21 March 2019

Mr John Pierce
Chairman
Australian Energy Market Commission
PO Box A2449
Sydney South NSW 1235

10 Eagle Street
Brisbane QLD 4122
T 07 3347 3100

By electronic submission

Dear Mr Pierce

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

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

The AEMC published its draft determination on 7 Feb 2019, which ruled against AEMO's proposed broader economic cost and risk assessment framework for determining RERT procurement trigger and volume and reinforced the linkage to the reliability standard, which the AEMC considers to still be appropriate. The AEMC also decided that an explicit risk metric is not needed for the reliability standard or RERT procurement. The AEMC's draft proposed tightening of the out-of-market restrictions and decided against AEMO's proposed multi-year contract. The reasons for the draft decision are due to concerns about RERT's potential to cause market distortion and increase to consumers' electricity cost.

AEMO does not share the AEMC's view above and is concerned that the draft rule will expose consumers to excessive tail-end reliability risks. As AEMO has raised in several of public filings, the risk for large USE events has increased recently due to more extreme weather, higher outage rate of aging generation assets and uncertain output of renewable plant. The January 2019 load shedding event, in which the total energy not served by the market in Victoria (including avoided load shedding through RERT dispatch) was more than double of the region's annual reliability standard, is a demonstration that such risk is real. AEMO is unconvinced of the AEMC's claim that there is no need to explicitly incorporate risk aversion in the reliability standard or RERT procurement, or that the market is best placed to manage reliability risk for end consumers. AEMO is concerned the proposed draft rule will not provide adequate protection for consumers against tail-end reliability risks.

In the attached submission, AEMO has described in detail our view on the AEMC's draft determination as well as our concerns and recommendations regarding the specific rules. 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

Peter Geers
Chief Strategy and Markets Officer

Attachment: Enhanced RERT AEMO Submission – Submission to the AEMC's Enhanced RERT Draft Determination

AEMO
AUSTRALIAN ENERGY MARKET OPERATOR

Enhanced RERT AEMO Submission

March 2019

Submission to the AEMC's Enhanced RERT Draft Determination

Contents

1. Introduction

AEMO welcomes the opportunity to provide a submission to the AEMC's draft determination regarding the Enhancement to the Reliability and Emergency Reserve Trader (enhanced RERT) rule change.

On 9 March 2018, AEMO submitted the enhanced RERT rule change proposal to the AEMC. The proposal targeted improvement to RERT as a safety net mechanism to more effectively manage the growing risk of involuntary load shedding in the NEM. AEMO proposed to enhance RERT's function as an insurance mechanism against tail-end reliability risks through delinking its procurement trigger and volume from the reliability standard. Instead AEMO proposed that RERT procurement decisions should be determined through an economic cost and risk assessment framework. In subsequent submissions, AEMO clarified that the current reliability standard, based on an average USE, can expose consumers to extreme USE events. Hence, AEMO proposed that the assessment framework incorporate an explicit risk metric to allow AEMO to procure adequate RERT resources to protect consumers against tail-end reliability risks.

To increase the resource pool and make RERT more cost effective, AEMO proposed that the procurement lead time be extended from 9 months to 12 months, and that AEMO be permitted to sign multi-year contracts where they lower the overall cost.

The AEMC published its draft determination on 7 Feb 2019 which included consulting on the appropriateness of the reliability standard. The AEMC draft has ruled against AEMO's proposed broader economic cost and risk assessment framework for determining RERT procurement trigger and volume and has reinforced the linkage to the reliability standard, which the AEMC considers to still be appropriate and not in need of an additional explicit risk metric. The AEMC's draft also ruled against AEMO's proposed multi-year contract and proposed tightening of the out-of-market restrictions. The reasons provided for the draft decision are concerns about RERT's potential to cause market distortion and increase to consumers' electricity cost.

AEMO does not share the AEMC's view on the appropriateness of the reliability standard, or its assessment of RERT's potential for market distortion and customer bill impact. AEMO considers that:

- There is ample evidence in AEMO's forecasts as well as real market events to highlight that tail-end risk is a real concern in the NEM and the risk has increased in recent years.
- The current reliability standard, with its average USE metric, is inadequate in protecting consumers from tail-end reliability risks, which would leave them worse-off. An explicit risk metric is needed to protect consumers if they are risk averse against reliability load shedding. The AEMC should undertake an empirical study to investigate the existence and extent of risk aversion towards reliability risks and should consider the abundant international examples showing system operators procuring more resources than their reliability standards to account for these risks.
- AEMO does not agree with the AEMC's view of RERT's impact on consumer costs. The January 2019 load shedding event demonstrated that RERT is cost effective in avoiding involuntary load shedding, with average costs significantly less than Victorian VCR. Further, if risk aversion towards load shedding is real, consumers would be better off if RERT reduces such risks.
- AEMO is not convinced by the AEMC's conclusion on RERT's potential to cause market distortion. We consider the concerns about market distortion could be misplaced when the market has not delivered the optimal outcome for managing reliability in the first place. AEMO is not convinced by the AEMC's assertion that the market is best placed to manage reliability risks for consumers and is seeking further detail from the AEMC on how this works with respect to the operational concerns we raised in Section 4.

AEMO believes the AEMC's draft rule will result in RERT being less effective, by potentially reducing the supply pool as well as increasing the cost of RERT resources. The current approach does not provide AEMO with enough flexibility as the procurement decision is linked to the reliability standard. This standard as discussed below does not provide adequate protection for consumers against large tail-end reliability risks. AEMO believes the current rule will expose end consumers to extreme USE risks, thus leaving them worse off.

