

29 November 2018



Mr John Pierce
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Australian Energy Market Commission
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By electronic submission

Dear Mr Pierce

National Electricity Amendment (Enhancement to the Reliability and Emergency Reserve Trader) Rule 2018 – Options paper

Thank you for the opportunity to present AEMO's view on the Australian Energy Market Commission's (AEMC) Options paper as part of the Enhancement to the Reliability and Emergency Reserve Trader (Enhanced RERT) rule change process.

AEMO proposes to delink the RERT procurement trigger and volume from the current reliability standard. As we outlined in more detail in our additional information¹ to the rule change process, AEMO considers the current reliability framework to be no longer appropriate, due to its underestimation of the costs of unserved energy (USE) and the lack of explicit risk metrics to signal the value of insurance against USE risks. In AEMO's view, as the current reliability standard does not reflect the true trade-off in mitigating USE risks, it will not lead to an efficient reliability outcome. AEMO also recommends that the AEMC should seek expert advice on designing the appropriate risk metrics for the market.

AEMO's preferred procurement option is Option 2, but with a slight change to incorporate the risk dimension. Under this option, RERT procurement would be delinked from the current standard (until a more appropriate set of standards can be designed) and assessed under a broader cost and risk assessment framework. RERT would be procured to minimise the total economic (USE + RERT resource) costs subject to meeting some risk metrics. AEMO is willing to work with the AEMC and the stakeholders about the appropriate risk metrics. AEMO believes this option will ensure that the optimal reliability outcome can be delivered and will serve in the long-term interest of end electricity users.

In the attached submission, AEMO has described in detail our view on the three options proposed in the Options paper. If you would like to discuss the contents of this submission further, please do not hesitate to contact Paddy Costigan on 03 9609 8407 or Paddy.Costigan@aemo.com.au.

Yours sincerely

A handwritten signature in blue ink, appearing to be "P. Geers", is written over a light blue horizontal line.

Peter Geers
Executive General Manager Markets

Attachment: RERT procurement option – Submission to the AEMC's Enhanced RERT Options Paper

¹ AEMO, *The NEM Reliability Framework, additional information from AEMO to support its enhanced RERT rule change proposal*, November 2018. Available at <https://www.aemc.gov.au/rule-changes/enhancement-reliability-and-emergency-reserve-trader>

RERT Procurement Option

November 2018

Submission to the AEMC's Enhanced RERT
Options Paper

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1. Introduction

This submission is in response to the AEMC's options paper on the Enhancement to the Reliability and Emergency Reserve Trader (RERT) rule change process, published on 18th October 2018. The options paper mainly seeks stakeholder feedback on three options for assessing RERT procurement trigger and volume:

- Option 1 proposes that RERT could be procured only if the reliability standard is projected not to be met. Further, AEMO would be allowed to procure an amount that is just enough to meet the standard. AEMO would continue to operationalise the reliability standard for different time horizons in its Reliability Standard Implementation Guidelines (RSIG).
- Option 2 would delink the RERT procurement trigger from the reliability standard. Under this option, the volume of RERT would be determined under a broader cost and risk assessment framework. There would not be an explicit trigger although the assessment could lead to no RERT being procured in some years.
- Option 3 is similar to option 1 in that RERT would be procured only if the reliability standard is projected not to be met and AEMO could procure just enough to meet the reliability standard. Under this option, the NER or the Reliability Panel's guideline would be more prescriptive about how the reliability standard is operationalised, especially over time horizons less than a year.

AEMO supports option 2 and has proposed a slight modification to explicitly incorporate some risk metrics. Under this option, RERT will be procured to minimise the combined load shedding and RERT resource costs, subject to containing USE risk within a tolerable threshold.

AEMO understands that RERT is an integral part of the reliability framework and the procurement methodology needs to be assessed together with the framework. On 8th November 2018 AEMO provided to the AEMC our view on the appropriateness of the current reliability framework¹, as an additional piece of information ("Additional Information Document" hereafter) to the rule change process. In that document, we raised concerns about the appropriateness of the current reliability standard. These concerns included using an average USE metric to set the efficient level of reliability in a market with increasing tail-end USE risks. We consider the average VCR used in the current standard underestimates the true cost of load shedding and its risk neutral approach fails to signal the value of risk mitigation and insurance. AEMO considers the current standard does not set an efficient reliability level and as such RERT procurement should be delinked from it. AEMO believes that under our proposed procurement option, RERT can be used as an effective safety-net and insurance mechanism to fill in the gap (if any) between the optimal reliability level and that delivered by the market.

