24 February 2017

Mr Nathan White
Markets Executive Officer
Australian Energy Market Operator
GPO Box 200
Melbourne VIC 3001

Dear Mr White

RE: Causer Pays Procedure Consultation – Issues paper

ERM Power Limited (ERM Power) welcomes the opportunity to respond to the Australian Energy Market Operator's Issues Paper for the Causer Pays Procedure (CPP) – Issues paper published in December 2016.

About ERM Power Limited

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. ERM Power also sells electricity in several markets in the United States. The Company operates 497 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland. www.ermpower.com.au

General comments

ERM Power in general supports the principals that AEMO has applied in developing the CPP Issues Paper (the Paper). However, we have some concerns with the suitability of the currently used data for the calculation of causer pays factors (CPFs) and with some of AEMO's preferred options as listed in the Paper.

ERM Power believes that the CPP review would greatly benefit from the constituting of an Industry Working Group by AEMO, similar to the working group process applied to the review of the process for calculating Marginal Loss Factors.

Concerns regarding the suitability of data used in the current process

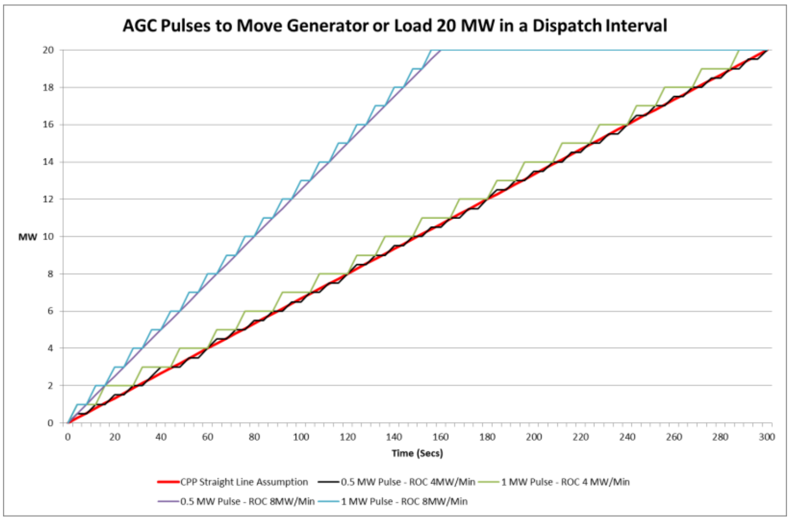
AEMO currently uses SCADA data transmitted from generators to determine CPFs, timestamped by AEMO at the time of receipt of the data into AEMO's systems, not the time it was transmitted by the participant. Interaction with AEMO staff during the AEMC's 5 Minute Settlement rule change Working Group has indicated the possibility that a data latency of 15 to 40 seconds routinely exists between the time that the data is recorded and sent, and the time at which it is received and timestamped by AEMO. We are concerned that this has the potential to introduce a data time mismatch into the CPF calculation process.

[1] Based on ERM Power analysis of latest published financial information.

The current CPF calculations for scheduled generators or load, is based on a smooth theoretical straight-line trajectory between Dispatch Targets. However, the AEMO Automatic Generation Control (AGC) system provides a series of discretely sized pulse change output signals to alter scheduled generator output in a series of stepped changes rather than the theoretical smooth straight line trajectory. These pulse signals can result in stepped changes in generator output from 0.5 to 1.5 MW depending on the generator.

It has also been observed that in determining the frequency of AGC pulses, the dispatch engine may factor in the ramp rates of generators. Hence, a generator with a high ramp rate may receive a higher number of AGC pulses during the initial minutes of a Dispatch Interval and a lesser number of, or NIL pulses in the remaining minutes. This results in generator output diverging from the theoretical straight-line trajectory.

The following graphically represents a range of possible outcomes for different AGC pulse sizes and generator ramp rates for a generator required to increase 20 MW in load. A similar graph can be created for a generator required to decrease load. In each case the red line represents the theoretical straight-line trajectory used in the CPF calculation.