In addition, AEMO has several concerns regarding specific details in the rules, and has offered some alternatives options in the current submission including:

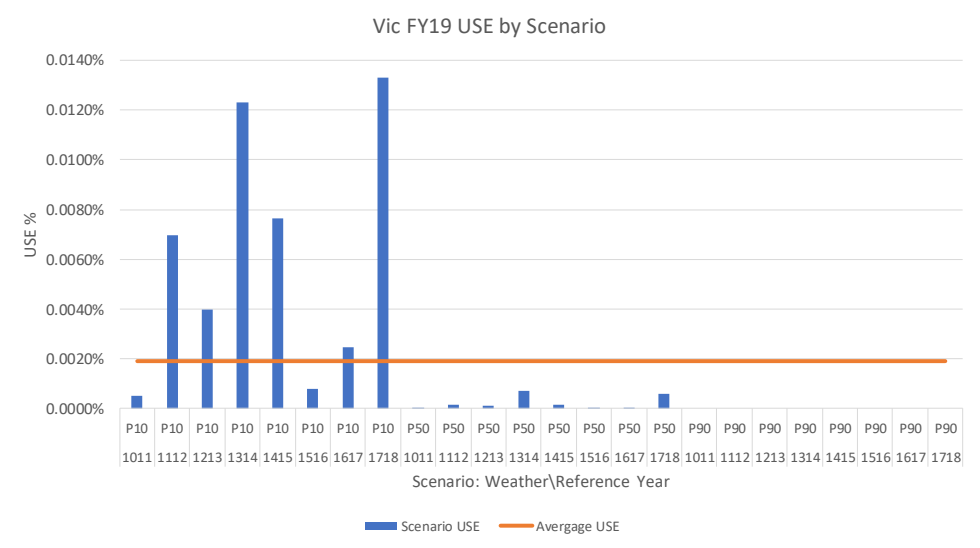
- Some of the reporting requirements are impractical and seem to provide little value to stakeholders when assessing the information to be provided. We propose the AEMC should modify the drafting to focus on information that would ultimately provide value for stakeholders and end consumers.
- The proposed "estimated load shedding VCR" seem to contradict the AEMC's own determination that the reliability standard will determine the volume of RERT. We propose the AEMC remove this requirement, or at least clarify a few operational aspects of this requirement.
- AEMO does not favour removal of the system security procurement trigger, in light of considering the emerging system security issues, before an adequate framework for procuring these emergency services is in place.
- AEMO considers the proposed implementation timeline does not provide AEMO enough time to develop the required new methodology and undertake consultation. AEMO proposes to postpone the date of the rule taking effect until on or after summer 2020, noting that in the lead up to and during summer, AEMO's operational staff are particularly occupied.

2. Increasing tail-end risks in the NEM

2.1 Tail-end risk and the January 2019 load shedding event

AEMO has observed a significant increase in NEM reliability risk in recent years due to a combination of extreme weather patterns, higher outage rates from ageing generation assets and the uncertain outputs of variable renewable generation plant. While the probability for "right combination" of these factors occurring is low, they are likely to lead to large amount of load shedding, and hence represent "tail-end risks" for end electricity consumers. The profile of risk is illustrated in AEMO's 2018 ESOO USE forecast, as shown in Figure 1. Each bar represents the forecast average USE[1] (as a proportion of annual energy consumption) for Victoria over different POE and weather reference years. The chart shows that USE outcomes are highly skewed: while USE are concentrated in POE10 scenarios, they tend to be very large, and significantly above the 0.002% reliability standard. As each scenario (bar) in Figure 1 is averaged over all outage simulations, individual USE outcomes *within* each scenario could be even more volatile.

Figure 1 Distribution of Victorian USE[2] for FY19 in ESOO 2018



The extent of reliability risk is demonstrated in the January 2019 Victoria load shedding event, which was driven by high demand and loss of thermal generation supply due to very high temperatures, along with low output from renewable generators. In one *single* heat wave that lasted for two days, the amount of electricity

[1] AEMO's 2018 ESOO forecast used approximately 1600 simulations consisting of different POE (10 and 50), weather reference year (2010-11 to 2017-18) and generation outage patterns. Each bar shown in this chart is averaged over all generation outage pattern for each POE & reference year scenario.

[2] The USE in this chart represents the amount of electricity demand not supplied by the market and include the involuntary load shedding that would have been avoided through RERT and direction.

supply lost in Victoria (including involuntary load shedding and those avoided by RERT dispatch) is approximately equal to the 2.5 times of the region's *annual* reliability standard.

On 24 and 25 January, Victoria experienced a heat wave which caused the maximum temperature to rise above 40 degrees Celsius on both days. Consequently, operational peak demand in Victoria was around 9300 MW on both days. The heat wave also affected South Australia on 24 January, with maximum temperatures above historical records[1] and peak demand at 3240 MW, roughly the same time as Victorian system peak. Victoria also experienced a large reduction in thermal generation operating during the event. On 25 Jan 2019, thermal generation capacity in Victoria had been reduced by more than 1600 MW, due to a combination of maintenance and unplanned outages of brown coal generators and capacity reduction of other thermal generating units. Renewable output was also limited on both days, with a combined solar and wind output of approximately 20% and 50% of total installed capacity during peak demand for 24 and 25 January in Victoria. As a result, AEMO dispatched RERT on both days. However, after exhausting all RERT resources that could be activated in time, there was still insufficient supply to meet demand on both days and AEMO subsequently determined load shedding was required in Victoria to maintain system security.

