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Australian Energy Market Commission
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Enhancement to the Reliability and Emergency Reserve Trader (RERT) Options Paper

Snowy Hydro Limited welcomes the opportunity to comment on matters raised in the Options Paper from the Australian Energy Market Commission (the Commission) on the Enhancement to the Reliability and Emergency Reserve Trader.

Snowy Hydro Limited is a producer, supplier, trader and retailer of energy in the National Electricity Market ('NEM') and a leading provider of risk management financial hedge contracts. We are an integrated energy company with more than 5,500 megawatts (MW) of generating capacity. We are one of Australia's largest renewable generators, the third largest generator by capacity and the fourth largest retailer in the NEM through our award-winning retail energy companies - Red Energy and Lumo Energy.

The RERT is an emergency reserve that should only be used as a last resort mechanism in cases of genuine market failure insuring that it does not undermine the market it is actually trying to protect. AEMO's desire to create a separate market for reserves (a standing reserve) undermines the NEM. This is because the NEM is a closed system where distortions from RERT market/process impacts on primary energy only market. Any resources that are incentivised to participate in the RERT instead of the primary NEM means distortions in the entry and exit of suppliers in the NEM. Inappropriate use of the RERT imposes significant costs on consumers as it carries both direct and indirect costs in the NEM.

Hence the RERT should be only be used as a last resort safety net and the energy-only market should be left to deliver the economic level of bulk supply reliability to customers. Snowy Hydro notes that there are other intervention mechanisms besides RERT, ie. Directions and Instructions which could be utilised in cases of genuine market shortfall.

Appropriateness of the reliability standard

As noted by the Reliability Panel in its advice to the AEMC dated 28 September 2018[1], the current reliability standard is still appropriate. The form of the standard should be retained as Unserved Energy measured in a probabilistic manner as the expected unserved energy in any relevant year.

Snowy Hydro supports a consistent framework for reliability, market price cap, value of customer reliability and use of the RERT. The NEM is an energy only market with it's success predicated on centralised decision making and letting markets and market signals work to signal new investments. The RERT should not perversely incentivise off market response as opposed to participation in the

[1] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change".*

market. We do not need the RERT to create another energy market with a higher price cap and pay as bid with fixed capacity/availability payments to providers creating a capacity market by stealth. As noted by the Commission, incentivising market participants to leave the energy market would crowd out participants in favour of the RERT in turn increasing costs to consumers without actually physically increasing the level of reliability.[2]

Snowy Hydro concurs with the Reliability Panel that if there are concerns with the changing nature of the supply-demand balance ie. the potential for peakier demand, then inputs and assumptions in operationalising the reliability standard ie. Maximum Price Cap, Market Floor Price, Cumulative Price Threshold, may need to be reassessed rather than modifying the standard to some other form ie. LOLE, LOLP.

International Comparison

Comparisons across different jurisdictions are difficult due to differing factors such as market design, competitive structure, level of interconnection, and the value of customer reliability. With AEMO comparing reliability metrics used internationally and the limitations mentioned above, we make the following observations:

- Loss of load probability (LOLP)defines the likelihood of encountering trouble (loss of load) but not the severity. Therefore LOLP has less physical significance and is difficult to interpret.
- Loss of load expectation (LOLE) has the same weaknesses that exist in the LOLP as it does not recognize the degree of capacity or energy shortage.
- Loss of energy expectation (LOEE) is equivalent to the NEM's Unserved Energy (USE) metric. It therefore reflects risk more accurately. Importantly this metric should become even more relevant
- Comparison of these different metrics is also meaningless without a comparison of LOLE and LOLP to USE in all historical years to give some context on the relative measures compared to USE.

Option which Minimises Market Distortions

In regards to the RERT procurement trigger and procurement volume, Snowy Hydro supports Option 3 of the Commission's outlined options. Option 3 will have the effect of requiring a specific reliability standard operationalisation that guides the discretion provided to AEMO resulting in lower costs and/or more reliability outcomes which are more predictable. The reliability settings of targeted levels of unserved energy and the market price cap should always be used as the primary investment signals for additional supply.

