enhance the RERT framework.

2.1 Current arrangements for the RERT

2.1.1 What is the RERT?

Reliability in the NEM is largely driven through market participants responding to financial incentives and information provided about the need for resources. If the market fails to respond to the information AEMO's next step is generally to engage in informal negotiations with market participants to alleviate any supply shortfalls. Further, AEMO can use network support and control ancillary services to the extent that the projected reserve shortfall is affected by a network limitation that can be addressed by such services. If these options fail, the NER give AEMO the ability to use a number of intervention mechanisms to intervene more directly.

The RERT is one of three existing intervention mechanisms in the NEM.[12] The RERT allows AEMO to contract for reserves (generation or demand-side capacity that is not otherwise available to the market through any other arrangement). AEMO can use the RERT in the event that it determines that market participants are not expected to meet the reliability standard (i.e. when AEMO projects that unserved energy in a region is expected to be greater than 0.002 per cent of total energy demanded in that region) and, where practicable, to maintain power system security.

The RERT guidelines, which are reviewed and prepared by the Reliability Panel, specify three types of RERT based on how much time AEMO has to procure the RERT prior to the projected reserve shortfalls occurring:

- long-notice RERT - between ten weeks' and nine months' notice of a projected reserve shortfall
- medium-notice RERT - between ten weeks' and one week's notice of a projected reserve shortfall
- short-notice RERT - between seven days' and three hours' notice of a projected reserve shortfall

Typically, AEMO sets up a RERT panel of providers for both the medium-notice and short-notice RERT and only triggers the procurement contract when it has identified a potential shortfall and after seeking offers from RERT panel members.[13] There is no panel for the long-notice RERT; rather, contracts are signed following the close of a public tender process.

12 In addition to the RERT, if there is a risk to the secure or reliable operation of the power system, AEMO can use directions or instructions under NER clause 4.8.9 to: direct a generator to increase its output, if this is possible and can be done safely; or direct a large energy users, such as a large industrial user, to temporarily disconnect its load or reduce demand.

13 AEMO has the discretion to use a tender process in addition to using panel members in the case of the medium-notice RERT.

The NER provide the high-level framework within which AEMO may procure and dispatch the RERT,[14] including requiring AEMO to comply with:

- the RERT principles in the NER[15]
- the RERT guidelines which are made and published by the Reliability Panel[16]
- the procedures for the exercise of the RERT, which are made and published by AEMO.[17]

The RERT principles provide that:[18]

- actions taken should be those which AEMO reasonably expects, acting reasonably, to have the least distortionary effect on the operation of the market
- actions taken should aim to maximise the effectiveness of reserve contracts at the least cost to end use consumers of electricity.

The RERT guidelines, prepared by the Reliability Panel, provide additional guidance to AEMO on the RERT principles and to the cost effectiveness of the RERT. AEMO is required to take into account the RERT guidelines when exercising the RERT. The RERT guidelines specify what AEMO may take into account when it is determining whether to enter into contracts for the RERT (that is, in procuring the RERT) and in dispatching the RERT.

AEMO also publishes a procedure for the exercise of the RERT under clause 3.20.7(e) of the NER in accordance with the rules consultation procedures. This procedure takes into account the RERT principles and RERT guidelines. AEMO also makes and publishes an operating procedure for the dispatch and activation of reserve contract. AEMO's procedure for the exercise of the RERT document provides information on AEMO's procedures in relation to the RERT panel, the evaluation of tenders, procurement of the RERT, the publication of information and the activation/dispatch of the RERT.

2.1.2 Procurement trigger

Under the NER, AEMO may determine to enter into reserve contracts to make sure that the reliability of supply in a region meets the reliability standard for the region, and where practicable, to maintain power system security.[19]

In procuring the RERT, AEMO must consult with relevant jurisdictions with respect to its determination of whether to procure and how much to procure.[20]

Current procurement trigger provisions under the NER are discussed in more detail in Section 5.1.1

Operationalisation of the reliability standard

14 Rule 3.20 of the NER.
15 Clause 3.20.2(b) of the NER.
16 Clause 3.20.8 of the NER.
17 Clause 3.20.7(e) of the NER.
18 Clause 3.20.2(a)(3) and clause 3.20.2(b) of the NER.
19 Clause 3.20.3(b) of the NER.
20 Clause 3.20.3(c) of the NER.

AEMO operationalises the reliability standard through its *Reliability Standard Implementation Guidelines* (RSIG). The RSIG is not part of the RERT framework per se but is a core part of the reliability framework since it specifies how AEMO implements the reliability standard. As a result, the RSIG specifies how AEMO triggers the RERT in practice and in accordance with the NER.

Over the medium-term (i.e. from seven days ahead to nine months ahead), this is done through the medium-term Projected Assessment of System Adequacy (PASA). The RSIG states that AEMO identifies a breach of the reliability standard when it declares a low reserve condition (LRC)[21] i.e. when medium-term PASA probabilistically projects that expected unserved energy for a given year in a given region exceeds 0.002 per cent.

Over the short-term (seven-day ahead) to real time, the RSIG states that AEMO identifies a breach of the reliability standard when it declares a lack of reserve 2 (LOR2) or an LOR3 condition.[22] The methodology for calculating LORs is described in AEMO's reserve level declaration guidelines, which AEMO is required to update in accordance with the NER.[23]

The operationalisation of the reliability standard is discussed in detail in Section 4.4.1.

2.1.3 Procurement lead time and contracting period

Under the NER, AEMO must not enter into a reserve contract, or renegotiate, more than nine months prior to when AEMO reasonably expects the reserves to be needed.[24] The procurement lead time refers to the amount of time AEMO has to enter into contracts (i.e. procure the RERT) prior to the date that AEMO expects the reserves under the contract may be required to ensure reliability of supply, or maintain power system security. For example, a procurement lead time of up to nine months means that AEMO cannot enter into a reserve contract if the expected reserve shortfall is in a year's time. It can only enter into a reserve contract for a reserve shortfall expected to occur up to nine months ahead.

The contracting period refers to the duration of the reserve contract. Some contracts may last months, while others may only last for a few trading intervals. This is different from the procurement lead time. The NER do not prescribe a specific contract duration for reserve contracts; however, the procurement lead time specified in the NER acts as maximum limit on the duration of a reserve contract because AEMO is not permitted to enter into reserve contracts in respect of reserve shortfalls that are expected to occur outside that lead-time. As an example, if AEMO identifies shortfalls for the next two summers, it would not be able to sign a two-year reserve contract. Instead, it could only enter into reserve contracts in respect of reserve shortfalls that will occur within nine months of the entry into the contract.

21 In accordance with clause 4.8.4(a) of the NER.
22 In accordance with clause 4.8.4(b) of the NER.
23 Clause 4.8.4A of the NER.
24 Clause 3.20.3(d) of the NER.

2.1.4 Procurement volume

The NER do not prescribe the amount of reserves that AEMO should procure once it has identified a potential shortfall. In relation to reliability, the NER imply that AEMO can only procure so much as would be reasonably necessary to ensure the reliability standard is met (and where practicable, to maintain power system security).[25] However, the way that AEMO operationalises the standard may influence how much reserves it procures.

Reserve procurement volumes are discussed in more detail in Section 5.2.

2.1.5 Types of reserves

The NER specify that AEMO may enter into one or more contracts with any person in relation to the capacity of:[26]

- scheduled generating units, scheduled network services or scheduled loads (being scheduled reserve contracts)
- unscheduled reserves (being unscheduled reserve contracts).

As such, the NER do not have restrictions on the types of technologies[27] that can participate in the RERT.

2.1.6 Out-of-market provisions

To minimise distortions, reserves contracted under the RERT must not otherwise be available in the market. Under the NER, AEMO must not contract for scheduled reserves if such reserves are likely to be submitted or otherwise available for dispatch in the trading interval(s) to which the contract would relate.[28] The NER also specify that any reserve contracts entered into must contain a provision that the other party to the contract has not and will not otherwise offer the reserve which is the subject of the contract in the market for the trading intervals to which the contract relates (except in accordance with that contract).[29]

2.1.7 Direct costs of the RERT

The NER do not prescribe any types of costs or payment structure with respect to the RERT.

There are a number of direct costs associated with reserve contracts: [30]

- the operational and administrative costs of arranging contracts ("admin costs")
- the costs of being on stand-by, i.e. capacity payments such as availability payments ("availability costs") - this is typically a $/MW/year payment and not specific to one event

25 Clauses 3.20.2(a) and 3.20.2(b) of the NER.

26 Clause 3.20.3(a) of the NER.

27 The NER do not have any restrictions but some technologies may not be technically capable of participating in the RERT.

28 Clause 3.20.3(h) of the NER.

29 Clause 3.20.3(j) of the NER.

30 As noted above the NER do not prescribe any types of costs or payment structure with respect to the RERT.

This information in this section is based on the Commission's understanding of RERT contracts (which are confidential) and based on AEMO's event reports of the two RERT activations that occurred in 2017-18 summer (described in Section 2.4). AEMO, Summer 2017-18 operations review, available at: http://aemo.com.au/Electricity/National-Electricity-Market-NEM/Security-and-reliability/Summer-operations-report

- the costs of being on stand-by for a specific event, i.e. pre-activation payments for specific events ("pre-activation costs")
- the cost of the reserves themselves, e.g. usage/activation payments when the RERT is dispatched ("activation costs") - this is typically a $/MWh payment
- the costs associated with the intervention, i.e. impact of dispatching the RERT on participants ("compensation costs").

2.1.8 Payment structure and cost recovery

The NER do not prescribe any particular structure of payments under the reserve contracts. The NER require that RERT costs incurred by AEMO be met by fees imposed on market customers in the region where the RERT has been procured and/or dispatched.[31] Cost per market customer is proportional to energy consumption of that customer.[32] If reserves are required in multiple regions, cost sharing arrangements must be agreed between the regions and AEMO when entering the contracts.[33] Costs are recovered through usual weekly settlement processes.

2.1.9 Information provided to the market

Given that reserves are out-of-market, it is important that there is transparency in how the RERT is used. As soon as practicable after the RERT is dispatched, the NER require that AEMO publish a report detailing a number of things, including the circumstances giving rise to the need to dispatch reserves and the processes associated with such dispatch[34] The remainder of NER clause 3.20.6 requires AEMO to provide more information to the market, including reporting on the cost and recovery of the cost of the RERT. AEMO is also required to inform the market every time it enters into a new contract[35] and there are a series of market notices that it must publish in the lead up and during the activation/dispatch of the RERT.[36]

2.1.10 Activation/dispatch of the RERT

In the first instance, AEMO must determine the latest time for exercising the RERT and publish a notice of any foreseeable circumstances that may require implementation of the RERT.[37] Once such time has arrived, the NER state that AEMO may dispatch reserves to ensure that the reliability of supply meets the reliability standard, and where practicable, to maintain power system security.[38] AEMO must also take into account the RERT guidelines before dispatching the RERT.[39] Further, during periods of supply scarcity, AEMO must use its reasonable endeavours to act in accordance with the following sequence: dispatch all valid

31 Clause 3.15.9(a) of the NER.
32 Clause 3.15.9(e) of the NER.
33 Clause 3.20.3(f) of the NER.
34 Clause 3.20.6(a) of the NER.
35 In accordance with the RERT guidelines.
36 See Clauses 4.8.5, 4.8.5A, 4.8.5B of the NER.
37 Clause 4.8.5A and clause 4.8.5B of the NER.
38 Clause 3.20.7(a) of the NER.
39 Clause 3.20.7(f) of the NER.

dispatch bids and offers, then the exercise RERT and then implement directions and clause 4.8.9 instructions.[40]

If the RERT is dispatched, AEMO applies intervention pricing (also known as "what-if" pricing or "but-for" pricing) in all circumstances.

2.2 AEMO-ARENA demand response trial

On 19 May 2017 AEMO and ARENA announced a joint demand response pilot program for the NEM that involves the procurement of demand response reserves that would sit within the RERT framework (i.e. provide short-notice reserves). The program began on 1 December 2017 and will run for three years.

The program's aim is to trial a strategic reserve model (referencing international market designs) for reliability or emergency demand response, to inform future market design as well as contributing to reserves for summer.

ARENA will provide, over a period of three years, up to $22.5 million of funding for projects outside New South Wales, and ARENA together with the New South Wales Government (on a 50-50 basis) will provide up to $15 million of funding for New South Wales projects. Those demand response service providers that were successful through the ARENA funding process receive the ARENA capital-funding grant in the form of availability payments over three years and are required to sign onto the AEMO short-notice RERT panel and be available for short-notice RERT if requested. Providers will also receive usage payments of up to $1,000/MWh, if activated. If activated, the market would pay for the activation charges.

This program has delivered 141 MW in year 1, and will deliver 190 MW in year 2 and 202 MW in year 3, across New South Wales, Victoria, and South Australia. This capacity complements 226 MW of non-market generation and 741 MW of industrial demand response contracted by AEMO under the long-notice RERT arrangements for summer 2017-18.

The Commission understands that ARENA and AEMO are currently reviewing lessons learnt from last summer in order to modify their trials for the upcoming summer. For example, ARENA and AEMO are working together to review and develop additional baselines to reflect different load profiles and features. The intent is to develop some additional baselines to be captured in time for the second year of the trial.