While the numbers are still preliminary, it is estimated that the total amount of involuntary load shedding on both days was 1015 MWh, which is approximately 15% above the annual reliability standard for Victoria. In addition, the activation of RERT is estimated to have avoided another 1252 MWh of involuntary load shedding. Therefore, the total amount of energy not served by the market is estimated to be 2267 MWh, or approximately 2.5 times of the annual reliability standard for Victoria. The total RERT cost (excluding compensation to affected participants) on both days was 30.62 million, with a total of 2984 MWh of RERT activated.[3] RERT proved to be a cost-effective tool in managing the load shedding event on both days, with an average cost of $10,261/MWh and avoided load shedding cost at $24,457/MWh, significantly less than the average Victorian Value of Customer Reliability (VCR) of $32,620/MWh.[4]

2.2 The growing trend of tail-end risks

The January 2019 load shedding event is not an isolated incident, but part of a growing trend from early 2017 that demonstrates tail-end reliability risks have increased in the NEM as it transitions away from an over-supplied market.

In February 2017, there were two instances where electricity supplies had been interrupted due to shortage of generation. On 7 February 2017, AEMO instructed 100 MW load shedding in South Australia for 30 minutes, although a software error caused approximately 300 MW load to be disconnected in the region. On 10 February 2017 AEMO instructed approximately 300 MW load to be shed in NSW for about an hour.

While 2018 did not see any actual load shedding, there have been a few "near-miss" events in Victoria. The five days of highest demand were as follows:

Table 1 Five Highest Victorian Demand Days Summer 2017-18

Date	Weekday	Max Demand (MW)	Olympic Park Temp °C
18 Jan 2018	Thu	9,125	40
19 Jan 2018	Fri	9,153	40.3
28 Jan 2018	Sun	9,144	38.1
29 Jan 2018	Mon	8,953	33.5

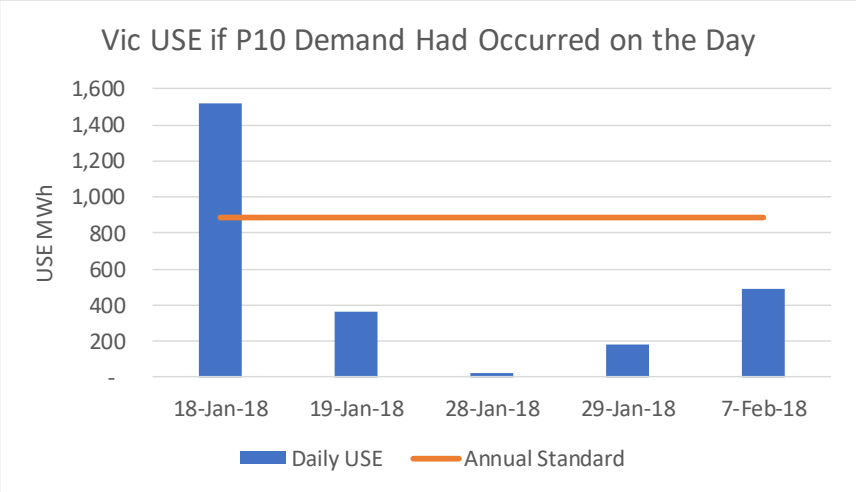
[3] In general, more RERT would be dispatched than the exact amount needed to avoid load shedding. This is due to the blockiness of resources, unexpected changes in market condition and using RERT to creating some reserve headroom.

[4] See AEMO, Value of Customer Reliability Review, Appendix, p 5. Note the values are in 2014 dollars and have not been adjusted by inflation.

Date	Weekday	Max Demand (MW)	Olympic Park Temp °C
7 Feb 2018	Wed	9,102	37.4

The 28 January saw record demand for a non-workday and 29 January was on track for a high demand before a cool change swept through in the afternoon. It is possible to estimate what the USE would have been if POE10 temperatures had prevailed (around 43.5°C) on any one of the 5 highest demand days by comparing the reserve conditions during the day with the additional demand resulting from a POE10 demand. This is shown in Figure 2.

Figure 2 Counterfactual USE if POE10 demand occurred



On 18 January the temperature was close to 40°C corresponding to a POE50 day. If, however, the day had turned out to be a POE10 day the resultant USE would have exceeded the *annual standard* in just one day. This outcome driven by the additional P10 demand being more than 1000 MW higher than the actual demand on those days and there being limited reserves available. On 19 January the reserves could have been even lower as Basslink was in danger of being fully de-rated due to the temperature at George Town, Tasmania approaching Basslink's operating limit.

3. The reliability standard and tail-end risks

3.1 Implication of the reliability standard on tail-end risks

The current NEM reliability standard is based on an average 0.002% USE metrics where equal weights are given to scenarios with no load shedding and those with large amount of USE. The current reliability standard would imply the following:

- There will be some risk of load shedding due to generation shortage. For example, in Victoria, when the market *just meets* the reliability standard, the amount of load shed is equivalent to 400,000 households experiencing 30 minutes *on average* each year.[5]
- Such outages are a particular risk during summer heat waves when temperatures are above 40 degrees.
- The amount (MW) of outage can vary by year, and the current reliability standard allows the number of households experiencing outages to be much higher than the average.