We believe the Reliability Panel is the most appropriate body to develop and provide more guidance on how AEMO would operationalise the reliability standard. This could be codified either in the NER or through Reliability Panel guidelines.

RERT Lead Time

Snowy Hydro believes with the existing 9 month process there is more than sufficient time for the Australian Energy Market Operator (AEMO) to procure off market reserves. Longer term contracting of resources for the RERT should be avoided as this will distort the market. What is required is improvements to the market price signals to encourage this capacity into the NEM.

[2] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper* ", pp50

Snowy Hydro understands that deciding the point in time to trigger the RERT involves a trade-off between the accuracy and completeness of information available at the point in time. However we believe the 9 month process is more than sufficient with the Long Notice RERT already not being functionally efficient and as result:

- the cost of off-market reserves is higher than it should be;
- the triggering of the procurement process has deterred or crowded out market responses;
- the revenue structure of the RERT incentivises both off-market supply and demand response.
- the forecasting of demand to trigger the RERT process has been overly conservative.

As a result of these highlighted inefficiencies it would be problematic to extend the RERT to anything greater than 9 months. Addressing the forecasting issues is of greater importance and is fundamental to the operation of the RERT before any proposal to extend the lead time.

Demand Forecasting Inaccuracy and RERT Costs

Demand forecasting is becoming increasingly difficult to accurately calculate. In contrast new generation can come on-line really quick.

Significant demand forecast issues recently contributed to the activation of the RERT which increased costs to consumers. If there is a desire to use the RERT then the Short-Notice (SN) or Medium-Notice (MN) RERT are appropriate tools which allows AEMO to purchase reserves 7 days and 10 weeks respectively from the anticipated shortfall providing the appropriate trade-off for maintaining appropriate levels of unserved energy in the NEM. Long-term forecasting inaccuracy issues through increased variability and uncertainty on the demand side make this the most appropriate approach.

There is a recognition that there is a trade-off with cost per unit of the SNRERT and MNRERT being more expensive than LNRERT. However, there is higher confidence that the RERT procured under SN and MN would more likely be required. Over a longer term period like 3 to 5 years, utilising the SN and MN RERT should result in less overall costs. More importantly the SN and MN RERT is less distortionary than the LNRERT as it has less impact on investment decisions in the primary EOM.

Snowy Hydro appreciates the opportunity to respond to the Options Paper and any questions about this submission should be addressed to Panos Priftakis, Regulation Manager, by e-mail to panos.priftakis@snowyhydro.com.au.

Yours sincerely,

Kevin Ly
Head of Wholesale Regulation
Snowy Hydro

Appropriateness of the reliability standard

Snowy Hydro believes that the reliability standard sets an appropriate trade off between the prices paid for electricity and the cost of not having energy when it is needed. We believe the reliability settings adequately protects 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. Snowy Hydro agrees with the Commission that increasing the levels of reliability will increase costs for consumers.

AEMO's proposal to delink RERT procurement from the reliability standard and remove any explicit procurement triggers is strongly opposed by Snowy Hydro. It is premature for AEMO to be proposing to make significant changes to arrangements and structures when they have not settled issues regarding the values of customer reliability (VCR) and forecasting.

AEMO notes that as the RERT can be dispatched based on LOR2 conditions it is activated with an expectation of load shedding which should be factored into the risk assessment i.e. since the dispatch of RERT is based on an expectation, more RERT should be procured than is actually required [3]. Snowy Hydro however notes that the Reliability Panel already makes such a trade-off when it sets the reliability standards and settings. The RERT procurement is very complex and involves significant uncertainties which should not be based on a separate process formed by AEMO. The Reliability Panel brings together diverse groups and interests including AEMO, in order to have additional perspectives and insights on reliability.

The reliability standard should remain a key standard to input into various decisions made by AEMO in its role as the system operator, including being a trigger for the procurement of the RERT. The Panel consults with all market participants and AEMO before making any decisions.

Snowy Hydro supports the Reliability Panel's advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change[4]. The Reliability Panel correctly determined that materiality threshold for reassessing the level of the reliability standard has not been met and following their assessment that nothing had significantly changed with the current reliability standard it still remained appropriate.