2.3 Lessons from last summer

2.3.1 Use of the RERT last summer

A total of 1,141MW (867MW of demand response and 274MW of generation) was made available to AEMO under the RERT for summer 2017-18. The RERT was activated twice in Victoria, on 30 November 2017 and 19 January 2018, when reserve levels were forecast to reduce to a point that would trigger a lack of reserve (LOR) 2 declaration.[41]

40 Clause 3.8.14 of the NER.

41 AEMO, Summer 2017-18 operations review, p. 31.
In June 2018, following a number of LOR2 notices in New South Wales, AEMO entered into reserve contracts (i.e. it procured the RERT) on 7 June and again on 8 June. The RERT was not dispatched on either of those events

AEMO reported the following costs in relation to its RERT activities for the 2017-18 financial year[42] (most of which was incurred over the summer):[43]

- Availability payments: $27.03 million
- Pre-activation costs: $21.56 million
- Activation costs: $3.23 million
- Other costs (e.g. compensation costs): $0.17 million.

The total costs add up to $51.99 million for 2017-18. These costs were recovered from market customers (e.g. retailers) in Victoria and South Australia in accordance with NER clause 3.15.9.

In summary, AEMO's review of its summer operations for 2017-18 summer has concluded, in relation to RERT, that:[44]

- RERT was an effective tool at improving reserves across a range of time horizons.
- RERT providers were highly engaged, and communication between them and AEMO was efficient, which enabled sound decision-making in determining the requirement for, activation of, and subsequent deactivation of reserves.
- Training and onboarding processes for providers became smoother over time.
- Demand response resources trialled through the AEMO/ARENA pilot were effective, and performed to expectations. Ongoing assessment of these resources and their adequacy will continue over the next two summers.
- Using AEMO's deterministic approach to managing reserves, which was in place at the time of activation of RERT on 30 November 2017 and 19 January 2018, there were sufficient levels of RERT available to mitigate the risk of load shedding against the single largest credible risk determined at the time of peak demand.

Last summer was the first time procured RERT had been activated, and the first time more than one contract at a time had been entered into. AEMO noted it will work to improve communications around activation of reserves and verification of quantities of demand response.[45]

2.3.2 AER compliance

In the lead up to the summer of 2017-18, the AER flagged its expectations of market participants regarding compliance with a number of critical obligations under the NER. This was in preparation for a summer, which was forecast at times to have a lack of reserve to meet the reliability standard. The summer readiness content was accompanied by a checklist to assist market participants with their summer preparations.

42 This excludes costs, if any, that were incurred when AEMO contracted reserves on 7 and 8 June 2018 in NSW. The costs, if any, are not yet known.

43 AEMO, https://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/RERT-Update—-cost-of-RERT-2017-18.pdf

44 AEMO, *Summer 2017-18 operations review*, p. 31

45 AEMO, *Summer 2017-18 operations review*, p. 31

The messaging focussed on the provision of high quality and timely information to AEMO, but also discussed market ancillary services, generator performance standards and compliance with dispatch offers.

The AER will again release summer readiness commentary ahead of the 2018-19 summer. This is likely to include information around the RERT and medium-term projected assessment of system adequacy to account for recent policy changes in those areas.[46]

2.3.3 Summary

The events of last summer provided useful insights into operational issues regarding the RERT. This summer will also provide insights that are relevant to regulatory issues.

2.4 RERT for summer 2018-19

Recently, AEMO has sought expressions of interest for RERT Panel members in Tasmania, Queensland, NSW and the ACT who may be able to provide reserve energy on short and medium notice as part of a RERT Panel.

Further, in the recent ESOO AEMO noted that in consultation with the Victorian Government, AEMO is seeking to contract additional reserves under the RERT mechanism, to manage the projected risk in Victoria of the reliability standard not being met, and of loss of consumer load.

2.5 Overview of AEMO's rule change request to enhance the RERT

As noted above, AEMO submitted a rule change request to consider the broader RERT framework in light of:

- a growing proportion of variable renewable generation (on-grid and behind the meter)
- an aging fleet of thermal generation and
- unexpected retirement of capacity increasing risk of forced outages.

Within this context, AEMO considers there is a need for an enhanced RERT as a stronger safety net to mitigate against the risks associated with unanticipated shortfalls.

AEMO has identified three key issues with the current RERT framework, which are discussed in turn below.

The procurement lead time and contracting duration are too short

AEMO considers the current lead time on signing contracts for reserves has the potential to limit the availability, or increase the cost of reserves. It also notes that the procurement of RERT, and the associated costs (e.g. assessing tenders) represents a significant time commitment and cost, meaning that the inability to enter into longer-term agreements leads to inefficient procurement processes.[47] AEMO considers that the inability to enter into longer-

46 AER, *Quarterly Compliance Report: National Electricity and Gas Laws, 1 April - 30 June 2018,* available at: https://www.aer.gov.au/system/files/Quarterly%20Compliance%20Report%20-%20April%20to%20June%202018.PDF

47 AEMO, *Enhancement to the RERT, rule change request,* p.6

term agreements means potential resources, such as diesel gensets, may not be able to be procured in the most efficient way.[48] AEMO's recent experiences support the position that greater reserves could be made available at lower cost if greater certainty could be offered to potential reserve providers.[49]

AEMO notes that the ARENA trial process revealed that significant quantities of reserves are available, and that the volume of reserves increases and the unit costs decreases over time if a firm contract is available. Although AEMO could potentially negotiate ahead of signing a contract (as can be done under the current RERT framework), AEMO states that the lack of a firm commitment (i.e. that comes with signing a contract) may prevent these reserves from being made available.[50]

There is a lack of comprehensive risk assessment framework

AEMO considers that there is inconsistency between the operational objectives of the current RERT (meeting the reliability standard, which allows some load shedding in a financial year) and directions (maintaining a reliable operating state[51] which implies no load shedding).

AEMO is concerned that its market projections indicate a heightened risk of significant load shedding over upcoming summers. In particular, AEMO's modelling highlights a heightened risk of load shedding in 2018-19 and 2019-20 in Victoria and, potentially, South Australia, even when the projected unserved energy over a broad range of scenarios meets the reliability standard.[52]

AEMO also notes that jurisdictional governments are unwilling to tolerate load shedding and are intervening as a result (e.g. the Hornsdale Power Reserve battery in South Australia).[53]

Bespoke products are problematic

AEMO currently procures RERT through highly bespoke, negotiated contracts. AEMO states that this creates uncertainty for potential providers and makes it difficult for AEMO to compare offers, and is highly time consuming for all parties. AEMO notes that the ARENA trial, which offers standardised products, has shown strong and competitive offers from potential providers – this made the offers directly comparable.[54]

48 AEMO, *Enhancement to the RERT, rule change request,* p.6
49 AEMO, *Enhancement to the RERT, rule change request,* p.6
50 AEMO, *Enhancement to the RERT, rule change request,* p.6
51 See clauses 4.2.7 and 4.8.9 of the NER.
52 This commentary is consistent with the outcomes presented in AEMO's 2018 ESOO published on 23 August 2018.
53 AEMO, *Enhancement to the RERT, rule change request,* p.6
54 AEMO, Enhancement to the RERT, rule change request, p.6-7

3 ASSESSMENT FRAMEWORK

The Commission's assessment of this rule change request must consider whether the proposed rule promotes the National Electricity Objective (NEO).

3.1 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 NEO.[55] This is the decision making framework that the Commission must apply.

The NEO is:[56]

> To promote efficient investment in, and efficient operation and use of, electricity services for the longer 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.

In the consultation paper the Commission identified that the relevant aspects of the NEO are the efficient investment in, and efficient operation and use of electricity services with respect to the price and reliability of supply of electricity, and reliability of the national electricity system because:

- The RERT is one of the intervention mechanisms available to AEMO primarily to manage reliability of the power system in the event that the power system is not expected to meet the reliability standard.
- The direct costs of the RERT are passed on to market customers (e.g. retailers) in the region where the RERT was used, and ultimately recovered from consumers. This means that the RERT has an impact on prices, while the indirect costs such as market distortions also have implications for reliability and prices.

3.2 Assessment principles

In the consultation paper the Commission proposes to consider whether or not the rule change improves the efficiency of the RERT process and reliability of the power system.[57] In particular, it will consider the following principles:

- **Promoting reliability of the power system:** A reliable power system is a crucial part of the energy market and the long-term interest of consumers. The Commission will have regard to the potential benefits to reliability brought about by the proposed rule change.
- **Minimising direct costs:** The RERT carries direct costs in terms of availability and activation payments, administrative costs, as well as compensation costs.

55 Section 88 of the NEL.
56 Section 7 of the NEL.
57 Section 88 of the NEL.

- **Minimising market distortions:** Minimising distortions on market participants (i.e. market distortions) is important in order to minimise indirect costs, which could be substantial. The Commission will have regard to the distortionary impact of the proposed solution.

Based on stakeholder feedback to the consultation paper and further consideration by the Commission, the Commission also proposes the following additional principles:[58]

- **Improving transparency:** Transparency of the RERT framework, procurement and activation decisions, as well as costs is crucial to underpin market participants' understanding of how the RERT is used and to inform he decisions that they make.
- **Efficient risk allocation:** It is important that the risks associated with the provision of resources and the cost of load shedding are being allocated appropriately to those who are best placed to manage those risks. This will serve to reduce overall costs (by allowing risks to be better managed) and reduce the risk to consumers.

These additional principles could be considered sub-categories of the three outlined in the consultation paper. For example, a lack of transparency could result in an increase in market distortions, while efficient risk allocation should result in lower costs. Nevertheless, the Commission considers it valuable to explicitly consider these additional principles separately.

Stakeholders also suggested a number of other principles or considerations. The rationale for not including them explicitly is outlined below:

- The assessment framework should result in a least cost pathway to meeting the reliability standard[59] – this proposal pre-supposes that meeting the reliability standard effectively minimises the combined cost of reliable electricity and the cost of unserved energy. As part of this rule change we are considering whether this is the case, whether the reliability standard should not be the benchmark for some RERT related decisions, or whether changes are required to the reliability standard to better minimise these combined costs, but this not a principle in and of itself.
- Consideration of institutional responsibilities, particularly between AEMO and the Reliability Panel[60] - the Commission agrees this is important, and will consider how institutional arrangements can be improved to better meet the principles outlined above; however, this is not a principle in and of itself.
- Promoting efficient investment and the resources required to ensure that the market can meet its reliability objectives at all times should be considered[61] - this is captured by the principle of promoting reliability of the power system, as outlined above.

58 For example, the EUAA "support greater oversight and transparency around the whole RERT process". EUAA, submission to the consultation paper, p.5.

59 EUAA, *submission to the consultation paper*, p. 4.

60 AEC, submission to the consultation paper, p. 2.

61 Meridian, submission to the consultation paper, p.2.

4 APPROPRIATENESS OF THE RELIABILITY STANDARD

This chapter discusses the appropriateness of the reliability standard and how this will be considered in this rule change request.

4.1 What is the reliability standard?

The reliability standard (for generation and inter-regional transmission elements) is the maximum expected unserved energy (USE) in a region for a given financial year as a share of total energy demanded in that region. In general terms, 'unserved energy' means the amount of customer demand that cannot be supplied within a region of the NEM due to a shortage of generation or interconnector capacity.[62]

The standard has three main aspects: form, level and scope:

- The *form* of the standard is the method by which reliability is measured. The NEM standard is an output-based measure expressed in terms of 'unserved energy'. This is also an expression of risk - the level of electricity at risk of not being supplied to consumers in any region.
- The *level* of the standard specifies how much USE is acceptable as a percentage of annual demand. The level is currently set at 0.002 per cent USE.
- The *scope* of the standard defines what does and does not count towards the NEM's reliability performance. In terms of the electricity supply chain, the standard currently includes generation and bulk transmission capacity and excludes distribution networks. In terms of events, the standard currently excludes power system security incidents.

Crucially, this is not set at zero per cent. The current reliability standard is 0.002 per cent expected unserved energy and is defined in the NER.[63] In simple terms, the reliability standard requires there be sufficient generation and transmission interconnection in a region such that at least 99.998 per cent of forecast total energy demand in a financial year is expected to be supplied.