AEMO considers that the above is not an appropriate measure, as the average metrics conveys no information about the extent of tail-end risks. As shown in Figure 1, when the market just meets the reliability standard, the amount of load shedding could in fact be multiple times of the 0.002% metrics given the "right" yet plausible combinations of demand and supply circumstances. As these are likely to coincide at times when people need electricity the most (e.g., during summer heat waves) these tail-end events could have significant adverse impact on end consumers.

The AEMC concluded in the draft determination that the current reliability standard remains appropriate and there is no need to incorporate any additional risk metric. In addition, it also maintained the linkage of RERT procurement, in terms of both trigger and volume, to the standard, because:

- Reliability events are managed through rotational load shedding which will minimise the impact on individual consumers.
- There is no evidence of risk aversion regarding reliability
- The perceived adverse impact on end consumers as RERT increases their electricity bill.
- The AEMC's assertion of RERT being distortionary and its belief that the market is best placed to manage tail-end reliability risks

AEMO does not share the AEMC's view on these points, as discussed in the Section below and Section 4.

3.2 Rotational load shedding does not guarantee low impact on consumers

The draft determination maintains that load shedding for reliability has a low impact on end consumers because it is rotated across the region and hence individual consumers will only be affected for a limited

[5] This assumes on average each household lose 2kWh of energy when their load is shed.

duration. However, in practice rotational load shedding is managed manually, the process can be risky and prone to error. This is evidenced by the Feb 2017 South Australia load shedding event, where an instruction to disconnect 100 MW load resulted in the incorrect disconnection of 300 MW load.[6] Larger events with more MW shed and longer duration would likely experience more difficulties in the process. Further, the exact load amount that can shed within each block can be uncertain. AEMO is investigating the extent to which rooftop solar has resulted in shedding areas with net generation, so that "load shedding" a block would worsen the supply/demand balance rather than improving it. Restoration of load after a large load shedding event could also pose a challenge and needs to be carefully managed. This is evidenced by the difficulty of restoring South Australian load after the 2016 blackout event, even when enough generation capacity was available.

The AEMC considers in the draft that there is a clear distinction between reliability events and system security events[7]. AEMO's view is such a line of distinction is often blurred during load shedding, as AEMO may instigate load shedding to maintain power system security. For example, on 24 and 25 January, load shedding was required to maintain interconnectors at their secure limits. When load shedding (actual LOR3) occurs, the system has expended its reserves. Further unplanned contingencies during the load shedding process, such as a trip of a generation unit or an error in the load shedding process, could cause the system to be insecure and potentially lead to cascading load shedding, losing more MWhs than the original contingency size.

3.3 International comparisons and evidence of risk aversion

AEMO's view differs from the AEMC's reasoning that there is a lack of evidence of risk aversion and therefore a risk metric within the reliability standard is not required. This is the first time such an issue has been seriously considered when assessing the appropriateness of the reliability standard, and no empirical or field work has been carried out to test this in the NEM to date.[8] The recent January 2019 load shedding event with many affected customers would provide a valuable opportunity to gather information on this subject. For example, one could directly target the affected Victorian consumers and design questions to estimate the materiality of risk aversion towards load shedding. If this is outside the scope of the AER's VCR study, additional studies could be commissioned.

In addition, there is ample international evidence suggesting that:

- Reliability standards are typically set at much tighter levels in other international jurisdictions
- System operators often procure to a higher reliability level than implied by their reliability standards.

Table 2 summarises the different metrics that are used in reliability frameworks across international jurisdictions. The jurisdictional comparison reveals that the NEM standard is quite unique in relying on a single average USE measure without supplementary metrics. It is also generally not as restrictive as standards in other countries. For comparison, the 2018 ESOO USE forecast in Victoria over 2018-19 is close to the NEM's 0.002% standard but translates into a 1 in 10-year LOLE of 7.2 days and an LOLP of 31%, which are much less restrictive compared to the standards used in US.

Table 2 Comparison of reliability metrics used internationally

Metric	Annual Standard	Jurisdiction	Supplementary Requirement	Market Type
USE	0.002 %	WEM (Aus)	Reserve margin = greater of 7.6% or largest unit	Capacity

[6] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 63-64.

[7] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 64-65.

[8] It is unclear VCR could explicitly measure risk aversion as they measure the cost during certain events, but not consumer's preference to risk. As an analogue, one could lose $100,000 in a car accident, but the preference for risk aversion is measure by the risk premium one is willing to pay to avoid such cost.

Metric	Annual Standard	Jurisdiction	Supplementary Requirement	Market Type
		NEM (Aus)		Energy only
	300 MWh (0.0005%)	AESO (Alberta, Canada)		Energy only
1 in 10 LOLE	2.4 hours	NY-ISO, PJM, ISO-NE (US)		Capacity
		ERCOT (Texas)	Non-binding 13.75% reserve margin[9]	Energy only
	3 hours	National Grid (GB)	Sufficient capacity for a 1 in 10 year winter peak	Capacity
	3 hours	RTE (France), Elia (Belgium)	< 20 h lost load 95% of the time	Capacity
	8 hours	EirGrid (Ireland), Portugal	Index of load served > threshold 95% of the time	Energy only
LOLP	4 %	NWPCC (US)		Capacity
	15 %	OCCTO (Japan)	Based on 0.3 days/month LOLP during peak periods	Energy only

The AEMC requested Brattle undertake a review of reliability framework from four international jurisdictions and found that

> **"None of them explicitly discuss risk aversion…. [I]n all four of the overseas jurisdictions that we reviewed, the reliability frameworks ultimately resulted in the system operator procuring more resources than system modelling shows is needed to meet the reliability standard."[10]**

First, we would like to note that the statement that "none of the four jurisdictions explicitly discuss risk aversion" seems to directly contradict an earlier discussion in the determination where it acknowledges that the Great Britain's "least-worst regret" approach accounts for risk aversion.[11] The amount of resources procured under this approach is typically determined by the cost functions associated with the two most extreme (best and worst) scenarios,[12] and typically is higher than modelling based on a risk neutral approach.