In regards to comments regarding the standard needing to be tightened, the Reliability Panel noted that the vast majority of supply interruptions were network interruptions, specifically from the distribution network (around 95 per cent of total interruptions) as shown in Figure 1 below[5]. Further to this the reliability Panel noted that, *"notwithstanding the current level of the standard, EY modelling 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."*[6]

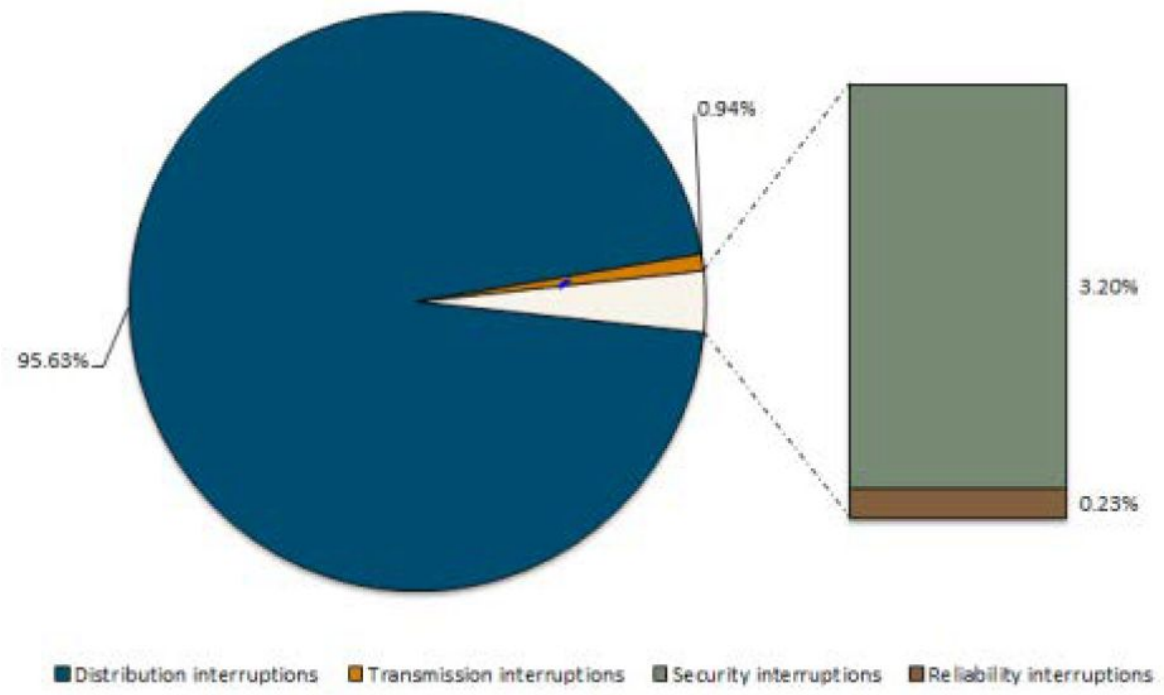
[3] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper* "

[4] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change".*

[5] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change"*

[6] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change", pp6*

Figure 1: Sources of supply interruptions in the NEM: 2007-08 to 2016-17



The reliability settings of targeted levels of unserved energy and the market price cap should always be used as the primary investment signals for additional supply. The form of the standard should be retained as Unserved Energy measured in a probabilistic manner as the expected unserved energy in any relevant year.

The Reliability Panel correctly notes the implications that might arise if the RERT's procurement trigger was delinked from the reliability standard[7]. If there are out-of market reserves that have no availability payments, and usage costs up to the market price cap there is an attraction to allowing AEMO to procure these and use them to help manage operational reliability. The Panel rightfully questions why are these reserves not "in the market"? (either by participating directly, or participating via its retailer or a third party provider) and that by allowing these reserves to be procured for the RERT, what implications does this have on broader wholesale market investment and operational signals?[8]

Snowy Hydro believes the existing market design and contracting arrangements in the NEM remain effective and will continue to deliver new investment without compromising reliability. The NEM is an energy-only market. Under this structure, peaking generators such as Snowy Hydro, and others, regularly invest large amounts of capital to ensure they are available during times of scarcity. They do everything possible, at their own cost and own risk, to ensure they are ready to generate during the relatively few periods when demand cannot be met by other types of market generation.