The graph clearly outlines the current dispatch process limitations in comparison to the theoretical straight-line approach, used in the current CPF calculations. Depending on system frequency outcomes at the time, these process limitations, which are beyond the control of a participant, may result in a participant receiving a higher CPF than that warranted by a participant's own actions.

Also, AEMO's current dispatch process delays the issuing of dispatch targets and AGC pulses to move to these new dispatch targets until approx. 15 to 20 seconds into the Dispatch Interval. Until that time, output is maintained to match the previous dispatch interval's dispatch targets (adjusted for any FCAS regulating services activation). This delays the generator's movement along the theoretical straight line trajectory and introduces an offset error at the start of each Dispatch Interval.

In addition, ERM Power is concerned that scheduled generators and loads are being unfairly penalised across Dispatch Interval boundaries. The NEMDE in dispatching a scheduled generator for the current Dispatch Interval uses its initial output and not the previous Dispatch Intervals target output to calculate the target output for the current Dispatch Interval. AGC pulses from AEMO are then based on moving from this initial output, (and not the previous Dispatch Intervals target output), to the target output for the current dispatch interval.

By creating the theoretical straight line approach based on previous to current target outputs this immediately introduces a further offset error into the CPF calculation for scheduled generators and loads.

A further error can be realised when AGC pulses are not delivered directly to units by AEMO but via systems supplied generally by TNSPs. This could occur where the AEMO AGC system delivers a series of pulses across a period which are aggregated to a different number of pulses sent in a different timeframe to a generator when the pulse size of the two systems are different or where a time delay exists in the transmission of pulses across 3 different systems.

Currently the theoretical straight-line approach may not factor in the technical starting characteristics of generators that are subject to a Fast Start Inflexibility Profile (FSIP). In addition, some generators with very fast start capabilities are forced by weaknesses in AEMO's FSIP process, to bid as non-fast start generators. Fast Start and Very Fast Start generators do not follow a straight line trajectory during start up; these units generally synchronise later in a Dispatch Interval, and then ramp at a very fast rate to achieve the target output by the end of the Dispatch Interval. Whilst the Dispatch Engine (NEMDE) factors the FSIP limitations into the dispatch process, the current CPF calculation excludes such consideration. The need for Fast or Very Fast Start generators to dispatch at short notice has been rising with the increase in intermittent generation in the NEM, and increased volatility in spot price, and therefore it is important that the CPF calculation should accurately reflect the technical characteristics of this type of plant.

Currently AEMO excludes any Dispatch Intervals from the CPF's calculation process where FCAS Contingency Services have activated, ERM Power supports this. However, we believe this may unfairly discriminate against smaller sized generators for unit trip scenarios as there is a very high probability that a trip of a large generator will activate contingency services, whereas the trip of a smaller sized generator may not, resulting in the impact of a large reduction in generator output for a large sized generator trip on the participants CPF being excluded. To be consistent we believe any Dispatch Interval where a trip of any generator or scheduled load has occurred should be excluded from the CPF calculation.

The CPF calculation for Semi-Scheduled Generation is based on initial dispatch levels to final dispatch levels, rather than initial output to target (forecast) output. As AEMO provides this forecast or target output this may be a reasonable approach, as a participant should not be held responsible for actions made by others. However, the NEMDE in dispatching other units relies on this forecast or target output in setting targets for scheduled generators, if actual dispatch levels varies this would then introduce a larger frequency error into the system, resulting in a larger Frequency Indicator value than would otherwise be the case when being calculated. As the Frequency Indicator value directly contributes to the calculation of CPFs we are concerned that this creates another area of error into the calculation process that can result in increased CPFs to scheduled generators.

Currently AEMO uses its derived Frequency Indicator (FI) value rather than the actual system frequency in the CPF calculation. Whilst system frequency at a centrally located point is one of the variables in the derivation of this value, there are other variables that move this away from a pure frequency correction support consideration.

The derivation of the FI value, which changes every 4 seconds, makes it quite difficult for participants to recalculate the value of FI itself from real time information available, as it also requires knowledge of which units were enabled for regulation FCAS, and their previous 4-second deployment values. This make it impossible in real time for participants to implement control system actions to minimise a participant's CPF.