It appears to AEMO that the study highlighted that all four international system operators have been able to procure more resources than needed to meet the reliability standard and presented strong evidence for adopting a risk aversion framework. In fact, through advocating an explicit risk metric that accounts for the trade-off against higher bills, AEMO has proposed an improvement over our international counterpart's practice by making any proposed procurement more transparent.

[9] ERCOT is moving towards economically optimum and market equilibrium reserve margins in lieu of static reserve margins.

[10] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, p 66.

[11] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, p 51.

[12] Brattle, High Impact, Low Probability Events and the Framework for Reliability in the National Electricity Market, pp 37-38.

4. The perceived high costs and market distortion of RERT

The AEMC considers the perceived high impact to customer bills of RERT and RERT's potential for market distortion are of significant concern. In addition to concluding that an additional risk metric is inappropriate, both these factors seem to weigh heavily in the AEMC's decision to limit resources from participating in RERT and restricting AEMO's procurement flexibility. AEMO is not convinced by the analysis provided in the draft determination as discussed in the following section.

4.1 The perceived high-cost of RERT

The January 2019 load shedding event demonstrated that RERT is a cost-effective tool to manage tail-end reliability risks. In total, nearly 3000 MWh of RERT was activated and avoided 1252 MWh of involuntary load shedding at a total cost of 30.62 million.[13] The avoided load shedding cost is $24,457/MWh, significantly less than the average Victorian VCR of $32,620/MWh. While RERT costs are passed through via higher electricity bills to end consumers, they must be weighed against the avoided load shedding cost. In the January event, the 30.62 million cost helped avoid a load shedding cost of 40 million, which clearly is a net benefit to end consumers.[14] This highlights that demand response resources can be a cost-effective means to manage tail end events.

It seems premature to consider higher electricity bills to consumers are bad *per se* without considering the benefit of *reducing tail end reliability risks*. If empirical data shows risk aversion towards load shedding is real (see Section 3.3), it might be *efficient* to pay additional costs to reduce the risk. Not doing so might expose consumers to an inefficient level of risk and leave them worse off.

AEMO's proposal to contract for multiple years was designed specifically to reduce the cost of RERT. As explained previously,[15] one potential barrier to RERT providers is the uncertainty of recovering their deployment and mobilisation costs (including the cost of negotiating and entering contracts) over a short payback period. This dynamic leads providers to increase their RERT offers, or even withdraw from supplying RERT altogether. The proposed multi-year contract would provide more certainty to RERT suppliers as it allows them to spread their fixed cost over potentially up to three years, which further reduces the cost of RERT reserves.

[13] It needs to be noted in addition to avoiding load shedding, RERT is also used to create reserves to cover LOR2 conditions to prevent potential system costs due to a large unexpected contingency event.

[14] This has not included the additional benefit of using RERT in LOR2 to prevent the system cost due to unexpected contingency.

[15] AEMO, *The NEM reliability framework, additional information from AEMO to support its Enhanced RERT rule change proposal,* pp 28-30.

4.2 The assertion that RERT causes market distortion

AEMO is not convinced by the analysis provided on the potential for market distortion caused by procuring RERT. The AEMC has not quantified the cost of market distortion either in terms of resource costs or its impact on pool prices.[16] The determination also cited availability cost as a reason for market distortion.[17] However, none of the RERT contracts signed by AEMO in 2018-19 so far has any availability cost. AEMO considers that most, if not all resources would not be in the energy market even without RERT.[18]

The draft determination maintains that reliability risk is best managed by the market[19] and the belief that the Retailer Reliability Obligation (RRO) will significantly improve reliability outcomes through the market, to the extent that it will materially reduce the use of RERT.[20] However, the RRO only requires retailers to cover up to 1-in-2-years but might not address the tail-end risks that are caused by POE10 events. In previous submissions, AEMO has raised concerns[21] about whether retailers would indeed manage reliability risks efficiently for end consumers. It seems there is significant asymmetry in a retailers' decision to optimise their portfolio and the end consumer's risk preference regarding reliability load shedding:

- Retailers' maximum loss during involuntary load shedding is at MPC if their *unshed* load is unhedged. Their loss is potentially zero if their load is shed during the process. Both are materially less than the current VCR for most end customers, implying the retailers' loss post load shedding is different to that of end consumers.
- Retailers generally only need to ensure that they have covered their load. They could hedge reliability risk through various means other than bringing on additional generation capacity. One alternative option is through a weather derivative. This particular approach to hedging does not seem to alleviate the risk of load shedding to end consumers.
- Even if some RERT resources will be moved into the market as the result of the new "out-of-market" provisions, participants will use them to optimise their own portfolio. As there can be significant differences in retailers' and end consumer's incentives and their risk preferences towards load shedding, there is no guarantee the contractors' decision will minimise the chance of load shedding. In recent years AEMO has observed many instances of the market not responding to market information or market notices.