¹ AEMO, *The NEM Reliability Framework, additional information from AEMO to support its enhanced RERT rule change proposal*, November 2018. Available at <https://www.aemc.gov.au/rule-changes/enhancement-reliability-and-emergency-reserve-trader>

2. AEMO's view on the current reliability framework

2.1 The theoretical linkage of the reliability standard and the RERT

The current reliability standard in the NEM is a maximum expected unserved energy of 0.002% of a region's annual electricity demand for a given financial year.² In principle, the reliability standard is meant to set the efficient level of reliability by balancing the marginal benefit and cost of avoiding USE and to incentivise the optimal generation mix to deliver the desired reliability outcome. In an energy-only market such as the NEM, this is primarily achieved through energy prices sending new investment (or retirement) signals to market participants. If the market is forecast to under-deliver the efficient reliability level, in which case there will be a projected breach of the reliability standard, AEMO can procure RERT to fill in the gap.

The above framework relies on a few crucial assumptions. First, it assumes that the reliability standard, expressed as 0.002% expected USE, represents the optimal level of reliability. Second, it assumes that the reliability standard, together with its reliability settings³, will incentivise, at least in the long term, the optimal resource mix through the energy market to deliver the efficient reliability level. However, as AEMO outlined in our Additional Information Document, we question the validity of these assumptions and consider that the existing reliability framework will not deliver an efficient reliability outcome in the NEM.

2.2 The appropriateness of the existing reliability framework in the current NEM

In this section, we will briefly outline AEMO's view about the appropriateness of the existing reliability framework. More details can be found in the Additional Information Document (see Footnote 1).

In recent years, AEMO has observed an increased risk of unserved energy (USE) in the National Electricity Market (NEM). USE can be characterised as a tail risk with a low probability of occurrence but potentially a high consequence. Whilst historically the NEM has experienced very little USE, this is not a good guide to future USE outcomes due to the tightened supply-demand balance, the trend of increasing maximum temperatures, the variability of renewable resources and the observed recent increase of forced outages at thermal plant.

² Clause 3.9.3C(a) of the NER

³ Currently this is mainly achieved through the Market Price Cap (at \$14,500/MWh in 2018-19), which is set to ensure a marginal generator can recover its cost by entering a market in an environment where the level of load shedding has just breached the reliability standard. More details can be found in the Reliability Panel's 2018 reliability standard and settings review (available at <https://www.aemc.gov.au/markets-reviews-advice/reliability-standard-and-settings-review-2018>)

This raises the question about the suitability of the existing reliability framework and the reliability standard in managing a system with increased risk and uncertainty. The current standard based on an average USE has the following issues:

- It does not adequately take into account the severity of tail-end risks - other metrics such as conditional tail risk and "USE at risk" can provide better insights.
- It equally weights all USE events. If there is a higher cost, for example, of more severe USE events then this metric underestimates the cost of load shedding.
- It ignores risk aversion which is a common human behaviour, as evidenced by the prevalence of insurance products in daily life.

The above suggests that not only is the current standard potentially set at an inefficient level, it also lacks an explicit risk dimension, and does not reflect the value of insurance and risk mitigation. When risk averse economic agents make decisions, the trade-off is not only based on expected cost and benefit, but also on the spread or variance of risk. In the absence of an explicit standard for risk mitigation, USE risk for the end consumers is predominantly managed through retailers' portfolio management. AEMO considers this dynamic is unlikely to be appropriate for managing tail-end USE risks, due to the potential misalignment of USE cost and risk preferences between market participants and the end consumers. This is explained further in the Box below.

Box 1: Mis-alignment of risk preference between market participants and the wider community

While individual market participants might respond to a more volatile system through changes in their investment, operation and contracting strategies, their optimal decisions are made with respect to their own portfolio and risk preferences. Apart from the potential intrinsic difference in risk preferences between retailers and the wider community, the cost suffered by a retailer and the community is also different in a load shedding event.

The cost of USE to the end user is measured at VCR (approximately \$33,000/MWh on average based on the 2014 estimate), but the cost to the retailer is close to zero if its load is disconnected or completely covered by contract. Even if the retailer's load is not disconnected and is unhedged, its maximum cost is only \$14,500/MWh at market price cap, which is significantly smaller than the VCR. In addition, retailers can manage high prices events through either weather derivatives or pool pass-through contracts, which could further reduce their cost during load shedding events.