[7] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change".*

[8] Reliability Panel AEMC, 2018, *"Reliability Panel advice on the Enhancement to the Reliability and Emergency Reserve Trader rule change".*

AEMO's view that *"there may be under-investment in capacity to participate in RERT thus limiting competition, leading to inefficient resource mix and higher costs"* is concerning and suggesting a seperate market to the NEM is formed to support the RERT. Snowy Hydro believes the existing market design and contracting arrangements in the NEM remain effective and will continue to deliver new investment without compromising reliability. We do not want to be left a scenario where investment is being encouraged to off-market for the RERT leading to increased prices.

International Comparison

AEMO's additional information paper dated November 2018, Table 1 had a comparison of reliability metrics used internationally, shown below[9]. Comparisons across different Jurisdictions are difficult due to differing factors such as market design, competitive structure, level of interconnection, and the value of customer reliability.

Table 1: Comparison of reliability metrics used internationally[10]

Metric	Annual Standard	Jurisdiction	Supplementary Requirement	Market Type
USE	**0.002 %**	WEM (Aus)	Reserve margin = greater of 7.6% or largest unit	Capacity
		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 [12]	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
No formal requirement		Germany, Nord Pool, CAISO (US)	Various bespoke metrics.	Capacity

With AEMO comparing reliability metrics used internationally and the limitations mentioned above, Snowy Hydro make the following observations:

[9] Australian Energy Market Operator (AEMO), 2018, "Additional information from AEMO to support its Enhanced RERT rule change proposal", pp11

[10] Australian Energy Market Operator (AEMO), 2018, "Additional information from AEMO to support its Enhanced RERT rule change proposal", pp11

- Loss of load probability (LOLP) is defined as the probability that the load will exceed the available generation. Its weakness is that it defines the likelihood of encountering trouble (loss of load) but not the severity; for the same value of LOLP, the degree of trouble may be less than 1 MWh or greater than 1000 MWh. It cannot recognise the degree of capacity or energy shortage. Therefore LOLP has less physical significance and is difficult to interpret.

- Loss of load expectation (LOLE) is generally defined as the average number of days (or hours) on which the daily peak load is expected to exceed the available capacity. It therefore indicates the expected number of days (or hours) for which there is a load loss or deficiency. This concept implies a physical significance not evident from the LOLP metric but it has the same weaknesses that exist in the LOLP as it does not recognise the degree of capacity or energy shortage.

- Loss of energy expectation (LOEE) is equivalent to the NEM's Unserved Energy (USE) metric. This index is defined as the expected energy not supplied (ie. unserved energy) due to periods when the load exceeds the available generation. It is a more appealing index since it encompasses the severity of the deficiencies as well as their likelihood ie the expected value of unserved energy. It therefore reflects risk more accurately. Importantly this metric should become even more relevant and appropriate as the NEM transitions to a different generation mix where the power and energy output varies in positive correlation with the weather.

- In the same paper, AEMO makes a comparison of these different metrics[11] . This comparison is alarmist as AEMO has used a 1 in 10 year LOLE ie. used the 10% POE and compared this to the USE which is a weighted average of the 90%, 50%, and 10% POE demand forecasts. This comparison is also meaningless as it does not include a comparison of LOLE and LOLP to USE in all historical years to give some context on the relative measures compared to USE.

Options for Procurement Trigger and Procurement Volume

Snowy Hydro supports Option 3 of the Commission's outlined options to alter the procurement trigger and procurement volume. We welcome an enhanced role for the NER and/or the Reliability Panel in operationalising the reliability standard. We support this proposal because it:

- limits the discretion that AEMO may apply regarding procurement volume.
- Provides more certainty around the level of RERT that can be procured limiting the costs associated with the RERT through constraining how many reserves may be procured.

Option 3 as the Commission notes will *"retain consistency with the broader reliability framework and make sure that all market participants, including the system operator, are operating to one standard"*[12] which Snowy Hydro welcomes.

