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Thursday, 2 May 2019

Mr Charles Popple
Chairman
NEM Reliability Panel
PO Box A2449
Sydney South NSW 1235

Dear Mr Popple

REL0072 Definition of Unserved Energy

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the National Electricity Market (NEM) Reliability Panel Consultation Paper (the Paper) on the Definition of Unserved Energy (USE) issued 4 April 2019.

About ERM Power

ERM Power is an Australian energy company operating electricity sales, generation and energy solutions businesses. The Company has grown to become the second largest electricity provider to commercial businesses and industrials in Australia by load[1], with operations in every state and the Australian Capital Territory. A growing range of energy solutions products and services are being delivered, including lighting and energy efficiency software and data analytics, to the Company's existing and new customer base. The Company operates 662 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland. www.ermpower.com.au

General comments

The National Electricity Market (NEM) is in a state of transition, with forecasts for increasing penetration of intermittent output generation, replacing fully schedulable generators which also supply power system security services. Due to their input energy type, this new intermittent generation is at best only able to be semi-scheduled[2] by the market operator. The rate at which this transition is occurring means it is possible there may be an increased frequency of periods where load to consumers is temporarily disrupted due to lack of supply compared to that which has historically been the case. In considering this, it is worth noting that the NEM Reliability Panel in setting the reliability standard (for planning purposes) for the level of USE above zero recognises that it would be cost prohibitive to have zero USE under all possible market scenarios.

It is in this world of transition that the NEM Reliability Panel has issued a consultation paper regarding how unserved energy should be more clearly defined. In considering the questions raised by the Paper, it is ERM Power's view that the definition of USE must provide a repeatable calculation methodology which clearly defines both how the level of USE is calculated and also what components should be included in the total energy demanded in that region for a given financial year to allow both forecasts and any actual level of USE to be compared to the reliability standard of 0.002%.

[1] Based on ERM Power analysis of latest published financial information.
[2] AEMO may only impose an output cap on Semi-Scheduled generation

Definition of unserved energy in Chapter 10 of the National Electricity Rules

We believe the current definition of *unserved energy* as set out in Chapter 10 of the National Electricity Rules (the Rules) is reasonably adequate in that the definition in Chapter 10 is referenced to clause 3.9.3C(b) of the rules. Its formulation through reference to a detailed clause in the Rules is consistent with many other chapter 10 definitions.

Whilst clause 3.9.3C(b) may require some areas of improvement to improve clarity this is not a reflection of a significant omission in the definition of *unserved energy* in Chapter 10.

One area that we believe does require improvement in both the Chapter 10 definition and clause 3.9.3C(b) is that the term "*energy* demanded" should be included as a defined term in Chapter 10.

At the time when the original reliability setting was being discussed and defined, the super majority of "*energy* demanded" was supplied via the transmission grid; there was little in the way of behind the meter energy resources or non-scheduled generation. The denominator to be used in the calculation of any forecast or actual *unserved energy* was clearly definable as the forecast and actual "scheduled demand as generated" as provided by the Market Operator. Today, there are multiple terms being used by the Austra,ian Energy Market Operator (AEMO) with regards to energy consumption forecasts ("*energy* demanded") all of which are prepared on a different basis with a range of outcomes. The table below shows both the range of definitions and the current AEMO commonly used forecasts for 2018/19 for the Victorian region. For simplification, "scheduled demand" has not been included in the table, as the values for actual "scheduled demand as generated" are published by AEMO, but forecasts for "scheduled demand as generated" are not.

Definition	Value GWh
Native as generated	48,787
Native as sent out	45,574
Native as delivered	44,441
Operational as generated	46,516
Operational as sent out	43,302
Operational as delivered	42,216

To provide consistency with the original setting of the reliability standard, ERM Power supports the use of "native as generated" demand as the defined value for "*energy demanded*" in Chapter 10. To use an alternative such as "operational as delivered" would in effect result in a tightening of the reliability standard from that which was originally set and which has been reaffirmed by the Reliability Panel through a number of reviews.