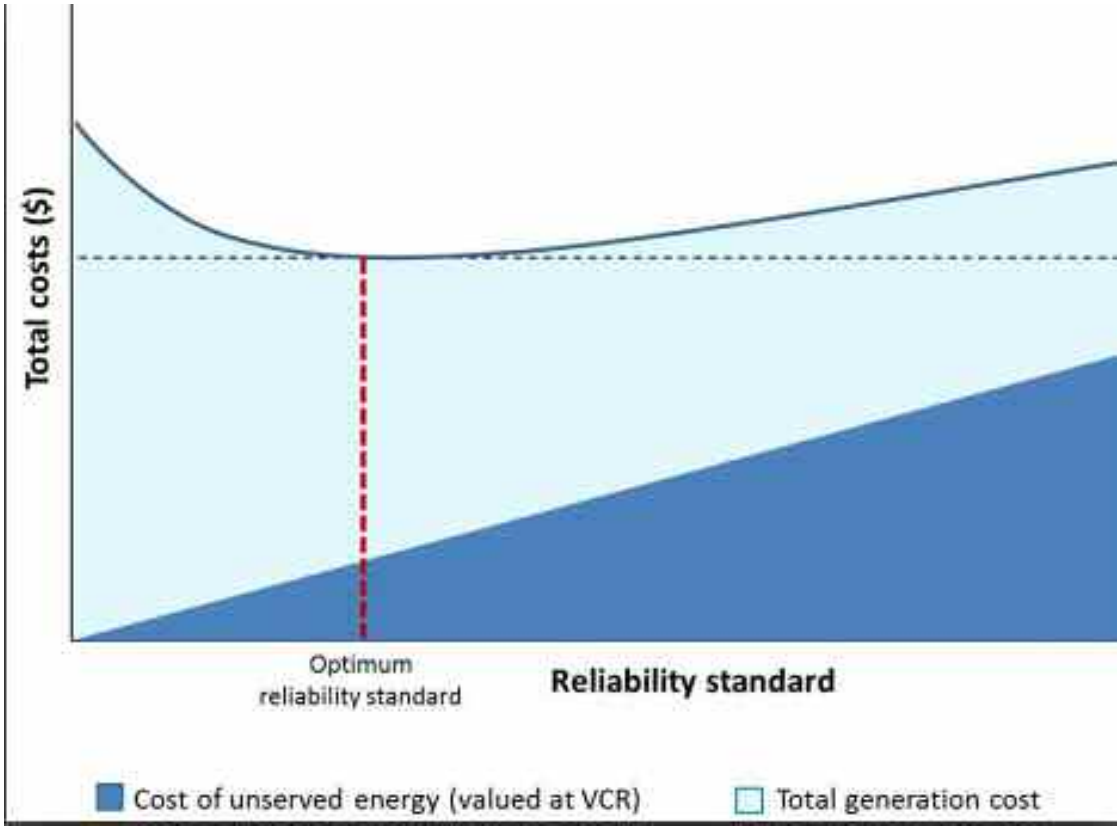
Setting the level of the reliability standard involves a trade-off between the prices paid for electricity and the cost of not having energy when it is needed. Increasing the levels of reliability means increased costs. Assessing this trade-off is important, and is frequently informed by the value of customer reliability - how much are customer's willing to pay for a reliable supply. Consumers would not be willing to pay for a 100 per cent reliable system, since such a system would also be very costly.

The market is optimised, from a theoretical perspective, when the reliability standard corresponds to the minimum combined cost of generation and unserved energy. A conceptual representation of this relationship is provided in Figure 4.1.

62 See also the definition of unserved energy in Chapter 10 of the NER.

63 See clause 3.9.3C(a) of the NER.

Figure 4.1: Assessment of the reliability standard



Source: ROAM Consulting, Reliability Standard and Settings Review, Final Report to AEMC, 21 May 2014, p. 12.

This diagram is somewhat simplified, as it assumes that the cost of unserved energy rises linearly as the reliability standard increases, based on a fixed value of consumer reliability. In reality, the value of consumer reliability (VCR) is not fixed, but instead varies due to a wide range of factors including:

- individual consumer preferences
- the time of day, weather and other conditions
- the length of time over which unserved energy occurs (e.g., the cost of a 60 minute outage is likely to be greater than 60 times the cost of a one minute outage).

BOX 1: VALUE OF CUSTOMER RELIABILITY

The value of customer reliability plays an important role in deciding and delivering a range of standards, settings and other policy parameters in the NEM, including the reliability standard and settings. To date, VCRs have only been estimated a limited number of times, with no single body responsible for determining VCRs. This has led to variations in both the

methodology and the resulting VCRs in previous estimations.

On 5 July 2018, the Commission made a final rule to make the AER responsible for calculating VCR estimates. This rule requires AER to develop a VCR methodology, and calculate the first VCR estimates under that methodology by 31 December 2019.

It should also be noted that reliability-related load shedding can be done in a controlled manner. For example, typically load is shed via switching off a "feeder". Feeders are typically switched off for approximately 45 minutes and so allow rotation of those areas or consumers that have experienced load shedding over time. This allows for the cost of load shedding to be minimised, for example by:

- load shedding those consumers who place a lower value on reliability
- rotating load shedding, so that no individual consumer is load shed for a long period of time.

BOX 2: HISTORY OF THE RELIABILITY STANDARD

Prior to the commencement of the NEM in 1998, each jurisdiction established its own standards for reliability and applied these in decisions relating to the installation of new generation capacity. Long-standing practice had generally been to manage the number of times interruptions to supply were likely. However, the measures adopted to achieve this varied between jurisdictions; from statistical indicators that focussed on achieving a particular loss of load probability (NSW and Victoria) to capacity margins calculated on the basis of the capacity of the largest one, two or three generating units.

In 1998, the National Electricity Code Administrator's (NECA's) Reliability Panel conducted a review to determine the power system reliability standards to apply in the new NEM. The Panel proposed that the "regional percentage demand equivalent of a maximum of 1GWh, expressed as percentage of regional demand be adopted as the standard". The Panel determined that the reliability standard in the NEM would be set at a maximum of 0.002 per cent of unserved energy in any region over the long-term.

There is some anecdotal evidence that the level of the reliability standard was derived from the value of customer reliability, cost of additional capacity and the minimum reserve level that should be held at any time (i.e. the size of the largest credible contingency event), as well as the value of customer reliability.

The level or form of the reliability standard has not been changed since market start. Over the years, the timeframe and governance of the reliability standards and settings has changed e.g. the standard has moved from being "over the long-term" to "10 years" to the existing "a given financial year".

4.2 Governance of the reliability standard

4.2.1 The NER

The reliability standard, both the form (expected unserved energy per region per year) and the level (0.002 per cent), is in the NER.[64] As a result, any party may submit a rule change request to change it. Furthermore, the definition of what is counted towards unserved energy and what is not is also prescribed in the NER,[65] noting that in practice, wholesale-level reliability events count towards unserved energy while loss of load from any other event (e.g. from a system security event) does not.

4.2.2 The Reliability Panel

The NER require the Reliability Panel to review and provide advice on the reliability standard and settings to the AEMC every four years.[66] The NER also require the Panel to publish guidelines to explain how it will review the reliability standards and settings - the Panel may amend these guidelines from time to time using the rules consultation procedures.[67]

If the Panel recommends changes to the reliability standard, then it would submit a rule change request to the Commission to change the NER.[68]

4.2.3 AEMO

AEMO is responsible for operationalising the reliability standard through the Reliability Standard Implementation Guidelines (RSIG).[69] Amending the RSIG is subject to the rules consultation procedures, which requires AEMO to undertake two rounds of public consultation before amending the guidelines, as well as consulting with the Reliability Panel.[70] The NER also provides a high-level guidance as to how AEMO should operationalise the reliability standard over the short-term - this is explained in more detail in Section 4.4.

4.3 Interaction between the reliability standard and reliability settings

The reliability settings protect the long-term integrity of the market by limiting the extent to which wholesale prices can rise and fall, to limit market participants' exposure to prices that could threaten the financial viability of a prudent market participant. They are set to allow investment sufficient to achieve the reliability standard. The settings comprise:

- the market price cap, which imposes an upper limit on temporary high prices in the wholesale market
- the cumulative price threshold, which imposes a limit on sustained high prices in the wholesale market

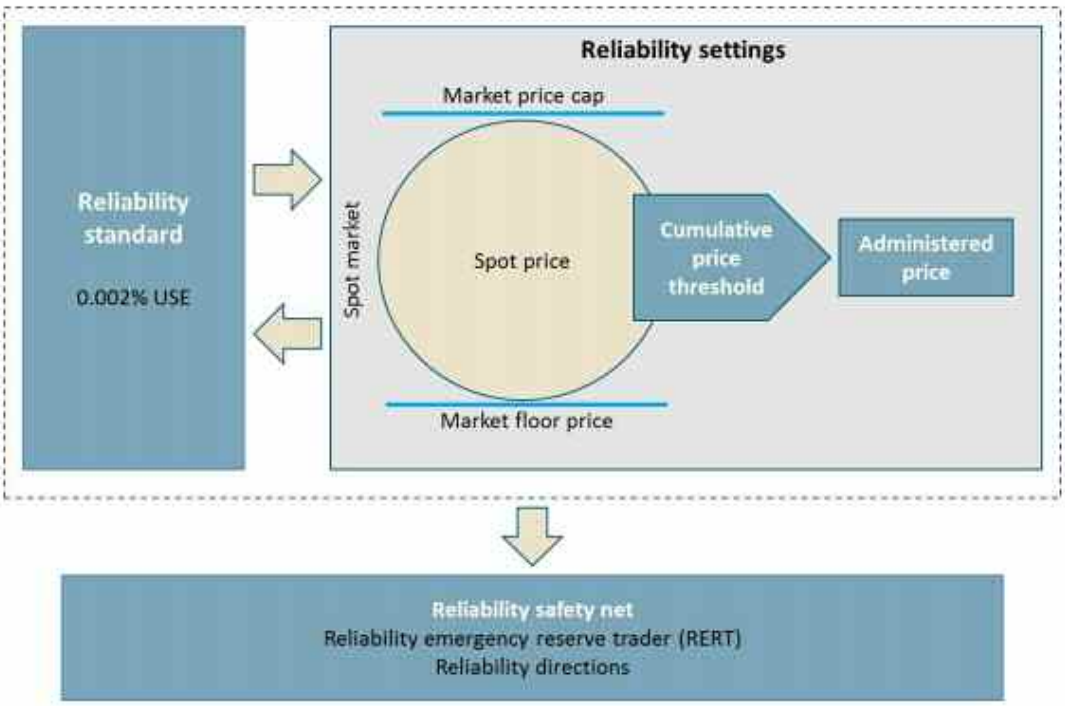
64 Clause 3.9.3C (a) of the NER as well as chapter 10 of the NER.
65 Clause 3.9.3C (b) of the NER.
66 Clause 3.9.3A(d) of the NER.
67 Clause 3.9.3A(a) to (c) of the NER.
68 Clause 3.9.3A(i) of the NER.
69 Clause 3.9.3D of the NER.
70 Clause 3.9.3D(c) and rule 8.9 of the NER.

- the administered price cap, which is the 'default' price cap that applies when the cumulative price threshold is exceeded
- the market floor price, which imposes a negative limit on prices in the wholesale market

The reliability standard and reliability settings are interrelated. For example, an increase in the level of the reliability standard (such as tightening the standard to a higher level of reliability of, say, 0.001 per cent of USE) may require a corresponding increase in the level of MPC, or some other form of generation remuneration, to signal the appropriate level of generation capacity and demand-side response to deliver the higher standard. Depending on the effectiveness of that pricing signal to investors, there could potentially be reliability shortfalls, which may adversely impact on electricity customers.

This interrelationship between the NEM reliability standard and reliability settings, and the two intervention mechanisms, is depicted diagrammatically in the figure below.

Figure 4.2: NEM reliability standard and reliability settings



4.4 Operationalising the Reliability Standard

While AEMO provides information to the market based on, and operates the system with reference to the 0.002 per cent standard, in the short term AEMO pursues a 0 per cent target. That is, in its day-to day-operation of the power system AEMO seeks to 'clear the

market' such that no demand goes unserved. The 0.002 per cent of unmet demand is expected to arise from contingencies such as unplanned outages.

In practice, further clarity with regard to how AEMO interprets the reliability standard is provided in AEMO's Reliability Standard Implementation Guidelines (RSIG). The RSIG specify how AEMO triggers the RERT in practice and in accordance with the NER.

Under the RSIG, how AEMO triggers the RERT differs depending on how far it is in advance of real time.

4.4.1 Medium-term

Over the medium-term (i.e. from seven days ahead to nine months ahead[71]), the RSIG states that AEMO identifies a breach of the reliability standard when it declares a low reserve condition (LRC).[72] This is determined when AEMO's medium-term Projected Assessment of System Adequacy (PASA) probabilistically projects that expected unserved energy for a given year in a given region exceeds 0.002 per cent.

AEMO projects the expected value of unserved energy by:[73]

- carrying out a number of iterations of power system simulation runs for 10 per cent probability of exceedance (POE)[74] demand and 50POE demand[75]
- averaging (i.e. taking the mean) all unserved energy outcomes in 10POE runs and repeating this for 50POE runs
- weighting the average (i.e. the mean) 10POE outcomes and average 50POE outcomes 30 per cent and 70 per cent respectively to obtain an expected value, i.e. what AEMO defines as expected USE.

This expected unserved energy value is an annual value. AEMO repeats this analysis for the two-year horizon - but reports annual USE separately. If the annual expected USE value as determined through the process above is more than 0.002 per cent in a given region then AEMO declares a low reserve condition (LRC) to inform the market that it has projected USE in excess of the reliability standard.[76]

In other words, the reliability standard is operationalised by AEMO as an annual expected USE – so if the current forecast of annual expected USE is less than 0.002 per cent for a given region, then the reliability standard is said to be met.[77]

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71 AEMO is prohibited from purchasing reserves greater than nine months ahead of real time under clause 3.20.3(d) of the NER.