In fact, it is possible for a participant to receive a higher CPF if it attempts to alter unit output to maintain the local frequency at 50 Hz, as the AEMO measured frequency may be different to that location, and the calculated FI value may determine an alternate outcome is required. A Participant may also be subject to enforcement action by the Australian Energy Regulator for failure to follow dispatch targets for attempting to support local frequency at 50 Hz. These make it impossible for participants to implement a real time risk management process.

In determining that a participant is supporting frequency correction, AEMO considers whether a participant is above the theoretical straight-line trajectory for positive FI values and below for negative FI values. If this is the case, the participant is considered to support frequency correction and a positive performance measure is recorded for that 4 second interval. However, when assessing participants who are enabled for FCAS regulation services, the current CPP does not take into account the amount of FCAS regulation services actually provided vs activated, only that the enabled participant is supporting frequency correction. Where an enabled participant fails to provide the full activated amount this leads to an increase in the FI value for non-enabled participants.

Given all these factors, ERM Power is concerned that, though sound in theory, the practical application of the calculation of causer pays factors sees the potential for many errors to manifest in the current CPF calculation process. We therefore believe a reasonably accurate calculation may be unachievable, and that AEMO should give consideration to constituting an industry working group to work through these concerns as part of the current CPP review, and possibly to consider alternative approaches to cost recovery for FCAS Regulation Services.

Responses to AEMO's preferred approach

Local Requirements and efficiency considerations

We agree with the AEMO approach to calculate local factors only on the basis of units within the local requirement. We also note AEMO's intention under Option 2 to pre-calculate up to 17 different sub-regional factors on a *just in case basis* to support this. ERM Proposes, an alternative, which would be to publish pre-calculated factors based on the 5 NEM regions only which would be used if local requirements are imposed on a regional basis, and could be used as a guide to possible outcomes in the event of local factors being imposed which are not aligned with regional boundaries. AEMO would then calculate accurate factors based on the actual local requirements on an *as required basis* to be used in the settlement process. We believe this is a more efficient approach and would significantly reduce the amount of additional analysis routinely required by AEMO.

Treatment of positive performance within a portfolio

We agree with AEMO's proposal to net positive and negative performance within a portfolio, except in circumstances where local requirements are activated; whereby performance within a region with a local requirement could not be netted against performance in the remaining regions. We seek confirmation that only those generators which are not enabled for regulation FCAS services are netted and that generators enabled for regulation FCAS services are calculated as NULL value for netting purposes.

ERM Power does not believe that units enabled for regulation FCAS services should be included in the netting outcomes as these units are from a process perspective controlling frequency outcomes via dispatch instructions (pulses) vs providing frequency support.

Treatment of positive performance within the sample period

We agree with AEMO proposal to net positive and negative performance within a portfolio across the sample period except in circumstances where local requirements are activated. This support is based on AEMO providing details as to how this outcome results in lower overall regulation requirements to the system. Similarly to netting of performance within a portfolio, generators enabled for regulation FCAS services would be allocated NULL value for netting purposes.

Size and timing of the sample period

ERM Power does not support retention of the current historically distant 28 day sample period for the calculation of Regulating FCAS services CPFs. ERM Power considers that as pricing for Regulating FCAS services are based on real time market outcomes, CPFs should also be calculated on a real time basis. Calculating CPFs based on average outcomes and combining this with pricing outcomes on a real time basis introduces temporal inconsistencies into Regulating FCAS services outcomes leading to a loss of market efficiency due to the inability of participants to effectively manage this risk.

ERM Power acquiesces to AEMO's proposal to implement a 7 day historically closer sample period but as an interim step towards the introduction of real time CPF calculation. However, we also propose that participants be allocated two CPF's, one CPF to apply when a unit is in-service and an alternative CPF = 0 when a unit is out of service. This would at least offer participants a basic risk management tool for Trading Intervals when very high regulation FCAS services price outcomes apply.

AEMO has also requested feedback regarding the current requirement to publish CPFs at least 10 days prior to the start of the settlement period to which they apply; we believe this could be reduced to 2 business days.