Further, the NEM has undergone a period of transition from an over-supplied market to the current situation with significant tail-end reliability risks. The last announced withdrawal of a significant power station, Hazelwood, took place more than two years go. However, over the last two years there had been no significant increase in dispatchable capacity. The fact that the load shedding event took place in January 2018 despite all physically available capacity being used, with unserved energy (include those avoided by RERT) exceeding the reliability standard by multiple times, seems to be evidence that the market *has not even* delivered the average USE standard, let alone an efficient outcome to protect consumers against extreme tail-end risks.

AEMO considers that market distortion should not be a material concern if the market itself does not even deliver an efficient outcome for managing tail-end reliability risks. No in-depth analysis has been provided to explain the mechanism through which the market delivers such an outcome for end consumers, apart from re-iterating the market is the best way to deal with reliability risk.

[16] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 118-119.

[17] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 119.

[18] Otherwise a resource could always "outbid" its RERT counterparts by directly entering the energy market, which guarantees that it would be dispatched first.

[19] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, p 86.

[20] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, p iii.

[21] AEMO, RERT Procurement Option, Submission to the AEMC's enhanced RERT Options paper, p 6.

5. Impact and effect of specific draft rules

5.1 The new reporting requirements

AEMO agrees with the AEMC that additional transparency surrounding the procurement and operation of RERT in general will be beneficial to the industry. However, AEMO considers that some requirements in the quarterly RERT contract report are impractical to incorporate from a modelling perspective. Further, the proposed report on the reconciliation between forecast and outturn seems to be overly prescriptive as some differences are inevitable due to market changes and forecasting methodology. Reporting every detailed difference, especially those that are outside AEMO's control and cannot be systematically predicted, would add little value to stakeholders.

Methodology to determine RERT contract amount

The draft rule requires[22] AEMO to include, in the reserve contract report, a detailed explanation on how AEMO has determined the amount of reserve in accordance with its real-time operation of RERT, including how it determines the last time to intervene and determines that a market response would not avoid the need to activate and dispatch RERT.

It is impractical to incorporate such information in modelling, as the model is limited by the extent to which it can incorporate real-life variables. For example, in real life, a forecast Lack of Reserve Condition 3 (LOR3) condition might be avoided as the tight demand supply condition is alleviated due to an increase in wind, or a generator responded by making more capacity available. Conversely, an unexpected outage or under-forecast in demand could lead to an LOR3 condition with minimal time for the market to react. These uncertainties cannot be included in a model where inputs are deterministic, and consequently it is impossible to incorporate AEMO's decision around these uncertainties that are absent within the model. As such AEMO believes any information provided to stakeholders will be of little value in predicting future outcomes and at worst be misleading.

AEMO proposes the AEMC modify draft clause 3.20.6 (d) (2) (ii) by removing "including how those amounts were determined in accordance with the methodology specified in clause 3.20.7(e)(2)".

Report on dispatch or activation of reserves

The draft rule also requires[23] AEMO to provide a detailed report on why the amount of reserve activated and the period of activation is different to its forecast. AEMO considers such requirement to be too prescriptive.

It is expected that forecast and modelling *will differ* from actual outcome. This could arise because some real-life factors cannot be included in forecast and modelling. The difference may also arise due to inputs changing outside the control of AEMO, such as an unexpected trip of a transmission line or a generator. More importantly, AEMO provides forecast, including LOR and LRC conditions, so market participants *can react* to them.

[22] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.6 (d)(2)

[23] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.6 (e)(7) - (8)

It is unclear what useful information participants would be able to learn from a detailed report like this. AEMO supports reporting on the amount and period of RERT dispatch and outlining the major drivers that contributed to the differences between the actual outcome and forecast. It would be impractical for AEMO to provide a detailed reconciliation that explains all factors (minor difference in inputs, known modelling methodology constraints and AEMO's operational decision to respond to unexpected events under high stress with little notice, etc.). As above, any information provided to stakeholders will be of little value in predicting future outcomes. AEMO proposes that the AEMC removes the need for such detailed reporting.

RERT cost estimate

The draft rule requires AEMO to publish the maximum amount payable under RERT contracts when AEMO signs new contracts.[24] AEMO understands this requirement stems from stakeholders' desire to know what the upcoming costs will be to budget and better manage the impacts. However, AEMO does not believe reporting the maximum (or any other statistic) of the estimated cost will add material value to stakeholders. While AEMO is still to develop the methodology under the new rule, it is likely that the maximum amount will be estimated based on the worst USE forecast. The probability of such event is likely to be very low and it is unlikely to be useful to market participants. In general, there will be a significant amount of uncertainty about the cost, especially in relation to long and medium notice RERT. This could in fact cause more confusion rather than providing any useful information for budgeting purposes.

It is also unclear how AEMO should report expected cost when market conditions have changed between when it signs contracts and when it produces the report. For example, if AEMO entered a RERT contract in early March. However, in April or early May, when preparing the report, AEMO is made aware of some significant changes in generator availability, which has significantly changed the expected cost of RERT. Should AEMO publish the estimated cost based on its knowledge when preparing the report (Apr/May), or when it signed the contract (early March)? The latter would carry known in inaccuracy in the report, which would provide misleading information to stakeholders. The former could also be problematic by adding significant administrative burden to AEMO, as it would have to undertake additional modelling. What would AEMO be expected to do if there are further changes between such re-modelling and the publication of the report?