72 In accordance with clause 4.8.4(a) of the NER.

73 In accordance with clause 3.7.2 of the NER and the RSIG.

74 A POE shows the probability that a value will be exceeded It is usually abbreviated to POE. For example, 10 per cent probability of exceedance is referred to simply as 10POE. For example, if 10POE demand is, say, 9,000 MW, this implies that there is a 10% probability that demand is higher than 9,000 MW. Another way of putting this is that demand may be higher than 9,000 MW one every 10 years.

75 Similarly, if 50POE demand is 7,000 MW, this means that there is a 50% probability that demand is higher than 7,000 MW - or a one-in-two year occurrence.

76 This is relevant as monitoring LRCs is one of the actions that AEMO may take in relation to the RERT according to the RERT guidelines and RERT procedures. The RSIG also state that AEMO will use an LRC to decide whether to intervene under clause 4.8.9 (directions) or rule 3.20 (RERT) of the NER.

77 In accordance with clause 4.8.4(a) of the NER.

Using this approach there is a clear, mathematic link between the reliability standard as defined in the NER process for determining whether the reliability standard is being met.

4.4.2 Short-term

In the pre-dispatch (a day ahead) and short-term PASA (seven days ahead) timeframes, AEMO operationalises the reliability standard through lack of reserve (LOR) declarations in accordance with AEMO's Reserve Level Declaration Guidelines which AEMO is required to update in accordance with the NER.[78]

AEMO identifies that reserves are running low if reserves available in the market fall below the required reserve level as determined by the LOR methodology.[79] The required level relevant to the RERT is called an LOR2.[80] This is calculated as follows:[81]

- As a minimum, the LOR2 reserve level is the largest identified credible contingency event, typically the loss of the largest generating unit in a region
- However, AEMO then applies a forecasting uncertainty measure (FUM) to this minimum level in order to account for forecasting errors such as wind or demand forecast errors. If the FUM is larger than the largest credible contingency event, then the FUM sets the LOR2 reserve level.

In simple terms, the forecast volume of reserves (i.e. the forecast excess of supply over demand) in the market must be equal to or more than the LOR2 reserve level in order for AEMO to procure the reserves.

To be clear, there is no mathematical link between the LOR framework and the reliability standard, although under the RSIG, AEMO makes the assumption that if a period of LRC or LOR is identified, then there is a risk that the reliability standard may be breached. A potential reason for this is the inherent difficulties which arise from trying to assess an annual reliability standard over timeframes far shorter than a year.

4.5 Appropriateness of the reliability standard

AEMO notes in its rule change request that the reliability standard may no longer be appropriate given changing system conditions, in particular, a more peaky system and one with more common extreme weather events. It also states that community expectations have shifted so that jurisdictional governments are unwilling to tolerate load shedding and are intervening themselves directly in the market as a result.

In its rule change request, AEMO did not propose a specific solution to the issue that it raised with the procurement trigger. Instead, it stated that it wished to have a trigger that takes into account a broader risk assessment, which would include the risk of unserved energy, not just

78 Clause 4.8.4A of the NER.

79 In accordance with Clause 4.8.4(b) of the NER. For more information, see AEMO's reserve level declaration guidelines.

80 This is the relevant level as monitoring LOR2s is one of the actions that AEMO may take in relation to the RERT according to the RERT guidelines and RERT procedures. The RSIG also state that AEMO will use an LOR2 to decide whether to intervene under clause 4.8.9 (directions) or rule 3.20 (RERT) of the NER.

81 See AEMO's reserve level declaration guidelines are available at https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Consultation-on-initial-version-of-Reserve-Level-Declaration-Guidelines

the expected value of unserved energy. AEMO has subsequently, in its submission to the consultation paper, clarified its position that the procurement trigger should be removed and be substituted with a broad risk assessment.

AEMO has also noted previously that it does not consider the reliability standard is appropriate in the face of an increasingly 'peaky' supply-demand balance and that it will work with the Reliability Panel in considering this.

BOX 3: RELIABILITY STANDARD AND PEAKY SUPPLY

The reliability standard does take account of an increasingly "peaky" supply-demand balance. As described in Section 4.3.1, when AEMO operationalises the reliability standard through the PASA process within the RSIG, it carries out a number of simulations of the power system. As part of these simulations it uses various forecasts for supply and demand. An increasingly "peaky" supply-demand balance is therefore captured as part of those simulations via the forecasts AEMO uses for supply and demand. All else equal, an increased peakiness might be expected to result in an increased forecast USE, which may result in the reliability standard not being met.

It is also important to note that the market price cap (MPC) is also set through a process of simulations of the power system which take account of forecasts of supply and demand. To the extent that forecast are for a "peakier" supply-demand balance, this would indicate that a higher market price cap is required to deliver the same level of USE (all else equal). This is because generation to serve the peak is only required for a short amount of the time, and generators must therefore recover its fixed costs over this shorter time through higher prices. The Reliability Panel has recently undertaken a process to determine the MPC, which has taken account of both the peakiness of the supply and demand balance and also many other factors. It concluded that no change (in real dollars) is required to the MPC to deliver the reliability standard, despite the possible increased peakiness of the supply-demand balance.

Note: See AEMC's website: https://www.aemc.gov.au/markets-reviews-advice/reliability-standard-and-settings-review-2018

Given this, and the fact that the reliability standard is the current trigger for the RERT, the appropriateness of the reliability standard is an issue within scope of this rule change request.

The issue is not considered in-depth in this paper, nor does it set out the Commission's views on the appropriateness of the reliability standard. However, it does set out how the Commission is approaching considering this issue, in consultation with AEMO and the Reliability Panel.

4.5.1 The Reliability Panel is providing advice

The Reliability Panel has a number of responsibilities that are related to this rule change request, specifically:

- under the NER the Panel has an ongoing and periodic obligation to review and provide advice on the reliability standards and settings to the AEMC every four years, with its most recent review of the reliability standards and settings published in April 2018[82]
- in reviewing the standard and settings, the Panel must comply with a Reliability Standard and Settings Guideline, which it prepares, the most recent of which was published in December 2016 with this version guiding the recent review of the standards and settings[83]
- the Panel is also required under the NER to develop and publish guidelines that provide guidance for AEMO in its operation for the RERT.[84]

Given the role of the Panel, the Commission wrote to seek the Panel's views on the appropriateness of the reliability standard as a procurement trigger for the RERT.[85] In particular, the Commission requested that the Panel draw on previous work that relates to this rule change request as identified above, informed by its expert views, and present views back to the Commission on:

- whether the reliability standard i.e. 0.002 per cent unserved energy remains appropriate for the NEM
- whether there was any evidence in the recent review of the reliability standard and settings that the standard may need to be tightened, in some or all conditions, to meet community expectations, including any stakeholder submissions on this point
- the potential costs and benefits arising from any tightening of the reliability standard
- whether the Panel considered a different metric to the reliability standard (i.e. a metric that is different from unserved energy per region per year) as part of its analysis and any views on its appropriateness
- the implications that might arise if the RERT's procurement trigger was delinked from the reliability standard and what implications this may have for the reliability settings.

The advice was provided to the Commission on 28 September 2018. Both the request for advice and the advice itself can be found on the Commission's website.

The Panel's views are summarised below.

Whether the reliability standard i.e. 0.002 per cent unserved energy remains appropriate for the NEM

The Panel acknowledged the reliability standard is "a crucial market standard". The Panel reitrerated its recommendation from its 2018 review of the reliability standard and settings:[86]

"the materiality threshold for reassessing the level of the reliability standard has not been met at this time for the following key reasons:

- the absence of any change in AEMO's value of customer reliability measure

82 Clause 3.9.3A(d) of the NER.
83 Clause 3.9.3A(e) of the NER.
84 Clause 3.20.8 of the NER.
85 In accordance with section 38(4) of the NEL.
86 Reliability Panel, *2018 Reliability standard and settings review, final report*, p. 13

- changes in the way consumers use electricity do not suggest they are markedly less reliant on grid-supplied electricity
- other factors such as changes in the costs of new entrant generation since 2014 and the benefits of predictability and stability."

The Panel noted that "nothing has changed in relation to these factors since the Panel made its final determination, and so there is no new evidence for the Panel to consider in order to change its earlier views that the current reliability standard is still appropriate".[87]

However, the Panel acknowledged that "the NEM is transforming, and these materiality criteria may be met in the future".[88] In this regard, the Panel noted that:[89]

- "the AER must publish the results of a VCR study by end of 2019. It is likely that these new VCRs will be different to the previous values that were used in the market. This could therefore be a trigger for the Panel to consider a future reassessment of the reliability standard at or prior to the next four yearly review, particularly, if the study reveals material changes in the value of customer reliability.
- the Panel will also continue to monitor emerging trends and uncertainties that bear on the effectiveness of the reliability standard and settings and which may affect the other two limbs of the materiality threshold to warrant reassessing the reliability settings."

Evidence that the standard may need to be tightened, in some or all conditions, to meet community expectations, including stakeholder submissions on this point

The Panel restated its findings from its *2018 Reliability standard and settings review*, "notwithstanding the current level of the standard, EY modelling [conducted for the Panel's review] forecasts the system will provide a level of reliability significantly better than then 0.002 per cent reliability standard in all national electricity market regions, for the review period".[90]

The Panel reported that "submissions received during the consultation process for the 2018 review considered the current level of standard was appropriate.[91] All of the submissions that commented on this issue supported keeping the reliability standard at its current level" i.e. none suggested changing the level.[92]

Potential costs and benefits arising from the tightening of the reliability standard

87 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change,* p. 2

88 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 3.

89 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 3.

90 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 3.
The Panel notes that the unserved energy outcomes presented by AEMO in its 2017 and 2018 Electricity Statement of Opportunities (ESOO) were higher than the unserved energy outcomes forecast by EY. It is important to note that the rationales that underpin these two models are different (as are the accompanying assumptions and sensitivities) so different results are unsurprising.

91 Submissions from EnergyAustralia, Engie, PIAC, ERM Power, Snowy Hydro, EUAA and Origin all supported retaining the current level of the reliability standard.

92 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 4.

The modelling conducted for the 2018 Reliability standard and settings review provided an estimate of the indicative costs associated with tightening the reliability standard. The Panel noted:[93]

"The modelling indicated that the expected unserved energy under the base scenario conditions in Victoria was very low at around 0.0000003 per cent in 2020-21. EY indicated that reducing this already low level of expected unserved energy to zero would require an additional 1,000 MW of capacity to be in place in Victoria in 2021-21. The additional cost of moving to (close to) zero expected unserved energy under the base scenario would increase wholesale energy costs by nearly 7 per cent ($200 million per annum) in that region, as measured against current market outcomes in Victoria."

Consideration of different metrics for the reliability standard

Alternative metrics for the reliability standard were not considered by the Panel in the 2018 Reliability standard and settings review.[94]

However, other metrics such as loss os load probability, were considered in the preparation of the 2016 Guidelines that guide the Panel's work on these matters.

As noted in its advice, in 2016 the Panel concluded that the form of the standard should be retained as USE and that it should not be automatically reassessed at each review, for the following reasons:[95]

- "Firstly, the NEM is an energy only market, with no separate market to incentivise investment in capacity. The Panel considers that the best way to determine if there has been sufficient capacity investment to meet customer demand is to measure the extent to which all customer demand has been met. A volumetric measure of energy demand met, such as USE, provides an optimal measure of the relative effectiveness of the NEM to meet customer demand.
- There are benefits in retaining the same form of standard to provide a level of certainty and stability to market participants and USE has been used for the reliability standard since market start. Maintaining the status quo has no inherent value, although a perception that it may be subject to regular change could create market uncertainty, potentially increasing the cost of investment. In the absence of any clearly identifiable benefit of changing the form of the standard, however, and given the limitations of each of the alternative types of measures, the Panel considers that these costs are not justified.
- Finally, the Panel remains satisfied that the form of the standard should remain defined as a probabilistic target for the purposes of system planning, defined as the maximum expected unserved energy. This measure of expected unserved energy is very important, as it recognises that there are many factors that may impact on the level of USE in a given year, with very different probabilities attached to each. A measure of reliability like

93 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change,* p. 4.

94 The 2016 guidelines establish that the form of the reliability standard should be retained as unserved energy and should not be assessed at each reliability standard and settings review.

95 Reliability Panel, 2016, *Review of the reliability standard and settings guidelines*, final determination, p. 22

expected USE recognises that in any given year, there is a risk that outlier events could result in the standard not being met."

Although the above considerations were made in 2016, the Panel acknowledged that:[96]

"Nothing material has changed that would necessitate further consideration of the reliability standard. If there are concerns that the reliability standard is not appropriate in the face of an increasingly peaky supply-demand balance, then the inputs and assumptions in operationalising the reliability standard may need to be reassessed rather than the standard itself. The Panel will continue to monitor system and market trends to confirm that the above conclusions remain valid."

Implications that might arise if the RERT's procurement trigger was delinked from the reliability standard

The Panel considered that "the market price settings and the reliability standard are well integrated and encourages the Commission to maintain that integration. In other words, the Panel does not consider that the RERT's procurement trigger should be delinked from the reliability standard – at least in the long-term".[97]

The Panel elaborated:[98]

"Delinking the procurement trigger from the reliability standard would effectively create a separate standard. Imposing another standard that only relates to procurement of the RERT could distort investment signals. This would be problematic given the current frameworks for reliability in the NEM. So, the Panel would advise against delinking the RERT's procurement trigger from the reliability standard in the NEM, particularly in relation to the long-notice and medium-notice RERT (reserves procured up to nine months, and up to ten weeks, respectively, in advance).