We provide the following definition for use in Chapter 10 for the Panel's consideration;

energy demanded

> The sum of all *energy* consumed within a region including that supplied by *transmission network* or *distribution network* connected energy sources, including *generating unit* auxiliary load, network losses and all distributed energy resources.

Contingency based definition of unserved energy

ERM Power supports the continued use of the contingency event based definition for the determination of a reliability based USE event. Notwithstanding, we believe there are some areas of clause 3.9.3C(b) that may benefit from minor improvements.

When considering an "inter-regional transmission element" as included in clause 3.9.3C(b)(1)(i), we are concerned that this could be read as limited to only that section of the network which physically connects across 2 regional boundaries. Alternatively we believe it should also include all sections of an intra-regional network that allows flow between regions across the inter-regional transmission flow path.

By way of example, the Victorian region could, under a high demand scenario, experience involuntary load shedding due to the failure of a single transmission element between Murray and Dederang or Dederang and South Morang, yet these sections of the transmission network would not normally be considered an inter-regional transmission element. In this case, failure of a section of this inter-regional flow path would have a similar impact as failure of one of the inter-regional transmission elements themselves even though this would be considered an intra-regional transmission element. The intent of the clause would be improved by changing the wording to "inter-regional transmission flow path element". This would ensure that the failure of any of the intra-regional network elements along the inter-regional flow path would have the same impact from a USE calculation perspective.

We consider clause 3.9.3C(b)(1)(i) could also be improved with regards to the clarity of "that may occur concurrently with generating unit or inter-regional transmission element outages" by a change to "that may occur concurrently with previously existing generating unit or inter-regional transmission element outages."

The current wording of the clause could be confused to that applying to a scenario where two credible contingency events were to occur simultaneously, which in fact would be a multiple credible contingency event and therefore not a reliability event. We believe there is benefit to clarifying the wording to indicate that where an additional contingency event occurs at a time of a previously existing outage, then involuntary load shedding associated with this second event would constitute reliability based USE.

We are unsure as to the purpose of clause 3.9.3C(b)(1)(ii) and suggest the Reliability Panel consider its deletion. In our view, the late commissioning of new generation or inter-regional transmission elements would be no different to an outage of an existing generator or inter-regional transmission element and should be considered as such.

The Paper considers that the current contingency-based definition of USE for the purposes of the reliability standard could be potentially complex to interpret, particularly with regards to forecast and availability deviations, both on the demand and supply side, which could be larger than the largest credible contingency, particularly on extreme weather days. In considering this question, changes in forecasts of demand would not fall within the bounds of a credible contingency event and any involuntary load shedding resulting from high demand outcomes, regardless of forecasts, would clearly fall under reliability based USE. Similarly, reductions in supply side availability due to partial outages or a single unit trip, or the failure of a single unit to start, the result of which in turn managed by AEMO by the use of involuntary load shedding, would clearly fall under reliability based unserved energy.

However, the simultaneous loss of multiple generating units, generally due to a transmission system induced fault, or the simultaneous failure to start of multiple generating units following issue of a *dispatch instruction*, is not a planned or credible event with regards to AEMO's management of the power system or the market and as such would not constitute a reliability-based event. Whilst the probability of such events would normally be allowed for in calculating the overall levels of reserve requirements for a region, (which is a separate type of event to the management of a credible contingency in real time), it would not be an efficient outcome for AEMO to issue a Clause 4.8.9 Instruction for involuntary load shedding simply to maintain regional reserve levels.

The Paper also raises the question of inclusion of loss of distributed energy resources embedded in the distribution network which may be subject to involuntary load shedding. We support the Panel's view that the inclusion of the loss of distributed energy resources in the calculation of unserved energy may present significant methodological and practical challenges due to the variability of output of distributed energy resources at any given time. For this reason, we do not support changes to the calculation methodology for their inclusion.