The Commission notes that under the Option 3 approach the gap could for example be a function of the difference between the monthly expected USE and the monthly reliability standard. In response to this we believe the Reliability Panel is the most appropriate body to develop and provide more guidance on how AEMO would operationalise the reliability standard. This could be codified either

[11] Australian Energy Market Operator (AEMO), 2018, "Additional information from AEMO to support its Enhanced RERT rule change proposal", pp12

[12] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper* ", pp57

in the NER or through Reliability Panel guidelines.

Snowy Hydro does not support Option 2 as it is premature for AEMO to be proposing to make significant changes which would allow the Operator to determine whether or not to enter into reserve contracts, and how much reserves, based on a RERT procurement economic assessment framework. Option 2 notes that AEMO is currently proposing an economic cost minimisation model that aims to minimise the total cost of procuring reserves[13]. We don't believe AEMO is best placed to provide a cost minimisation model for the market.

AEMO's recent report on recent usage of its RERT function did not offer reassuring portents. For example, AEMO's activation of the RERT on 19 January 2018 for the dispatch of 390 MWh cost some $24 million, or an incredible $62,000/MWh (or four times the Market Price Cap) while the indirect costs of generators who would otherwise be generating wasn't noted[14].

Further to this, under Option 2 AEMO would be aiming for a level of reliability which is explicitly different from that which the market is incentivised to deliver leading to, as the Commision correctly notes:

- Shifting of the risks associated with the provision of some capacity from market participants to consumers.
- AEMO not having financial incentives to make trade-offs to determine the appropriate level of reserves to procure.
- Incentivise market participants to leave the energy market with the hope of getting better remunerated in the RERT market[15].

As noted earlier in the submission, the reliability standard is foundational for the reliability settings. Snowy Hydro believes the market price settings and the reliability standard are well integrated and encourage the Commission to maintain that integration. The RERT's procurement trigger should not be delinked from the reliability standard.

Option 3 provides a more sophisticated reliability standard guidance, and is Snowy Hydro's preference, however should this option encounter significant obstacles then Option 1 could provide an alternative which is most similar to the status quo. AEMO although being able to invoke the RERT once it self-determines that a forecast breaches the standard would under Option 1 be restricted in purchasing RERT of greater quantity than that needed to just meet the standard.

Forecasting and Costs

Significant demand forecast issues recently contributed to the activation of the RERT which increased costs to consumers. The Australian Energy Council correctly noted that AEMO *"anticipated a high demand peak and dispatched several providers with long notice periods and minimum run times. On each day the demand subsequently fell below AEMO's forecast, and, in hindsight, the dispatch proved unnecessary."*[16]

[13] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper* ", pp47

[14] See http://www.nemweb.com.au/REPORTS/CURRENT/Reserve_Contract_Recovery/

[15] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper* "

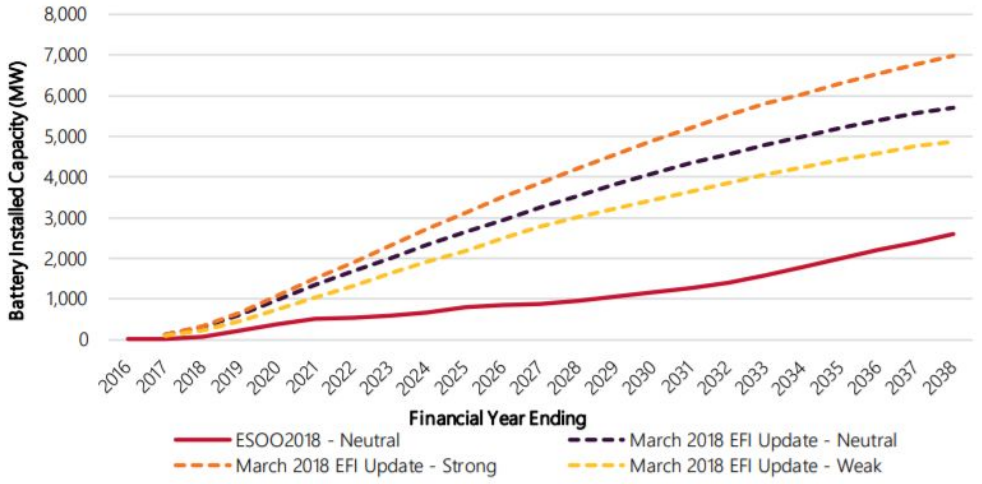
[16] Australian Energy Council submission to AEMC Enhanced RERT paper.