The difference in cost and potentially risk preference means the optimal risk outcome for a retailer can be different to that for the end consumers.

2.3 The AEMC's proposed approach to assess the appropriateness of the reliability standard

A key concern raised by AEMO about the current reliability standard is the lack of explicit metrics on USE risk limitation. While we acknowledge that setting an acceptable level of risk will inevitably involve a degree of subjectivity, it should not be assumed that any risk outcome delivered by a decentralised market is efficient. We would like to note that externally enforced risk regulation practices exist in other workably competitive markets such as the finance and banking sector⁴. For example, the Australian Prudential Regulation Authority regulates residential mortgage lending practices.

⁴ <https://www.apra.gov.au/sites/default/files/141209-Letter-to-ADIs-reinforcing-sound-residential-mortgage-lending-practices.pdf>

It is unclear to AEMO how a decentralised competitive market would deliver efficient risk management outcome with respect to reliability. AEMO would value an explanation of this from the AEMC. In particular, AEMO is interested in understanding the following:

- What is an objective and verifiable “efficient risk outcome” in terms of reliability for end consumers?
- The typical explanation of risk allocation and management in the NEM is that retailers manage risks on behalf of end consumers through their investment, operation and hedging decisions. However, the optimal risk outcomes might differ between the retailers and end consumers if they do not have the same preference.

For example, in a load shedding event, the end customers’ loss is measured at VCR and the loss of a retailer is at most at the MPC for its unhedged load. To the extent that the current (average) VCR is significantly higher than the MPC, it seems the trade-offs in avoiding load shedding are different between end consumers and retailers. AEMO would like to understand whether such mis-alignment in load-shedding cost could cause obstacles to deliver the optimal reliability outcome for the consumers?

- More generally, there is an extensive body of economic literature where the mis-alignment of preferences between the parties can lead to sub-optimal outcomes including risk management. A typical example in the financial sector is that fund managers typically have different preferences to their client, so that the best decision for the former can lead to an inefficient outcome for the latter. Hence externally imposed regulation could lead to efficiency improvement. It is conceivable that the preferences of retailers and end consumers can differ significantly. Generally, retailers’ make decisions, including optimising their financial risks, with respect to their own portfolio, whereas end consumers’ reliability risk involves physical loss of electricity and the consequent forgone consumption value.

Given the potential difference in preference, AEMO would like to understand how do retailers’ optimal choices with respect to their own portfolio lead to the efficient reliability risk outcome for end consumers?

AEMO proposes that the AEMC could seek advice from experts from other markets that specialise in risk management to determine whether some explicit risk management standard should be incorporated in the reliability framework and if so, the appropriate form and level of the metrics. AEMO welcomes the opportunity to continue to work with the AEMC and the stakeholders on this issue.

3. AEMO's view on procurement options 1 and 3

AEMO does not support either option 1 or option 3, as we do not believe they will lead to an efficient reliability outcome. Option 1 seeks to link the RERT procurement trigger and volume to the reliability standard, which, as we previously argued in Section 2.2, will lock the market into an inefficient level of reliability. AEMO does not consider this to be in the long-term interest of consumers for the following reasons:

- It might under-utilise cost effective resources to manage involuntary load shedding, leading to higher involuntary USE costs to consumers.
- It might expose the market to a large amount of load shedding risks in plausible but extreme USE events.
- It could increase the direct cost of RERT as potential providers might need a higher availability payment to recover their costs if they are not certain whether they will be required in the future.

AEMO also disagrees with the way the reliability standard is “operationalised” as in option 3. According to the options paper, this approach would allocate an annual standard into monthly (or more granular) time slices, by “[modelling] a year with 0.002 percent unserved energy to obtain a distribution of USE”.⁵ AEMO considers this to be problematic both in theory, as it does not seem to reflect the same trade-off in the current reliability standard, and in practice, as it is unclear how a representative USE distribution can be found at monthly level.

While AEMO has reservations about the current reliability standard itself, option 3 is, theoretically, a simple allocation approach which is likely to be inconsistent with the trade-off embedded even in the current standard. It is difficult to see how the proposed allocation approach balances the marginal benefit of avoiding load-shedding and marginal generation cost. Taken to the most extreme level, if one were to perform the allocation for every half-hour, it would lead to less than 100 kWh of USE target on average in any region in any half-hour, which means AEMO practically would need to ensure the system has no USE at any time. In fact, the reliability standard at the annual level is a “planning standard” designed for incentivising new generation investment over the long term. AEMO questions the merit of simply allocating it into smaller pieces at monthly, or even more granular “operational” framework, where it is no longer appropriate to trade off load shedding against generation investment cost.