In relation to the short-notice RERT (reserves procured up to ten days in advance), the Panel considers it less clear whether or not the procurement of the reserves should be linked to the reliability standard."

4.5.2 AEMO's views

The Commission understands that AEMO is in the process of refining its views on the appropriateness of the reliability standard, including incorporating more recent analysis and information and considering how it works in the current environment where tail events are become more extreme. These views will be available in mid-November. This will be an important input into the consideration of this issue through this rule change request. The workshop to be held in mid-November will provide AEMO an opportunity to present these to stakeholders, so that stakeholders can take account of this when they submit to this option paper.

96 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 6.
97 Panel, 2018, Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change, p. 6.
98 Panel, 2018, *Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change*, p. 6.

4.5.3 Next steps

In order to consider the appropriateness of the reliability standard the Commission will adopt the following approach:

1. Review the Panel's advice on its view on the appropriateness of the reliability standard.
2. Review AEMO's views on this matter.
3. Discuss these views with the technical working group for this review.
4. Consider how giving effect to these views may necessitate changes to the existing reliability standard framework, including the RERT and the associated time and cost that this would take to achieve.
5. Taking all of the above into account, consider whether or not the reliability standard is fit for purpose.
6. Present these views for stakeholder consultation in a workshop as well as the draft determination for this rule change request.

> QUESTION 1: APPROPRIATENESS OF THE RELIABILITY STANDARD
>
> Do stakeholders agree with our approach as to how the appropriateness of the reliability standard will be considered?

5 RERT KEY DESIGN FEATURES

There are numerous design features of the RERT which are in scope of this rule change process, including:

- procurement trigger – whether and on what basis should reserves be procured, including the appropriateness of the reliability standard as being a trigger for the RERT
- procurement volume – how to determine how much reserves should be procured
- procurement process – the process by which reserves are procured (e.g., auctions, tenders)
- procurement lead time – should there be a limit on how far in advance reserves can be procured ahead of real time, and if so, what should that limit be
- contract duration – whether there should be a limit on the tenure of reserve contracts
- reserve product and contract design:
  - whether reserve contracts should be bespoke or standardised, and if standardised, in what manner
  - whether any restrictions should be put in place on particular technologies
  - payment structure – for example, whether there should be limitations on fixed payments under the contract
- out-of-market provisions – whether and how to limit the procurement of reserves from providers who are otherwise "out of the market" (e.g., not participating in the energy market)
- dispatch triggers – on what basis should pre-procured reserves be dispatched
- cost recovery – on what basis should the costs related to the RERT be recovered
- transparency arrangements – information provision requirements to market participants, AER and other interested stakeholders.

This options paper considers options regarding the first two of these design features: procurement trigger and procurement volume. The Commission has decided to consult on these two design features but not the others at this point in time because it considers that:

- the procurement trigger and procurement volume are related to one another, such that the design of one is likely to impact the design of the other
- most of the other design features flow from the approach chosen for the procurement volume and procurement - it is therefore important to consider these features first, before considering the above features.

The other design features will be considered and consulted upon separately by the Commission when it releases its draft determination.

A more detailed discussion of procurement trigger and procurement volume, including the current arrangements and possible problems with those arrangements, is provided below.

5.1 Procurement trigger

The procurement trigger refers to the defined circumstances under which AEMO may procure reserves under the RERT framework, and the governance arrangements regarding decisions to procure reserves.

Under the NER, AEMO may determine to enter into reserve contracts to ensure that the reliability of supply in a region meets the reliability standard for that region (or regions), and where practicable, to maintain power system security.

5.1.1 Current procurement trigger provisions under the NER

Under the current arrangements in the NER, AEMO:

- *may* determine to enter into reserve contracts to *ensure* that the reliability of supply in a region meets the reliability standard for that region (or regions), and where practicable, to maintain power system security[99]
- must consult with relevant jurisdictions with respect to its determination of whether to procure and how much to procure.[100]

The clause allows AEMO the discretion to determine how "the reliability of supply….meets the reliability standard". This could be interpreted broadly – i.e. procuring reserves *in case* of a failure to meet the reliability standard in the future, even where the reliability standard is currently being met. There is no explicit prohibition on AEMO from doing this. Nor is there an express obligation on AEMO in the NER to only procure when a certain trigger is met, such as the declaration of a low reserve condition (LRC).

AEMO is required under the NER to have regard to the RERT principles in exercising the RERT (including with regard to procuring the RERT), which are that:[101]

- actions taken should be those which AEMO reasonably expects, acting reasonably, to have the least distortionary effect on the operation of the market; and
- actions taken should aim to maximise the effectiveness of reserve contracts at the least cost to end use consumers of electricity.

These principles limit to some degree AEMO's discretion with regard to the procurement of the RERT.

AEMO must also consult with the relevant jurisdictions when determining to procuring reserves.[102] There is little detail provided in the NER about how this occurs.

Stakeholders have raised concerns regarding the discretion provided to AEMO in the NER regarding procurement. Origin suggested that given the potential for increased use of RERT, the governance framework should be strengthened to clarify that the RERT is only to be used

99 Clause 3.20.3(b) of the NER.
100 Clause 3.20.3(c) of the NER.
101 Clause 3.20.2(b) of the NER.
102 Clause 3.20.3(c) of the NER.

to meet the reliability standard.[103] A number of other stakeholders have suggested the procurement trigger is (or should remain) the reliability standard.[104]

Given the recent procurement and activation of the RERT, and the possibility of further RERT procurement in the future, it is important to clarify the intent and purpose of the RERT procurement trigger as set out in the NER.

5.1.2 RERT Guidelines

The Reliability Panel prepares guidelines which provide further guidance to AEMO about using the RERT. This includes providing further guidance on what information AEMO must take into account when deciding whether to exercise the RERT. There are currently three different types of RERT:

- Long-notice situations where AEMO determines it has more than ten weeks of notice of a projected shortfall in reserves.[105] When it is considering whether to enter into reserve contracts for long-notice situations, AEMO may take into account: the details of the outcome of the medium term PASA; the outcome of the energy adequacy assessment projection; and any other information that AEMO considers relevant.
- Medium-notice situations where AEMO has between ten weeks and seven days of notice of a projected shortfall in reserves. When considering whether to enter into reserve contracts here, AEMO may take into account the information identified above.
- Short-notice situations where AEMO has between three hours and seven days of notice of a projected shortfall in reserves. When it is considering whether to enter into reserve contracts for short-notice situations, AEMO may take into account: the details of the outcome of the short-term PASA and pre-dispatch processes and any other information that AEMO considers relevant.

5.2 Procurement volume

Procurement volume refers to the amount of reserve contracts (in MW or MWh, for example) that AEMO may procure, and the governance arrangements regarding decisions about the amount of reserves to procure.

The NER do not prescribe the amount that AEMO should procure once it has identified a potential shortfall. That is, once the procurement trigger has been met, AEMO has discretion under the NER regarding the amount of reserves to procure.

This discretion is somewhat limited by the need for AEMO to have regard to the RERT principles when determine the procurement volume.[106] AEMO must also consult with the relevant jurisdictions when determining to procuring reserves.[107]

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103 Origin, submission to the consultation paper, p. 6.

104 Submissions to the consultation paper: Clean Energy Council, p. 2; EnergyAustralia, p. 3; Snowy Hydro, p. 7; ERM Power, p. 3.

105 This timeframe is effectively capped at 9 months under clause 3.20.3(d) of the NER, which prevents AEMO from entering into (or renegotiating) reserve contracts more than nine months prior to the date AEMO reasonable expects that the reserve will be required to ensure reliability of supply.

106 Clauses 3.20.2(a) and 3.20.2(b) of the NER.

107 Clause 3.20.3(c) of the NER.

In its submission to the consultation paper for the *Reinstatement of the long notice RERT*, the Victorian Government stated that it requires accurate information on the level of reliability that should be targeted in order to prevent outages at a reasonable cost, and suggested that there should be clear framework for setting a "capacity target for reserves, informed by an assessment of the reserves requirement over each hour of the peak demand event".[108] The Victorian Government also suggested that this target should be published before AEMO seeks contracts.

BOX 4: HISTORICAL EXAMPLE

From 15 January 2006 to 10 March 2006, NEMMCO contracted for 375MW of additional reserves for the South Australian and Victorian regions based on its forecasts which showed a potential shortfall of at least 500MW (at a total cost of approximately $4.4M). As some of the reserves had very expensive offers, the AEMC understands that NEMMCO, in consultation with jurisdictions, intentionally short purchased reserves such that the standard was not met.

The contracted reserves were not used as conditions were more favourable than originally forecast, hence the total costs stated above only reflect availability charges and are likely to have been higher if the reserves were used.

Source: AEMO, AEMO Submission to Reliability Panel review of RERT expiry, 29 September 2010, https://www.aemc.gov.au/sites/default/files/content/8dd95d49-df99-47e8-8786-a84b6cee5ad7/AEMO.pdf, p. 2; Marsden Jacobs Associates, NEMMCO 2005/06 Tender for Reserve Assessment of Energy Response Bid, https://energyconsumersaustralia.worldsecuresystems.com/grants/134/AP-134-EUAA-Assessment.pdf, p. ii

The way that AEMO operationalises the standard through the RSIG (discussed above) may influence how much reserves it procures.

5.3 Possible issues relating to the current procurement trigger and procurement volume

Three potential issues have been raised by stakeholders and identified by the Commission relating to the current procurement trigger and procurement volume.

These potential issues are outlined below in this chapter. Chapter 6 considers options to address the issues.

5.3.1 Reliability standard as procurement trigger may be inefficient

AEMO considers that the reliability standard as the procurement trigger may be inefficient. In particular, it notes that there may be reserve resources which may be procured at a cost lower than the cost of load shedding, but which may not be currently procured because the procurement trigger (i.e., a projected breach of the reliability standard) has not been met. In turn, this would result in higher total costs for consumers (the combined costs of providing a

108 Victorian Department of Environment Land Water and Planning, Submission to the consultation paper of the Reinstatement of the Long Notice RERT, p. 2.

level of reliability and the cost of unserved energy) and would be inconsistent with the NEO.[109]

5.3.2 Procurement trigger is not clear

Stakeholders have queried whether AEMO has too great a degree of discretion in determining whether to procure the RERT, and if so, how much.[110] Consequently, the current arrangements may:

- increase direct costs or reduce reliability to the extent that AEMO were to exercise this discretion in a manner inconsistent with the RERT principles (by either procuring too many/too few procurement reserves, respectively)
- increase market distortions, either as a consequence of AEMO exercising its discretion, or because the market perceives that AEMO might exercise its discretion, in a manner inconsistent with the RERT principles.

These outcomes, if realised, contradict the assessment principles identified in Section 3.2, and so would be inconsistent with the NEO since customers would experience the effects of these through higher prices or lower levels of reliability.

Some stakeholders have proposed alternative methodologies than the current methodologies employed by AEMO under the RSIG to determine whether and how much reserves to procure.[111] If AEMO were to be required to implement an alternative methodology through the NER, this would serve to reduce the level of discretion available to AEMO. Clearly, any alternative methodology required through the NER would have to be fit-for-purpose, balancing the direct and indirect costs of the RERT and the costs of load shedding.

Importantly, the Commission notes that AEMO's discretion, in and of itself, is appropriate. AEMO, as the market and system operator, is best placed to make complex operational decisions regarding the procurement of the RERT. Decisions of this nature necessarily require a degree of judgement. Attempting to limit AEMO's discretion may also serve to increase costs, by forcing AEMO to procure/not procure an inappropriate level of reserves. A question is therefore whether the AEMO's *level* of discretion is appropriate, balancing the risks of too little discretion with the risks of too much discretion. This is considered further in the options below in Chapter 6.

5.3.3 Clarity of framework

Some stakeholders have noted that there may be a general lack of clarity regarding the procurement trigger and volume provisions in the NER and related guidelines.[112] In turn, this is creating uncertainty for market participants, current and prospective RERT reserve provider and AEMO.

This lack of clarity may in turn flow through to:

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109 AEMO submission to the consultation paper, p. 7.

110 AEC submission to the consultation paper, p. 7. Merdian submission to the consultation paper, p. 2, 4.

111 AEC submission to the consultation paper, p. 4. Snowy Hydro submission to the consultation paper, p. 8.

112 AEMC, *Enhancement to the Reliability and Emergency Reserve Trader,* consultation paper submissions: Snowy Hydro, pp. 9-10; Origin, p. 6; Energy Networks Australia, p. 5.

- higher direct costs relating to the RERT or lower levels of reliability, to the extent that lower cost RERT providers choose against participating the RERT procurement process
- market distortions, as market participants or RERT providers undertake actions that they would otherwise not due to a lack of clarity.

6 OPTIONS FOR PROCUREMENT TRIGGER AND PROCUREMENT VOLUME

This chapter outlines options to alter the procurement trigger and procurement volume. We have considered these in isolation of considering the appropriateness of the reliability standard, which will be considered over the coming months.