Further to this AEMO recently highlighted in their additional information to support the Enhanced RERT rule change proposal that the risk of load shedding in the NEM is increasing due to *"the trend of increasing maximum temperatures leading to higher demands"*[17] only to later state in the same paper that *"in recent times, with the exception of Queensland, maximum demands have been flat to falling across most NEM regions"*[18]. Based on this information by AEMO it is unclear whether there is any risk of a generation shortfall due to increasing maximum demand.

Increased variability and uncertainty on the demand side make AEMO's task extremely challenging to forecast demand in the long-term. The increased climate variability and quantification of uncertainty in the growth of certain technologies mean that although AEMO makes every effort to ensure the information is accurate over the long term the likelihood of being inaccurate is much higher than a short-term to medium-term forecast.

As AEMO[19] notes in their ESOO the lack of granularity in a changing energy environment make it difficult to detect and understand key trends[20]. One example is the battery storage technology and the impact this has on the change in the demand forecasts. In 2017 AEMO's ESOO projected business and residential behind-the-meter battery systems by the end of the 20-year period forecast at 5.7GW in the 2018 the projected update was less that half at 2.6 GW. Although AEMO notes this has to do with lower forecast retail electricity prices and different assumptions around tariff structures and technology costs it makes it very difficult to rely on long-term forecasts that can change significantly. The chart below shows the scenarios for battery growth which differ significantly[21].

Figure 2: NEM battery installed capacity forecast, 2015-16 to 2037-38, Neutral scenario compared to March 2018 EFI Update, all scenarios[22]



[17] Australian Energy Market Operator (AEMO), 2018, "Additional information from AEMO to support its Enhanced RERT rule change proposal", pp2

[18] ibid", pp16

[19] Australian Energy Market Operator (AEMO), 2018, "*2018 Electricity Statement of Opportunities",* << http://www.aemo.com.au/-/media/Files/Electricity/NEM/Planning_and_Forecasting/NEM_ESOO/2018/2018-Electricity-Statement-of-Opportunities.pdf >>, pp28

[20] ibid, pp28

[21] ibid, pp28

[22] ibid, pp28

Snowy Hydro welcomes AEMO's efforts to integrate new data streams, hold various Forecasting groups, and look beyond the transmission grid but believe that the demand forecasts which is a primary input into the RERT should not rely on long-term demand forecasts.

AEMO's over forecasting of demand has unnecessarily triggered the activation of the RERT with the direct cost of the RERT being passed on to consumers. As a consequence, AEMO's RERT is impacting market participants by not allowing them to earn a return on investment thereby decreasing future investment in new or existing plant. The RERT should not deprive peaking generation from earning a return on investment. The RERT tends to be dispatched during periods of volatility, depriving peaking plant of earning scarcity pricing for making themselves available during these periods. This reduces the number of participants operating in the energy only market. Over time, the quality of the NEM's generation fleet will decline, compromising its ability to respond to future market events. In short, the system becomes less secure.

Snowy Hydro advocates that the Medium-Notice RERT which allows AEMO to purchase reserves 10 weeks from the anticipated shortfall provides the appropriate trade-off for the last resort mechanism of maintaining appropriate levels of unserved energy in the NEM. A key concern across the RERT is the availability payments paid, which accounted for over 50 per cent of the RERT cost in 2017-18[23]. We share the same concerns with the Commission about the distortionary effects if availability payments are made and are too high potentially making the provider favour the RERT even if they do not expect to be dispatched. In addition the long term forecasting issues that AEMO is working to resolve make the Medium-Notice RERT the most appropriate which would use the MTPASA which has undertaken significant improvements.

[23] Australian Energy Market Commission (AEMC), 2018, "*Enhancement to the Reliability and Emergency Reserve Trader Options Paper*"