Further, even if AEMO's cost forecasts were accurate every time, it still provides very little information about how RERT will affect individual end users. This is because the total cost must first be allocated to market customers including retailers, who then decide how they pass the cost onto end users. The draft rule already requires AEMO to report on the cost recovery on individual retailers after RERT are activated. This information based on actual cost incurred will be considerably more accurate and provide additional value to end users as they can see how much RERT cost is passed onto their own retailers. Given this, AEMO questions the value of publishing a forward cost estimate. In fact, AEMO would suggest if concerns remain on providing more transparency on end consumers' bills, the AEMC could consider making a rule to require retailers to disclose (either publicly or to the AER) their RERT cost pass through methodology or have the actual practice monitored by the AER whenever the total RERT costs exceed a certain materiality threshold.

AEMO proposes that the AEMC should remove clause 3.20.6 (d) (1). However, if the AEMC still decides that AEMO needs to provide some cost estimate, AEMO proposes it reports on the average cost. However, the cost estimate will have a large margin of error and will provide very little information (and indeed, even some confusion) for stakeholder budgeting purposes.

5.2 The estimated load shedding VCR

The draft determination introduced[25] a new concept of "estimated load shedding VCR" which AEMO will be required to determine based on the load that AEMO expects would be shed without activation of RERT. In

[24] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.6 (d)(1)

[25] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.1 (b)

determining such an estimate, AEMO will be required to have regard to the AER's new VCR estimates and jurisdictional load shedding priority list. The rule requires AEMO to use reasonable endeavours to ensure that:

> **"the average amount payable by AEMO under reserve contracts for each MWh of reserves for a region in a financial year (expressed in $/MWh) does not exceed the estimated load shedding VCR for that region."[26]**

For simplicity, we will use "VCR cap" interchangeably with "estimated load shedding VCR" in the discussion below.

Inconsistency with the draft determination regarding the reliability standard

AEMO considers that, by introducing a VCR cap, the AEMC has altered its position within the determination to link RERT procurement volume to the reliability standard and to maintain a "single standard". One consequence of this rule is that AEMO might not be able to procure enough reserves to meet the reliability standard, if the modelled average RERT cost exceeds the VCR cap. This in effect delinks RERT volume from the reliability standard, despite the de-linkage itself being one of the main reasons why the AEMC rejected AEMO's proposed broader economic and risk assessment framework (option 2)[27]. This requirement creates the "two standards" situation the AEMC tries to prevent in this draft determination, except in this case, it is the "less tight" of the two standards that now sets the RERT volume. By introducing the VCR cap, the AEMC is not implementing option 1, but a hybrid of option 1 and 2 such that:

- RERT procurement trigger is the reliability standard being exceeded,
- Conditional on the standard being exceeded, AEMO is required to undertake an assessment similar to option 2 without the risk metric but can only procure the *lesser* of option 2 outcome and the amount required to meet the standard.

AEMO considers this hybrid approach is even less transparent than implementing the AEMC's option 2.

The AEMC seem of two minds on this issue. On one hand, it considers that the reliability standard balances the right trade-off for reliability. On the other, it seems unable to reconcile this with the possibility that an explicit examination of VCR and resource costs shows the optimal resource level differs from that implied by the standard. This raises a further question: If AEMO cannot procure up to the standard when estimated VCR is less than RERT cost, then why should AEMO not be allowed to procure *more* than the standard if the estimated VCR is *greater* than the RERT cost? Even if one accepts the reliability standard is still the trigger for procurement, if AEMO is required to apply the VCR cap to determine the procurement volume, the test should be symmetric so that AEMO can procure more than the standard if there are cheaper resources willing to voluntarily load shed.

AEMO recommends an internally consistent decision, so that:

- Either the standard is right and should solely determine the procurement volume, or
- The standard does not truly reflect the cost and benefit of reliability, and one should be allowed to apply option 2 as AEMO proposed and procure above or below the standard depending on the outcome of the assessment.

Other issues with the estimated load shedding VCR

Apart from the inconsistency in the VCR cap above, there are a few important implementation issues:

- AEMO procures RERT to ensure the reliability standard is met. In operational terms, this includes forecast or actual LOR2 conditions, in which case the biggest contingency would lead to load shedding and potentially cause significant system security issues. It is unclear how this would work with the VCR cap.

[26] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.3 (k)(3)

[27] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 95-96.

- Different regions can have different VCR values due to different load shedding priority schedules. This may lead to issues with cost sharing arrangements between jurisdictions.
- The AER's review will not be completed until 31st December 2019[28], and the AEMC intends that the current rule be effective as of 31 October 2019. The current rule requires AEMO to develop a methodology of calculating the estimated cost of VCR as part of the RERT procedure[29]. AEMO considers this timeline is impractical to develop such methodology and undertake the required consultation.

AEMO's proposal on estimated load shedding VCR for final rule

AEMO propose that the AEMC should remove estimated load shedding VCR by removing clauses 3.20.1 (b) and 3.20.3 (k)(3), due to the significant issues raised above. If the AEMC retains the VCR cap, AEMO propose that it should:

- Allow AEMO more freedom in determining the VCR, with the only requirement to have regard to the AER's most recent VCR review in 3.20.1 (b)
- Clarify how such a cap should not apply for LOR2 conditions.