Three options are outlined:

1. More explicitly linking within the NER the procurement trigger and procurement volume to the reliability standard, with no additional guidance provided to AEMO in the NER about how the reliability standard is operationalised.
2. Procurement trigger and procurement volume based on a broader risk assessment framework (consistent with AEMO's rule change proposal).
3. More explicitly linking the procurement trigger and procurement volume to the reliability standard, and providing more guidance on how the standard is operationalised in the NER or Reliability Panel guidelines.

Each of these options seeks to address one or more of the issues with the current arrangements identified in Section 5.3.

The Commission welcomes feedback on the options, as well as alternative options that might be considered. There are a number of combinations and permutations that could be put forward in terms of each option. For the purpose of this paper and for seeking feedback, we have made some design choices on each design feature, although in some instances, we also put forward a limited number of variations. This is not meant to be a limitation on stakeholder feedback – the best approach may include variations on some of the design features.

For the purpose of these options, we assume that the level and form of the reliability standard remains the same. However, the appropriateness of the reliability standard is in scope of this rule change. The Commission's approach to considering this issue further is set out in Chapter 4.

6.1 Summary of key design features

The table below summarises the key design features of the RERT for each of the three alternatives as well as current arrangements, described above in Chapter 5. These key design features are discussed in detail in the next section.

In summary, options 1 and 3 are similar – they explicitly both link the procurement trigger to the reliability standard (whatever form this may take) but include a number of design choices aimed at addressing concerns relating to the level of discretion provided to AEMO in exercising the RERT and improving transparency and clarity.

The main difference is that option 3 would include an enhanced role for the NER and/or Reliability Panel in operationalising the reliability standard and the operationalisation itself would change.

Option 2 delinks the procurement trigger from the reliability standard and in fact, removes the explicit procurement trigger altogether. Instead, under option 2 AEMO would procure reserves whenever it is efficient to do so as determined through an economic assessment of the estimated costs of procuring reserves and load shedding. This option primarily addresses AEMO's concerns that the reliability standard is not an appropriate trigger for procuring reserves, leading to the inefficient under-procurement of reserves.

Table 6.1: **Summary of options**

KEY ASPECT OF RERT AND RELIABILITY FRAMEWORK	CURRENT ARRANGEMENTS	1. RELIABILITY STANDARD DETERMINES PROCUREMENT TRIGGER AND VOLUME	2. BROADER RISK ASSESSMENT OF PROCUREMENT TRIGGER AND VOLUME	3. OPTION 1 + CHANGES TO OPERATIONALISATION OF THE RELIABILITY STANDARD
Procurement Trigger	NER "trigger" clause ambiguous in the NER	Unambiguous trigger in NER: reliability standard	Broader risk assessment used as trigger	Unambiguous trigger in NER: reliability standard
Reliability standard	Current reliability standard	Current reliability standard	Current reliability standard for non-RERT aspects of framework. No explicit standard for RERT	Current reliability standard
Operationalisation of the reliability standard	Using current RSIG method	Using current RSIG method	N/A. Broader risk assessment used to determine both whether to procure and how much	Changes specified in the NER or Panel guidelines about how the reliability standard is operationalised. Nature of those specific changes yet to be determined.
Procurement volume	Largely at AEMO's discretion	Explicit link to reliability standard	Broader risk assessment used to determine both whether to procure and how much	Explicit link to reliability standard. Changes specified in the NER or Panel guidelines about how the reliability standard is operationalised.
Governance	Governance shared by the	Largely consistent with	Overarching principles about	Guidance given to AEMO as to how to

KEY ASPECT OF RERT AND RELIABILITY FRAMEWORK	CURRENT ARRANGEMENTS	1. RELIABILITY STANDARD DETERMINES PROCUREMENT TRIGGER AND VOLUME	2. BROADER RISK ASSESSMENT OF PROCUREMENT TRIGGER AND VOLUME	3. OPTION 1 + CHANGES TO OPERATIONALISATION OF THE RELIABILITY STANDARD
	NER, Reliability Panel and AEMO	status quo	risk assessment framework might be contained in the NER or Panel guidelines	operationalise the reliability standard either in the NER or the Panel's guidelines
Broader reliability framework	One reliability standard for both the market and RERT	One reliability standard for both the market and RERT	RERT procurement framework disconnected from rest of the reliability framework	One reliability standard for both the market and RERT. Changes to operationalisation of reliability standard would apply to the entire reliability framework

Note:

6.2 Option 1: Reliability standard determines procurement trigger and volume

Each of the key design elements outlined in Table 6.1 are discussed for option 1 in more detail below. In summary:

- Changes would be made to the NER such that the level of discretion currently potentially provided to AEMO regarding the procurement trigger, and the level of discretion provided to AEMO regarding the procurement are modified. Instead AEMO would *only* be able to procure reserves if the reliability standard is projected to not be met, and would only be allowed to procure an amount related to *just* avoiding a breach to the reliability standard.
- AEMO would continue to operationalise the reliability standard consistent with the RSIG, which it may change from time to time consistent with the rules consultation procedures.
- Other aspects of the procurement trigger and procurement volume would be unchanged.

In general, this option seeks to address concerns relating to AEMO's discretion by tightening, to a degree, the provisions in the NER regarding the procurement trigger and procurement volume.

6.2.1 Procurement trigger - linked to the reliability standard

As discussed in Section 5.1, under the current arrangements in the NER, AEMO "may determine to enter into reserve contracts to ensure that the reliability of supply in a region or regions meets the reliability standard…". This may have the practical effect of providing AEMO with considerable discretion with regard to the procurement trigger, for the reasons discussed in Section 5.1.1. In the extreme, the practical effect may be that there is no "real" procurement trigger specified in the NER.

Given that stakeholders have raised concerns about the lack of clarity or certainty that the existing procurement trigger provides, this option proposes to clarify what is the procurement trigger.

Under this option, the procurement trigger would be explicitly and unambiguously linked to the reliability standard in the NER, removing some of the potential uncertainty that may be considered to be related to the procurement trigger. This would be consistent with feedback from stakeholders on the trigger and the purpose of the RERT.[113]

Making clearer that the trigger is tied to the reliability standard would involve clarification that AEMO may trigger the procurement of the RERT only when it identifies a projected breach of the reliability standard, i.e. when it identifies that expected unserved energy is greater than 0.002 per cent through MT PASA (i.e. when it declares a low reserve condition) or when it declares a lack of reserve condition in the short-term PASA.[114]

113 Stakeholders include: AEC, Snowy Hydro, Energy Networks Australia, Origin, EUAA, ERM Power, Meridian, Energy Australia, AGL

114 Under this option, consideration would have to be given as to whether and how the current short term process (which does not have formal regard to the reliability standard) should be accommodated into a rule change which might otherwise require a change to that process so that it had specific regard to the reliability standard.

Consideration would need to be given as to whether and how procurement related to system security should feature in the procurement trigger.

6.2.2 Operationalisation of the reliability standard

Under this option, AEMO would continue to operationalise the reliability standard consistent with its RSIG. No change would be made to the status quo.[115]

As discussed in Section 4.3,over the medium-term, this is done probabilistically through Lack of Reserve Conditions (LRCs) and over the short-term through the lack of reserve (LOR) framework.

AEMO may, from time to time, amend the RSIG. To do so, AEMO must follow the rules consultation procedures as set out in the NER – this requires AEMO to undertake two rounds of consultation with industry.[116] AEMO may choose to open consultation on the RSIG at any time and in fact, has flagged in the rule change request that it may do so.

The Commission also notes that the LOR framework has recently been updated through a rule change request to make it more fit for purpose for the current power system conditions.[117]

6.2.3 Procurement volume

As discussed in Section 5.2, currently, there is no prescription in the NER with respect to volume of reserves to be procured if the procurement trigger is met. Stakeholders have expressed a desire for greater clarity on procurement volumes in order to help minimise the costs that may be imposed on the market, and so consumers, associated with procuring reserves.

Under this option, a greater degree of prescription would be provided in the NER. AEMO would only procure an amount to at most meet the reliability standard, as operationalised through the RSIG. That is, AEMO would only be able to procure an amount to at most:

- equal an LRC in the medium term (relevant to long-notice and medium-notice RERT)
- equal an LOR2 condition in the short term.

This option limits the discretion that AEMO may apply regarding procurement volume, although the procurement volume would still be based on AEMO's assessment under its RSIG.

There may be concerns that procuring an amount to equal the breach of the reliability standard may not be sufficient. For example, the majority of the reserves currently under contract in the RERT are demand response resources. Such resources typically only agree to have one or two activation periods per year. Procuring to equal the breach could result in a

115 As noted above, consideration would have to be given as to whether and how the current short term process (which does not have formal regard to the reliability standard) should be accommodated into a rule change which might otherwise require a change to that process so that it had specific regard to the reliability standard.

116 Clause 3.9.3D(c) of the NER.

117 For more information see *Declaration of Lack of Reserve conditions* rule change project page: https://www.aemc.gov.au/rule-changes/declaration-of-lack-of-reserve-conditions.

situation where if there were three activations per year, there would not be sufficient reserves for AEMO to manage the system. Therefore, it may be appropriate for AEMO to be allowed to procure a defined amount more than required to avoid LRCs or LOR2 conditions.

Procuring reserves that include a margin of error would increase the direct costs of the RERT, but may avoid costs associated with load shedding in the case of forecasting errors or if some procured reserves were not available.

In considering whether this is appropriate, the AEMC notes that there is already a margin of error/conservatism inbuilt in the LRC and LOR2 frameworks within the RSIG, namely:

- the use and weighting of POE10 and POE50 forecasts within the LRC framework, rather than only applying POE50 forecasts, or symmetrically applying POE90 forecasts to "balance" the use of POE10 forecasts
- the forecasting uncertainty measure (FUM) in the LOR framework. We understand that AEMO's practice has been to use the largest forecast reserve shortfall and apply a 10 per cent margin of error when making RERT decisions in an operational timeframe.[118]

However, this margin of error relates to the *forecast errors* associated with whether the reliability standard is going to be breached or not; not the *forecast errors* associated with the supply of reserves.

The Commission welcomes feedback on whether it is appropriate to build a margin of error into the NER (and if so, how should it be specified, and what its level should be), or allow AEMO to have an implicit margin of error within the RSIG processes.

It may be appropriate for AEMO to determine the volume of reserves consistent with the broader risk assessment approach (discussed in option 2 below) but capped to a quantity consistent with just avoiding an LRC/LOR2. That is, AEMO, through its economic assessment, could determine to procure a quantity of reserves *less* than that required to avoid LRC/LOR2 if those reserves were high priced. However, it would not be able to procure reserves greater than that required to avoid LRC/LOR2.

6.2.4 Governance of the procurement trigger, reliability standard and procurement volume

Consistent with the status quo, under option 1:

- the Reliability Panel would continue to have an implicit role in its oversight of the procurement trigger (i.e., the reliability standard), through its role in reviewing the reliability standard.
- any party (other than the AEMC), including the Reliability Panel may submit a rule change request to change the reliability standard – any changes to the reliability standard would occur through the rule change process.

118 AEMO's internal process where RERT may be required is to develop a RERT schedule with the aim of meeting the largest forecast reserve shortfall (that is, below the LOR 2 trigger level) in a period plus 10 per cent. See https://www.aemo.com.au/-/media/Files/Media_Centre/2018/Annexure-A_30-November-2017.pdf

- AEMO would continue to operationalise the procurement trigger through its RSIG. As described in Section 4.3, under the current guidelines, AEMO uses the LRC and LOR frameworks for medium and short term procurement, respectively.
- AEMO would determine the procurement volume consistent with the RSIG (although under the option constrained to just avoid the LRC/LOR2, with or without a specified margin of error).
- the RSIG would continue to be subject to the rules consultation procedure when they require amendment. Such an amendment might allow AEMO to implement its economic assessment (described under option 2) to determine the appropriate amount of reserves to procure, capped at that required to just avoid the LRC/LOR2 or a different interpretation of the reliability standard under an amended RSIG.
- AEMO would continue to be required to consult with jurisdictions (i.e., state governments) when determining whether to procure reserves, and how much. Consideration would have to be given to whether AEMO would be able to procure more reserves than that required to meet the reliability standard as determined through its RSIG if this was requested by the jurisdictions. For example, AEMO might be allowed to procure reserves that exceeded what would otherwise be allowed under the NER if it received explicit, published permission from the relevant jurisdiction.
- AEMO would continue to be required to comply with the NER, with compliance enforced by the AER.

6.2.5 Implications of this option

The practical impact of option 1 compared to the status quo approach taken by AEMO under the RSIG would be that the procurement *volume* would be set with regard to the reliability standard. This would improve transparency of the amount of reserves that would be procured under the RERT, providing stakeholders with more certainty about the level and costs of out of market reserves. Having more certainty around the level of RERT that can be procured may also limit the costs associated with the RERT through constraining how many reserves may be procured. However, if the volume is set without taking into account the costs of resources available, it is possible that some resources that are low-cost are not ultimately procured i.e. an inefficiently low volume of reserves is procured.

There would be no practical impact compared to the status quo approach under the RSIG to the procurement *trigger*. AEMO would continue to determine whether the reliability standard is being breached in the medium term using the LRC methodology, and the LOR2 methodology would continue to be employed for procurement decisions in the short term.[119]

There do not appear to be any consequential changes necessary to other aspects of the reliability framework (i.e., non-RERT related aspects) as a consequence of this option.