Exclusion of power system security events

We support the ongoing explicit exclusion of power system security events from the calculation of reliability based USE. In considering the question of what events should be excluded on the basis of power system security, we believe it could be beneficial for clause 3.9.3C(b)(2) of the Rules to also indicate:

> (iv) any event where available generation or supply sources are prevented from supplying *energy demanded* within a region by AEMO's maintenance of secure operation of the power system.

This would capture events where supply or transmission capability remains available, but maintenance of power system security prevents its use to supply consumers.

Definition of unserved energy

ERM Power does not support the inclusion of AEMO's reliability-related interventions in the definition of unserved energy. In general, AEMO's exercise of reliability-related interventions is to maintain regional reserve levels as opposed to preventing or reducing the value of involuntary load shedding, as such the super majority of provision of these services would not contribute to reductions in unserved energy. Further, we believe seeking to define an additional methodology for when or how reliability-related interventions should be included in the calculation of USE would only increase the complexity of the process and lead to unnecessary confusion for consumers and participants.

Also, in considering this question, we believe the Panel should consider that providers of these reliability-related intervention services are paid for the voluntary provision of the service. Whilst providers may have costs of service provision higher than the prevailing NEM market price cap which would prevent their provision of in-market price responsive demand management or supply services, we believe they should still be considered for the purpose of calculation of USE as a normal voluntary demand management or supply response to a price signal even though this price signal in this case is triggered out of market by AEMO.

The Paper also questions if demand reduction in response to the activation of the Mandatory Restrictions, Clause 3.12A provisions of the Rules should be included in the calculation of unserved energy in the event this led to a reduction in the value of involuntary load shedding. As noted in the Paper "*The level of demand response that will be achieved by restrictions is difficult to estimate and the actual response by consumers may be greater than is necessary*". Any methodology for the calculation regarding the potential impact of Mandatory Restrictions will require that AEMO determine what the counterfactual demand outcome would have been without the activation of Mandatory Restrictions and what its impact on the level on involuntary load shedding would have been. Similar to the inclusion of other reliability-related interventions in the calculation of USE, including estimates of the impact of Mandatory Restrictions would only increase the complexity of the process and lead to unnecessary confusion for consumers and participants.

ERM Power supports the continued use of only the value of involuntary load shedding as set out in any clause 4.8.9 Instruction issued by AEMO in the calculation of *unserved energy*. Whilst the Paper considers the possibility of post event adjustments to the value of the load shedding to take into account the value of actual shed load or what the load shedding volume should have been, with perfect hindsight, where too much load has been shed or load shedding has continued for longer than necessary, we do not support the use of post-event calculated counterfactual load shedding values. Post event adjustment of load shedding values would in our view increase the complexity of the process and lead to unnecessary confusion for consumers and participants.

Matching consumer experience of supply interruptions

We support the Panel's view as set out in the Paper that supply interruptions other than wholesale-level reliability interruptions should remain excluded from the USE definition.

Voluntary curtailment or demand response

ERM Power does not support the inclusion of price driven demand-response in the calculation of unserved energy. Demand-response is a legitimate market action and it would be inconsistent to record it as USE.

Conclusion

The Paper has set out a number of areas for possible improvements in the definition and calculation of USE. Our submission suggests additional improvements to the Rules for the Panel's consideration. Our primary concern is that the definition of USE must provide a consistent and repeatable calculation methodology which clearly defines both how the level of USE is calculated and also what components should be included in the total energy demanded in a region for a given financial year to allow both the forecast and actual level of USE to be compared to the reliability standard of 0.002%.

Whilst not directly forming part of this consultation process, we recommend that the Panel also consider if changes to the reporting requirements under Rules clauses 4.15 or 8.8 or Guidelines issued by the Panel under clause 8.8 are warranted to improve the transparency of reporting in this area. This relates to an operating incident where involuntary load shedding had occurred to determine if specific minimum reporting requirements similar to the increased level of reporting requirements to be implemented under the Enhanced Reliability and Emergency Reserve Trader (RERT) rule change determination are required. Currently there is little guidance with regards to minimum reporting requirements in this area.

Please contact me if you would like to discuss this submission further.

Yours sincerely,

[signed]

David Guiver

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