5.3 System security procurement trigger

The draft rule proposed to remove system security as a trigger for RERT procurement. The reasoning is summarised as follows:[30]

- System security and reliability are managed under different frameworks.
- It is unclear what the trigger should be for procuring RERT for system security.
- The out-of-market provision, which applies to energy market and demand response arrangements, needs to apply to the relevant power system security service as well.

AEMO considers it would be inappropriate to remove an important safeguard tool for system security. System strength is already an on-going issue in South Australia and potentially is becoming a concern in Victoria as well given the expected large number of renewable entrants. In fact, AEMO has already issued a system strength direction in Victoria for the first time on 16 November 2018. To provide system strength, certain combinations of synchronous generators need to be online at the same time. This makes some generators "pivotal" if they are present in a large proportion of combinations. Currently AEMO directs generators online to provide system strength. However, directions will no longer be available if a generator retires or is mothballed from the market. While maintaining a clear framework and having a formally defined trigger are important, AEMO considers that it is far more crucial to ensure there is an existing mechanism to *procure* emergency reserves to ensure adequate resources for system security. The AEMC acknowledges that system security issues could potentially have a large impact on the consumers. Therefore, it seems premature to take away one of AEMO's only tools to procure mothballed plant prior to a suitable alternative being put in place. AEMO proposes that the AEMC should remove the proposed deletion of the system security procurement trigger for RERT.

The current out-of-market provision does present an obstacle to procuring RERT for system security, as the resources that could provide system strength are large synchronous generators that currently operate in the energy market. Therefore, they would be prevented from participating in RERT, even for supplying system strength only, due to the 12-month out-of-market restriction. AEMO proposes that the AEMC should consider exemptions in the rule when AEMO clearly needs to procure the relevant resource for system security.

[28] AER, Values of Customer Reliability, Consultation Paper, October 2018, p3.

[29] AEMC, Draft National Electricity Amendment (Enhancement of Reliability and Emergency Reserve Trader) Rule 2019, 3.20.7 (e)(3)

[30] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, pp 100-102.

5.4 Implementation issues

The AEMC proposes that the new rule will take effect on 31 October 2019. AEMO is expected to start consultation on the RERT procedure, post 27 June 2019 after the reliability panel publishes the RERT guideline[31]. AEMO does not consider this timeline will provide sufficient time to undertake the proper design and full stakeholder consultation on the updated procedures including developing the new methodology for procurement and determining the estimated load shedding VCR. As discussed earlier, the VCR review will not be finalised by the AER until 31 Dec 2019, which presents further obstacles for AEMO to design the estimated load shedding VCR.

In addition, having a new rule starting at the very start of summer could interfere with the process of RERT procurement and AEMO's daily operations. For example, it might affect contracts that are under negotiation around the kick-off date, and AEMO might need to update the relevant procurement documents following the publication of the new RERT procedure (e.g., contracts, Invitation to Tender). This could cause delays and risk to the system if AEMO needs to sign new RERT contracts urgently. Further, AEMO might have less available staff resources available for administrative work during summer due to summer operations taking priority for AEMO staff and leave arrangements.

Therefore, AEMO proposes the new Rule apply after summer 2020. However, AEMO recognises the importance of providing additional transparency to the market and is willing to undertake the reporting requirement (with the appropriate transition arrangement for methodologies that still will be under development) from 31 October 2019.

[31] AEMC, Draft Rule Determination, Enhancement to the Reliability and Emergency Reserve Trader, p 201.

6. Impact of the draft rule and recommendations

AEMO considers that the draft rule will reduce the effectiveness of RERT and does not provide AEMO with sufficient flexibility in procuring reserves under the safety net. AEMO remains concerned that this will lead to higher cost of RERT as well as excessive tail-end reliability risk, which will be to the detriment of consumers. The new out-of-market provision will lead to less RERT resources being available and the decision against multi-year contracting means that not only will the pool of resources be smaller, the available resources might be offered at higher cost. Further, the draft rule maintains the link between RERT procurement to the current reliability standard. However, as explained in section 2, this leaves significant tail-end risks to end consumers and will leave them worse off if they are indeed risk averse towards reliability risks.

The load shedding event in January 2019 demonstrated tail-end reliability risk is a real concern in the NEM and proved that RERT is a cost-effective mechanism to protect end-consumers from extreme USE outcomes. Therefore, RERT is an important tool to ensure end consumers are not exposed to excessive reliability risks. AEMO recommends that the AEMC re-consider the impact of its decisions on the potential tail-end reliability risk the consumers would be exposed to, especially when the current rule is likely to lead to a smaller pool of RERT compliant resources.

As discussed earlier, AEMO has not been convinced by the AEMC's analysis that reliability risks are best managed by the market and that there is no need to explicitly incorporate risk aversion in the reliability framework, or for RERT procurement. As outlined in Section 3, AEMO urges the AEMC to reconsider RERT's market distortion potential, whose impact has never been properly quantified, and would likely to be small if the market does not already deliver an efficient reliability outcome. We recommend the AEMC refrain from making decisions purely based on any perceived consumer cost impact of RERT. Instead, a small and reasonable increase in consumer bills should be weighed against the RERT's benefit of removing tail-end risk for consumers.

AEMO therefore believes the draft rule can be improved to meet the objective of improving reliability outcomes at reasonable costs for end consumers. AEMO is committed to continuing to work with the AEMC to ensure the best reliability outcome for consumers.