In practice, AEMO considers that using a single, or even a few “benchmark years” with 0.002% USE will not lead to a representative monthly distribution of USE and would be contradictory to the very design of the current reliability standard. The average USE metrics from the current standard is based on the average outcomes from a wide range of simulations in which USE outcomes can vary greatly depending on weather and outage patterns. Using a few years with 0.002% annual USE could potentially bias the distribution if years with significantly more or less annual USE have different monthly USE distribution patterns.

⁵ AEMC, *Enhancement to the Reliability and Emergency Reserve Trader, Options Paper*, 18th October 2018, p55

The other practical question is whether the “benchmark years” need to be updated to reflect AEMO’s best knowledge about the market condition so that it is forward looking. For example, if AEMO is made aware of a significant planned generation outage event in a coming shoulder month but does not update this input in the “benchmark years”. The benchmark might lead to very a low USE target for that shoulder month, but there would be USE well in excess of the target due to the outage in reality.

The above discussion seems to suggest that one needs to use the same range of forward looking inputs as in AEMO’s MT PASA modelling to obtain a representative USE distribution. However, as the modelled USE quantity and the benchmark monthly USE proportion are drawn from the same inputs and modelling, the monthly USE quantity will exceed the monthly target if and only if the annual USE quantity exceeds the annual standard. This seems to make the exercise in option 3 entirely redundant. The same argument applies to allocating USE to other time slices.

4. AEMO's Preferred Procurement Option

AEMO's preferred option is Option 2 with a slight modification to incorporate the risk aspect. It is a broader cost and risk assessment framework to procure RERT to ensure the delivery of the efficient level of reliability. Under this option, RERT will be procured to minimise the combined load shedding and RERT resource cost, subject to containing USE risk within a tolerable threshold. This proposal follows from our discussion in Section 2.2 (and detailed in our Additional Information Document), as AEMO believes that the efficient level of reliability should also incorporate some risk metrics. Currently the exact form and level of these metrics is still unclear, but AEMO considers they should capture the size, likelihood and shape of tail risks. Therefore, the examples used are for illustration purpose only. AEMO is willing to engage with the AMEC and stakeholders on the design of the appropriate risk metrics.

4.1 The assessment framework

The objective of the assessment framework is to find the optimal resource mix that minimises the combined RERT resource and residual USE costs, subject to satisfying the appropriate risk metrics. It would broadly utilise the following inputs:

- Forecast USE outcomes: The USE forecast would come from a wide range of POE, weather pattern and outage scenarios. An example input source could be MT PASA or ESOO.
- Cost of USE: The cost of USE would be informed by VCR based on the relevant characteristics such as time, duration, magnitude and (if possible) customer segment. The AER has recently initiated its VCR study and it is expected that VCR values reflecting these characteristics will be available in late 2019.
- Cost and operating characteristics of RERT resources: The cost of RERT will consist of availability, activation and usage cost. Operating characteristics of these resources, such as lead time and usage limit will also be taken into account.
- Some externally set metrics that set the limitation of allowable USE risk in the system.

Figure 1 illustrates the procurement outcome when the model is set to minimise only economic cost, as described in option 2. A total of 763 MW of resources are procured in this instance. However, as risk is not explicitly constrained, this results in the following risk outcomes (as measured by example risk metrics), shown in Figure 2, which, could be excessive depending on the limitation of allowable USE risk:

- The top 2.5% of USE outcomes have an average 520 MW of USE (conditional tail expectation, left panel). The example risk limitation is 200 MW average for the top 2.5% USE outcome.
- Conditional on USE occurring, there is approximately 4% probability that there will be more than 200 MW USE (USE at risk, right panel). The example risk limitation is less than 1% probability of having more than 200 MW USE.