Having one reliability standard, with the RERT linking procurement of reserves to the reliability standard would mean that:

119 As noted above, consideration would have to be given as to whether and how the current short term process (which does not have formal regard to the reliability standard) should be accommodated into a rule change which might otherwise require a change to that process so that it had specific regard to the reliability standard.

- The reserves procured through the RERT should balance the direct costs of procuring reserves with the cost of load shedding; however, as noted above, depending how the volume is set it could result in an inefficiently low volume of reserves being procured.
- Market participants would have the opportunity to collectively provide the desired level of reliability (i.e. the reliability standard), with AEMO making up the difference *to the extent the market fails*. This could be considered to appropriately allocate the risk of decisions regarding reserves in the hands of market participants in the first instance, who may be better placed to manage this risk.
- Distortions would be minimised since the reliability standard would drive market investment and operational decisions, as well as how many out of market reserves are procured.

6.2.6 Summary

QUESTION 2: OPTION 1

A) What are stakeholder views on this option?

B) Do stakeholders consider this option would promote reliability and security outcomes in the NEM?

C) Do stakeholders consider that this option would enhance the long-term interests of consumers?

D) Are there any other implications that should be taken into account when considering this option?

6.3 Option 2: Broader risk assessment of procurement trigger and volume

Each of the key design elements outlined in Table 6.1 are discussed for option 2 in more detail below. In summary:

- AEMO would determine whether or not to enter into reserve contracts, and how much reserves, based on a RERT procurement economic assessment framework. The current two stage process of first determining whether to procure reserves (the procurement trigger) and then determining how many reserves to procure (the procurement volume) would be combined into a single process.
- This economic assessment framework would procure an amount of reserves which minimises the combined estimated cost of procuring reserves and estimated cost of load shedding.
- As a consequence, the reliability standard would unambiguously be irrelevant in determining whether and how many reserves to procure.

This option primarily seeks to address the concern that there may be reserve resources which may be procured at a cost lower than the cost of load shedding, but which may not currently

be procured because the procurement trigger (i.e., a projected breach of the reliability standard) has not been met.

This option reflects our understanding of AEMO's current thinking on these issues, as articulated in their rule change request, submission to the consultation paper and refined in a presentation to our technical working group. Nevertheless, some elements of AEMO's thinking have been elaborated on by the AEMC in order to elucidate stakeholder feedback on these matters.

This option would explicitly remove the existing trigger clause and replace it with one that allows AEMO to procure a quantity consistent with an economic assessment of the cost of the RERT, regardless of whether the reliability standard is forecast to be breached or not.

6.3.1 Procurement trigger and procurement volume

Under this option, the explicit reserves procurement trigger would be removed from the NER, including reference to the reliability standard. The trigger to procure reserves would be *implicit* and embedded in the economic assessment framework to be carried out by AEMO, which would determine both whether to procure reserves, and how many to procure. In some years, AEMO's assessment may show that it is not economically efficient to procure any reserves. In that sense, the broader risk assessment framework would also act as a trigger.

Economic assessment framework

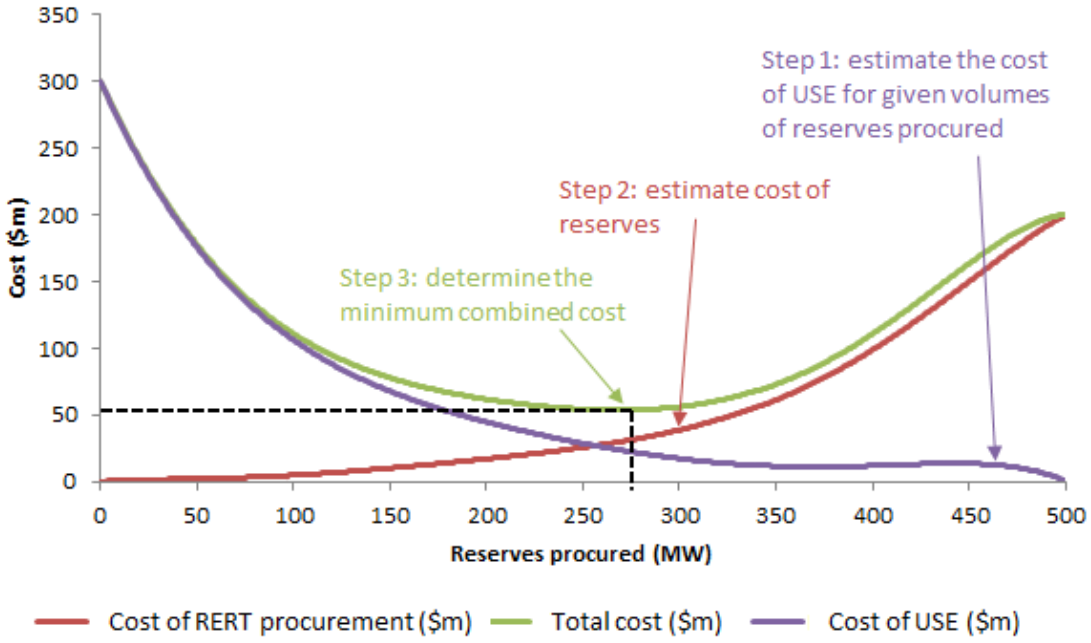
AEMO is currently proposing an economic cost minimisation model that aims to minimise the total cost (cost of procuring reserves and residual USE cost).

An overview of the main steps that would be taken in this analysis is provided below. These steps are still being developed by AEMO, and are somewhat simplified.

1. Monte-Carlo simulations of the cost of load shedding would be undertaken, based on estimations of the value of customer reliability (VCR) and quantity of load shedding under various possible future scenarios. Among those future scenarios would be a variety of different RERT reserve procurement amounts. A probability weighted average of the estimated costs arises from each scenario would be used to derive an estimated cost of load shedding for a given amount of RERT reserve procurement.
    - AEMO would need to use an estimate of the VCR in this step.
2. AEMO would tender for RERT reserves. From the actual offers provided to AEMO it would derive an offer curve for reserves based on average variable cost (i.e., per MWh dispatched).
    - AEMO would have to make assumptions about the likely quantity of reserves dispatched in order to account for any fixed costs associated with the procurement of RERT. This would allow it determine whether it is more appropriate to procure, for example, a reserve offer with high variable cost but zero fixed costs or low variable cost but non-zero fixed costs.
3. The volume of RERT to be procured is that which minimises the combined USE costs (derived in step 1) and RERT procurement costs (derived in step 2).

These steps are stylised diagrammatically below. Please note that the numbers are for illustrative purposes and bear no resemblence to possible actual costs.

Figure 6.1: Steps to AEMO's proposed model



In the diagram above, the green line equals the combined cost of procuring reserves (red line) and USE (purple line). Total costs are minimised to just above $50m when about 275MW of reserves are procured. A little under half of these costs relate to USE (where the dotted vertical line intersects the purple line), while a little over half relate to the cost of procuring reserves (where the dotted vertical line intersects the red line).

In effect, the process being described by AEMO is attempting to determine the volume of reserves where the marginal value of customer reliability (i.e., the increase in value derived from an additional unit of consumption) is equal to the marginal cost of supply (i.e., the increase in cost of an additional unit of supply). At this point, economic welfare is maximised - an additional unit of reserves would cost more than the value it delivers, while the cost of the marginal unit of reserves is less than the cost of load shedding.

This can be considered essentially the same process that is currently undertaken to determine the reliability standard, as described in Section 4.1. The information provided in Figure 6.1 is the same as the information provided in Figure 4.1, just presented in a different manner.

As with option 1, consideration would need to be given as to whether and how procurement related to system security should be considered as part of the economic assessment.

Procurement horizon

Under option 2, the broader risk assessment framework described above could either apply:

- in the medium term, replacing the existing LRC framework which is explicitly linked to the reliability standard, or
- in the short term, replacing the existing LOR framework which is not explicitly linked to the reliability standard, or
- both the medium and short term.

Careful consideration would need to be given to this choice. Decoupling the RERT procurement from the reliability standard in the medium-term may have more significant implications than utilising this method in the short-term. This is elaborated on in more detail below.

6.3.2 Operationalisation of the reliability standard

If the economic assessment is applied in the medium-term, the reliability standard would no longer be relevant to decisions about whether to procure reserves, or how many. Consequently, there would be no need to operationalise the reliability standard for the purpose of the RERT. Instead, operational decisions regarding reserve procurement would be made through the economic assessment framework described above.

6.3.3 Governance of the procurement trigger, reliability standard and procurement volume

Under this option, AEMO would be responsible for making decisions about whether or not to procure reserves, and how many, based on its assessment framework.

AEMO's assessment framework methodology would be transparent and public, contained for example in guidelines which it could change in accordance with the rules consultation procedures. General overarching principles about the risk assessment framework might be contained in the NER or Panel guidelines which would guide and constrain AEMO in the development and application of the assessment framework methodology.

AEMO may be required to use independently derived VCR, determined, for example, by the AER.

As with option 1, consideration could be given to whether the role of jurisdictions in procurement decisions would be amended. For example, AEMO might only be allowed to procure an amount that differs from the amount determined through its economic assessment if it had published permission from the relevant jurisdiction. The jurisdictions could be informed by the likely costs (load shedding and RERT procurement) associated with procuring more or less than that determined as appropriate by AEMO.

6.3.4 Implications of this option

As noted in Chapter 5, the current procurement trigger for the RERT differs between the medium and short term:

- In the medium term, the trigger explicitly links the procurement of reserves to the reliability standard through the LRC framework.

- In the short term, the trigger does not link the procurement of reserves to the reliability standard, and instead uses the LOR framework.

Consideration of consequences of option 2 compared to the status quo are therefore different depending on if this proposed approach is applied to the short term or medium term.

Medium term

As recognised by AEMO, there may be reserves that are not in the market but that could be economically-efficient to use i.e. those with a value of customer reliability above the market price cap but below the cost of load shedding. The Commission agrees that to the extent that the value of customer reliability is above the market price cap but below the cost of load shedding, inefficiencies arise from not procuring and dispatching these reserves. Such an approach would lower the combined cost of load shedding and the provision of reliability compared to the status quo.

As noted above, the process of trading off the cost of reserves with the cost of unserved energy in determining the reliability standard (described in Section 4.1) is very similar to that proposed to determine the level of RERT procurement within option 2.

A benefit of option 2 compared to the status quo is that it can make the trade-off between costs in a more dynamic manner, closer to real time and taking account of better information, compared to the Panel's four yearly assessment of the reliability standard and settings.

However, by explicitly not having the reliability standard as the procurement trigger, the RERT framework would become somewhat separate from the rest of the reliability framework. Under the broader framework, the market is incentivised to provide a level of reliability consistent with the reliability standard. Under option 2, AEMO, through the RERT, would be aiming for a level of reliability explicitly different from that which the market is incentivised to deliver. This may have a number of downsides compared to the status quo. It may:

- shift some of the risks associated with the provision of some capacity from market participants to consumers, in effect introducing a quasi-centralised capacity market since AEMO would be procuring reserves to sit outside the market on stand-by
- AEMO does not have financial incentives to make trade-offs to determine the appropriate level of reserves to procure, and indeed may have reputational incentives as system operator to procure more reserves than may be necessary, with the costs borne by consumers
- incentivise market participants to leave the energy market with the hope of being better remunerated in the RERT market (which is targeting a different, potentially higher standard of reliability, and hence must also remunerate resources accordingly). In effect, resources in the energy market would be "crowded out", in favour of the RERT market. In turn, this would increase costs to consumers, without actually physically increasing the level of reliability.

BOX 5: MARKET DISTORTIONS ARISING FROM THE RERT

In its submission AEMO noted that, "the concern that the RERT would attract resources away from the energy market seems somewhat unfounded in a competitive market, where non-transient market power cannot be sustained due to competition from multiple suppliers".

AEMO caveat this with the acknowledgement that revenue received through availability payments paid to RERT providers may be problematic:"it is possible that if the availability payment were too high, it could potentially make the provider favour the RERT even if they do not expect to be dispatched."

Consistent with AEMO's views, the AEMC considers there is likely to be distortionary effects if availability payments are made.

However, the AEMC also considers there may be distortionary effects of the RERT even *without* availability payments.

At any point in time, the level of competition between market participants determines the degree of downward pressure on wholesale prices. The pressure is greater at times when there are more competing generators and more available generation. In these circumstances, a generator's profit maximising strategy is likely to be consistent with recovering its variable costs.

Competitive pressures ease as demand approaches the limits of the generation available. As demand increases and the number of generators and the remaining available generation decreases, generators have a greater opportunity to be dispatched at bid prices higher than their variable costs. Generators have transient pricing power at these times.

Transient pricing power resulting in occasional spot price spikes is an inherent feature of a workably competitive wholesale market. It is only a concern if it occurs frequently enough and to a significant enough magnitude to lead to average annual wholesale prices above the long-run marginal cost (LRMC) of generation. LRMC is a measure of the workably competitive level of wholesale electricity prices, with actual prices expected to be above this level in some years and below in other years, reflecting supply and demand conditions at particular points in time. The market price cap is set at the level where the Reliability Panel estimate that sufficient generators can recover their costs (short and long run) through the energy market so that the reliability standard is met.