Figure 1 Resource procurement without explicit risk limitation

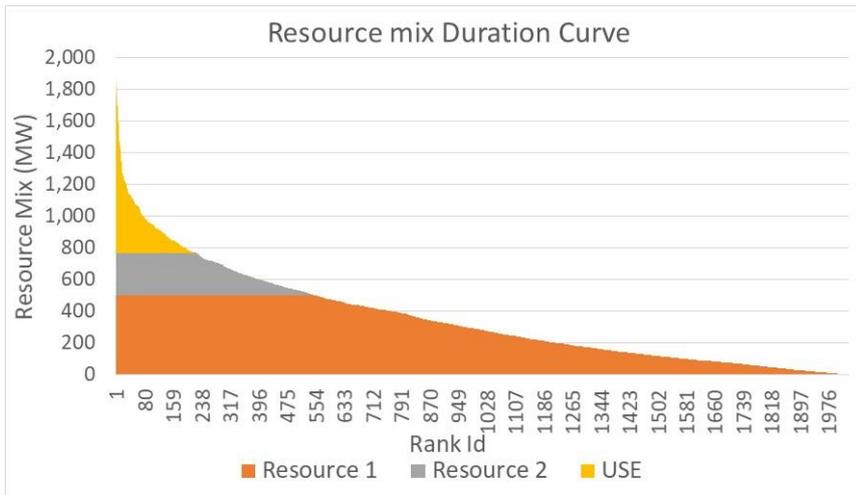
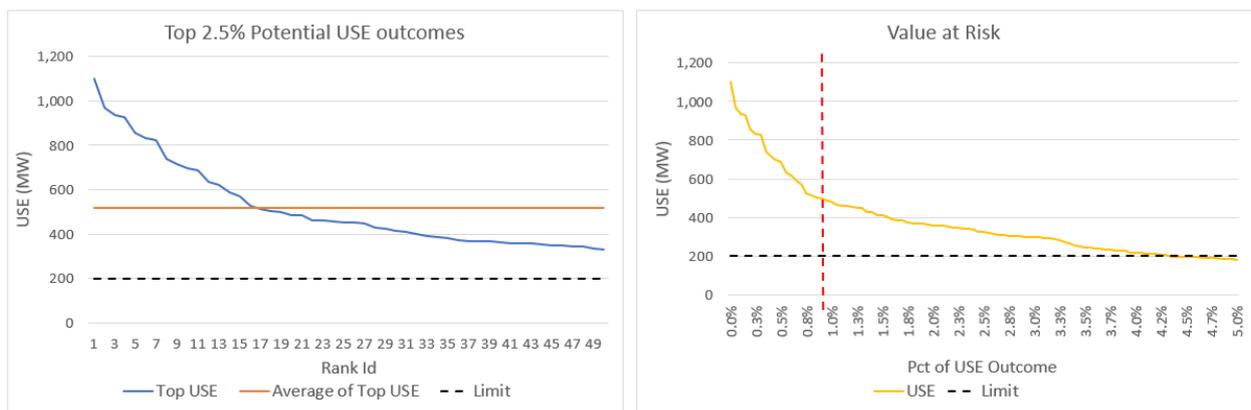


Figure 2 Risk outcome without explicit risk limitation



Imposing some risk limitation would mean that more resources need to be procured, however the cost minimisation requirement will still ensure that the lowest economic cost will be incurred subject to meeting the risk requirement. Figure 3 shows that to satisfy the above risk limit, a total of 1083 MW resources is needed. The resulting risk outcome is within the required limit, as shown in Figure 4.