The times when there is likely to be transient pricing power is coincident with the times when there is likely to be RERT activation: when the supply/demand balance is tight. In these instances, it may therefore be profitable for market participants to economically withhold resources from the energy market in an attempt to receive a higher payment in the RERT market. The trade-off undertaken by market participants is the same as for any participant considering bidding above their variable costs: the prospect of higher prices and revenues versus the risk of not being dispatched due to competitive pressures. These risks are in part why there are provisions in the RERT that the reserves have to be "out of the market". These provisions aim to mitigate these concerns.

> In effect, the RERT has the potential to allow market participants which would otherwise have the price they receive capped by the market price cap to receive a higher price. The presence of availability payments influences this trade off in favour of pricing more highly - but is not essential to it.
>
> Market participants may be restricted through "out-of-market" provisions from rapidly alternating their choice of whether to participate in the RERT or energy market. Nevertheless, they might consider that participating in the RERT market for an enduring length of time may be preferable, taking all the trade-offs into account.
>
> The Commission has heard anecdotally from several stakeholders that resources that have historically participated in the energy market have withdrawn and are now seeking to participate in the RERT market. While these observations may be primarily due to availability and/or pre-dispatch payments, they may also be due to the distortionary effects described in this box.

Source: AEMO, submission to the consultation paper, p. 4.

An alternative to option 2 would also be for the market price cap to be increased to the value of lost load. This in turn would incentivise in-market resources up to the value of lost load, and there would be limited or no need for AEMO-procured reserves above the market price cap. This may address AEMO's concerns while avoiding the possible negative outcomes described above. However, there may be considerable other implications from such an approach, including higher wholesale prices and so volatility and ultimately higher prices for consumers. Careful consideration is required for this alternative to be implemented.

Short term

The current short-term RERT process already targets a level of reliability different from the level targeted by the market. Option 2, if applied in the short term, may therefore be an improvement on the status quo by:

- reducing instances where economically efficient resources with a cost greater than the market price cap but less than the value of consumer reliability are not dispatched, and
- contributing less significantly to market distortions compared to if applied in the medium term.

However, if applied only in the short term, this could increase the cost of procuring reserves or even mean that reserves were not available to be procured. This in turn would flow through to higher costs to consumers and/or lower levels of reliability.

Other considerations

Option 2 has a number of practical challenges which would need to be resolved. For example:

- the availability payments as part of RERT contracts would need to be accounted for somehow to allow a meaningful comparison on a per MWh basis between reserves which have higher fixed but lower variable costs with reserves which have lower fixed but

higher variable costs. Such issues are managed in the energy market by market participants through contracts (which, for example, swap variable spot market prices for fixed prices), with the risks borne by market participants.

- The process described above abstracts away from more detailed considerations such as administrative costs of procurement, location, product firmness and activation time. These details would need to be further developed and embedded within the methodology if this option was implemented.
- the economic assessment requires, as a key input, an estimate of the value of consumer reliability. Resources which had an estimated procurement cost above this value would not be procured, while resources below this cost would be procured. The value used by AEMO would, in effect, act as a "market price cap" in the RERT market, set at the estimated marginal value of consumer reliability. Determining an appropriate figure for the VCR is challenging. Indeed, one of the reasons the MPC is not explicitly set at the marginal value of consumer reliability, but instead in relation to the reliability standard, is because of the inherent difficulties in determining an appropriate figure for the marginal value of consumer reliability.

6.3.5 Summary

QUESTION 3: OPTION 2

A) What are stakeholder views on this option?

B) Do stakeholders consider this option would promote reliability and security outcomes in the NEM?

C) Do stakeholders consider that this option would enhance the long-term interests of consumers?

D) Are there any other implications that should be taken into account when considering this option?

6.4 Option 3: Changes to operationalisation of the reliability standard + option 1

Each of the key design elements outlined in Table 6.1 are discussed for option 3 in more detail below. In summary:

- As with option 1, changes would be made to the NER such that the level of discretion currently provided to AEMO regarding the procurement trigger, and the level of discretion provided to AEMO regarding the procurement volume are removed. Instead AEMO would *only* be able to procure if the reliability standard is projected to not be met, and would only be allowed to procure an amount related to *just* avoiding a breach to the reliability standard.

- Unlike option 1, changes would be made under the NER/guidelines to require AEMO to change the way it operationalises the reliability standard such that it is more closely related to the reliability standard.

This option primarily addresses stakeholder concerns regarding the discretion available to AEMO in determining whether to procure the RERT, and if so, how much. It goes further than option 1 to address this concern by requiring changes to the way AEMO operationalises the reliability standard. The Commission welcomes feedback on possible specific changes required of AEMO, and presents some possibilities below.

This option recognises the inherent difficulty in implementing an annual standard for operational decisions regarding reserve procurement.

6.4.1 Procurement trigger

This option would contain the same changes to the procurement trigger discussed under option 1. Changes would be made to the NER to make it clear that AEMO may only procure if the reliability standard is not being met. Consideration may also need to be given as to whether and how procurement related to system security should be considered as part of the economic assessment.

6.4.2 Operationalisation of the reliability standard

The key difference between option 1 and option 3 relates to the operationalisation of the reliability standard.

As discussed in Section 4.3, currently, AEMO operationalises the reliability standard in accordance with the RSIG. In the medium term AEMO utilises the LRC conditions (which do take account of the reliability standard) while in the short term AEMO utilises the LOR framework (which makes an assumption only with respect to the reliability standard).

Option 3 involves a change to the operationalisation of the reliability standard.

One possible approach was suggested by the AEC and Snowy Hydro in their submissions.. The AEC stated that "[u]sing sophisticated statistical techniques, it should be possible to determine a relevant fraction of the annual USE target than can be tolerated in a specific sub-annual horizon."[120] This approach is elaborated on below, but the Commission notes that alternative approaches may be more suitable. The Commission is interested in stakeholder views on what alternative approaches might be.

Currently, the maximum unserved energy expected by the reliability standard is expressed on an annual basis. Apportioning this annual expected amount of unserved energy across multiple shorter timeframes (perhaps daily or weekly timeframes) would provide AEMO with an operational RERT trigger directly linked to the reliability standard. The feasibility of this approach from a practical and econometric point of view has not yet been determined.

This approach could work as follows:

120 AEC, Submission to the consultation paper, p. 5.

- A monthly expected USE standard rather than an annual standard would be determined.
- The first step would be to model a year with 0.002 per cent unserved energy to obtain a distribution of USE. If, say, January is the worst month for USE and 50 per cent of expected unserved energy falls in January, then that would guide the monthly standard.
- If 0.002 per cent annually equates to 1000 MWh, then the monthly standard (for each and every month) would be 50 per cent of that, i.e. 500MWh.
    - Alternatively, the monthly standard would be set at the proportion of USE determined for that particular month. That is, if 50 per cent of the expected USE fell in January, 40 per cent in December and 1 per cent in each of the other months, then 500MWh, 400MWh and 10MWh would be the monthly standards in January, December and each of the other months respectively.
- AEMO would then operationalise this standard through medium-term PASA.

A variation of this approach could include changes to how expected unserved energy is calculated as well, e.g. providing guidance on the weights used in AEMO's current MT PASA processes.[121]

The Commission welcomes stakeholder views on these alternatives, as well as any other alternatives to operationalising the reliability standard.

This methodology would apply to medium-term PASA but extending a similar application to short-term PASA and pre-dispatch could be explored.

6.4.3 Procurement volume

As with option 1, this option would explicitly link the procurement volume to the reliability standard.

The difference between option 1 and option 3 would be how the reliability gap is defined. In option 1, this is the gap between forecast expected USE and the annual reliability standard (in the medium term).

Under option 3, how the gap is defined would be more specifically laid out in either the NER or Panel guidelines. For example, under the approach outlined above, the gap would be a function of the difference between the monthly (for example) expected USE and the monthly (for example) reliability standard.

A variation of this could include AEMO's broader risk assessment framework being applied to its decision as to how much to procure, as with option 1. That is the reliability gap would be determined with reference to the monthly (for example) reliability standard, and then AEMO would undertake an economic assessment to determine the appropriate volume of reserves to procure, capped at just closing the monthly gap.

121 Currently, AEMO calculates expected USE by weighting the average of all 50POE simulations at 70% and the average of all 10POE simulations at 30%.

6.4.4 Governance of the procurement trigger, reliability standard and procurement volume

The governance of the procurement trigger would remain as per current arrangements, similar to what is discussed above under option 1.

However, more guidance would be given to AEMO as to how to operationalise the reliability standard either in the NER or the Reliability Panel's guidelines. The Commission welcomes feedback on the likely most appropriate governance arrangements for any additional prescription for AEMO operationalising the reliability standard.

As with options 1 and 2, consideration could be given to how jurisdictional input to the procurement process could be changed.

6.4.5 Implications of this option

This option would have the effect compared to the status quo of guiding AEMO's discretion by requiring a specific reliability standard operationaisation methodology to be used, in place of the current methodology in the RSIG.

The main benefit of this option is that guiding the discretion provided to AEMO results in lower cost and/or more reliable outcomes which are more predictable. Snowy Hydro noted that providing interpretations of the reliability standard would:[122]

- remove the confusion that seems to pervade this issue
- create a clearer governance structure over what conditions market intervention would occur.

However, the converse is that requiring AEMO to employ a particular methodology, and specifying this in the NER, may be constraining and result in inefficient outcomes. It would likely be more appropriate for the discretion about how to operationalise the reliability standard to be limited through Reliability Panel or AEMO guidelines.

These concerns are borne out when consideration is given to the example approach to operationalising the reliability standard outlined above. Were this approach taken, the following issues would need to be resolved.

- What is the appropriate length of time over which the division of the annual standard should apply? Options include seasonally, monthly, weekly or daily. Should weekends and public holidays be taken into account?
- Were the highest monthly (for example) standard to be applied to each month, it is possible that reserves would not be able to be procured in sufficient quantities despite forecasting a breach in the annual reliability standard. Taking an extreme example to illustrate the point, if the total expected USE to meet the reliability standard is 1000MWh, the monthly target based on the "worst" month was 500MWh, and each month was forecast to have 400MWh of load shedding, then no individual month would breach the monthly target yet collectively there would be forecast to be 4,800MWh of load shedding (12 months x400MWh), well in excess of the standard.

122 Snowy Hydro, Submission to the consultation paper, p. 8.

- Conversely, were each individual month's standard used (e.g., 500MWh in January, 400MWh in December and 10MWh in each other month) it is possible to procure considerably more than the amount required to meet the annual reliability standard. Using the numbers above, if there was forecast to be 900MWh of load shedding in January but zero in the other months, then the total forecast for the year would be 900MWh (less than the annual reliability standard) and yet 400MWh would be procured in January to meet the 500MWh monthly standard.

Likewise, other appoaches are likely to contain their own pratical challenges.

The changes to how AEMO operationalises the reliability standard contained within this option would flow to other aspects of the reliability framework which utilise the reliability standard. For example, if the LOR2 trigger is changed, then it would apply to both directions and to RERT procurement.

This would retain consistency with the broader reliability framework and make sure that all market participants, including the system operator, are operating to one standard.

6.4.6 Summary

QUESTION 4: OPTION 3

A) What are stakeholder views on this option?

B) Do stakeholders consider this option would promote reliability and security outcomes in the NEM?

C) Do stakeholders consider that this option would enhance the long-term interests of consumers?

D) Are there any other implications that should be taken into account when considering this option?

7 LODGING A SUBMISSION

The Commission invites written submissions to this options paper. Submissions are to be lodged online or by mail by 29 November 2018 in accordance with the following requirements. Where practicable, submissions should be prepared in accordance with the Commission's Guidelines for making written submissions on rule change requests.[123] The Commission publishes all submissions on its website subject to a claim of confidentiality. All enquiries on this project should be addressed to Sarah-Jane Derby on (02) 8296 7823 or sarah.derby@aemc.gov.au.

7.1 Lodging a submission electronically

Electronic submissions must be lodged online via the Commission's website, www.aemc.gov.au, using the "lodge a submission" function and selecting the project reference code ERC0237. The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated

7.2 Lodging a submission by mail

The submission must be on letterhead (if submitted on behalf of an organisation), signed and dated. The submission should be sent by mail to:

Australian Energy Market Commission

PO Box A2449

Sydney South NSW 1235

The envelope must be clearly marked with the project reference code ERC0237.

123 This guideline is available on the Commission's website www.aemc.gov.au

ABBREVIATIONS

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
ARENA	Australian Renewable Energy Agency
Commission	See AEMC
ESOO	Electricity statement of opportunities
EY	Ernst & Young
FUM	Forecast uncertainty measure
LOR	Lack of reserve
LRC	Low reserve conditions
MPC	Market price cap
NEL	National Electricity Law
NEM	National Electricity Market
NEO	National electricity objective
NER	National Electricity Rules
Panel	Reliability Panel
PASA	Projected assessment of system adequacy
POE	Probability of exceedance
RERT	Reliability and emergency reserve trader
RSIG	Reliability standard implementation guidelines
SRMC	Short run marginal cost
USE	Unserved energy
VCR	Value of customer reliability