Figure 3 Resource procurement with risk limitation

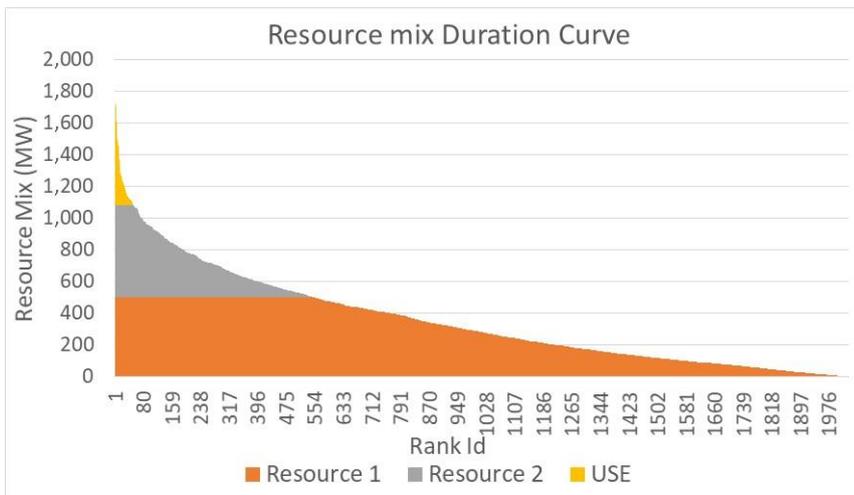
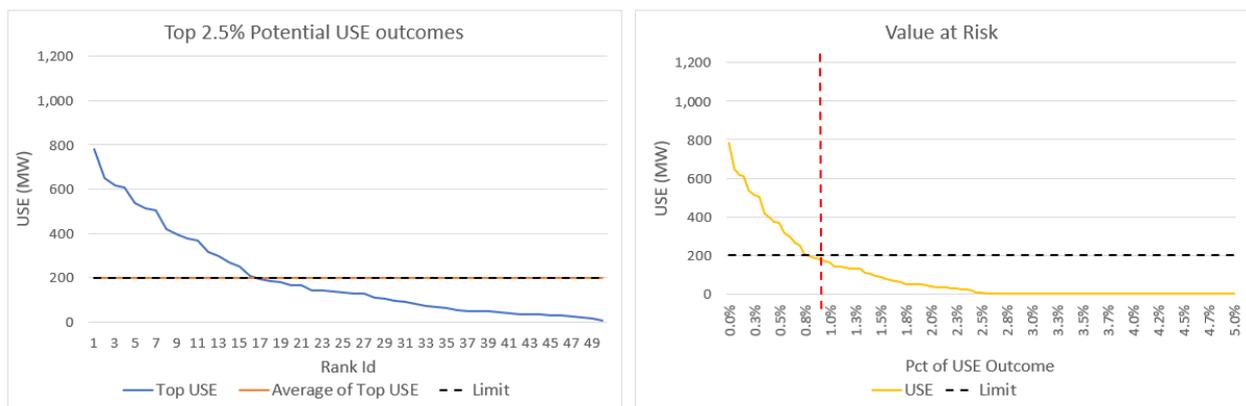


Figure 4 Risk outcome without explicit risk limitation



4.2 Efficiency implication and interaction with the reliability framework

AEMO believes our proposed assessment framework will deliver an efficient reliability outcome, which is the explicit objective of the procurement methodology and consistent with the NEO. While some cost will be incurred for RERT procurement, it will result in lower USE cost and risk.

A key feature of our proposed framework is the delinking of the procurement trigger and volume from the current reliability standard. In its options paper, the AEMC notes⁶ that,

“ 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.

⁶ AEMC, *Enhancement to the Reliability and Emergency Reserve Trader, Options Paper*, 18th October 2018, p50

As discussed in Section 2.2, AEMO considers the current reliability standard does not reflect the efficient level of reliability. Therefore, linking RERT procurement to such a standard will likely lead to under-procurement of RERT and locks the system into an inefficient reliability outcome. Ensuring an efficient reliability outcome should take primacy over the notional linkage between RERT and the reliability standard. The linkage should be a means to achieve an efficient reliability outcome, not an end in itself. If the proposed broader cost and risk assessment reflects truly efficient reliability trade-offs, then RERT procurement decisions should be assessed against this framework.

There are some concerns that RERT is a market distortion and could draw resources away from the main energy market. While AEMO agrees that in principal, generation resources on the margin might opt to participate in the RERT instead of the energy market, we question the practical significance of such an effect. AEMO recommends that the AEMC should undertake some formal analysis to quantify the cost of market distortion and its impact on wholesale energy costs. AEMO considers that the impediment to deployment of new resources such as demand response is more likely caused by existing barriers in the market arrangement rather than the existence of RERT. In fact, the AEMC's Reliability Framework Review⁷ (RFR) explicitly made recommendations to remove barriers to entry for demand response providers. Even if RERT does introduce some limited distortion, it should be assessed against the benefit of addressing existing inefficiencies in the market, such as the inefficient reliability outcome. Linking RERT procurement to an inefficient reliability standard is likely to do more to perpetuate the inefficient reliability outcome than mitigating any potential market distortion in investment. Further, market distortion can be reduced by the following measures:

- Implementing the recommendation in the AEMC's Reliability Framework Review.
- Our proposed procurement methodology, when identifying the optimal resource mix, will place a limit on the amount of availability cost a potential provider can receive from RERT.
- Strengthening out-of-market provision in the NER for RERT providers.

AEMO does agree that in an ideal world, RERT, as a reliability response, should be an integral part of the reliability framework and should reflect the same efficient level of reliability as the reliability standard. We propose that the AEMC should instead modify the reliability standard and framework so that it reflects the true cost and risk trade-offs and is fit-for-purpose in the current NEM. An efficient reliability framework would then subsume the proposed assessment framework for RERT, which will automatically link RERT procurement back to the framework.

⁷ AEMC, Reliability Framework Review, Final Report, 26th July 2018.