With regard to the current data error issues, an immediate improvement that could also be considered by AEMO is to simultaneously record 4 second SCADA data for local system frequency in addition to unit output. AEMO could then determine a participant's support for frequency correction based on a time consistent basis, that is, the local frequency outcome as opposed to the FI value. This provides merit in allowing participants to implement real time frequency management, benefiting both the power system and participants working towards improving their CPFs.

AEMO has raised the possibility in the Issues Paper that efficient risk management strategies by participants in response to high local FCAS regulation services prices could impact negatively on system security, in the event a partcipant was to choose to reduce or remove generation from service. ERM Power contends that this supposed risk to system security is no different to that which currently exists where historically generators have reduced or removed generation in response to high local FCAS contingency raise services prices.

ERM believes the main reason this has not occurred recently in the South Australian context is that a Jurisdictional Directive prevents AEMO from implementing local FCAS contingency raise requirements preferring instead to rely solely on under frequency load shedding of consumer demand to mitigate the impact on secure system operation of some credible contingency events. We note however that for similar system conditions, local FCAS contingency raise requirements continue to be activated by AEMO in other regions of the NEM.

Similarly, system security or reliability concerns which occur when a remote generator withdraws availability in response to being constrained on at a Regional Refererence Price less than its cost of production are routinely managed by AEMO to prevent any insecure system operation.

In all the cases above, any system security or reliability concerns can be and have been efficiently managed on a routine basis by AEMO by the issue of a Clause 4.8.9 Direction under which the generator continues to generate on the basis that all its costs will be covered.

We therefore believe it would be inconsistent for AEMO to cite possible system security concerns based on particpants efficient risk management stratergies, in response to regulating FCAS services outcomes.

Treatment of non-metered market generation

We support AEMO's proposal that a portion of the residual should be recovered from non-metered generation, in accordance with their contributions to this frequency deviation component.

Resolving cases where all market participant factors are zero or positive

ERM Power agrees that regulation FCAS costs should be recovered from market customers through the residual demand factor in cases where all participant factors are positive/zero. Notwithstanding, in the event that non-metered generation is responsible for part of the frequency deviations, then a portion of this should be recovered in accordance with their contributions to this frequency deviation component.

Facilities changing registration status during a sample period

AEMO proposes to use a NULL rather than a ZERO value for calculating causer pays factors for plant registered partway through a sample period. ERM Power believes that if the registration of this plant leads to an increase in system regulating FCAS requirements due to the commencement of their Market activity, then use of a NULL value would be warranted. However, if no change to the system regulating FCAS requirements was required then use of the ZERO value is sufficient.

Calculation of factors when a significant portion of the sample period is unreliable

AEMO's proposal to continue to use the last set of good causer pays factors in the event that less than 20% of the current sample period data is of poor quality, unreliable or reduced due to large periods of contingency events is reasonable. AEMO could also consider if this should be on a temporary basis until additional data can be rolled into the data set, allowing publication of new CPF's for the balance of the settlement period or if it would apply to the full duration of the settlement period.

Publication of causer pays datasets

ERM Power prefers that AEMO continue to publish the existing daily 4 second raw data files and the new aggregated data file as proposed in the issues paper.

Conclusion

ERM Power supports AEMO decision to consult on the current Causer Pays Procedure, the procedure was last reviewed in 2008 and with the large number of changes in the NEM a review of the CPP is timely. Whilst in theory calculation of reasonably accurate Causer Pays Factors appears achievable, in practice data errors and inconsistencies, the dispatch process for generation and technical limitations regarding generator operation may make this from a practical perspective unachievable. In addition, other areas of NEM operation currently enshrine the capabilities for participants to manage risk in real time; the current CPP actively prevents efficient risk management.

In our submission we have raised a number of significant issues with the current CPP and ERM Power believes that the CPP review would benefit from the constituting of an Industry Working Group by AEMO, similar to the working group process applied to the review of the process for calculating Marginal Loss Factors. We can see usefulness in this approach, whereby both participants and AEMO achieved a greater understanding of the CPP process and its limitations, and deliver improvement to the process that may not otherwise been the case.

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

Yours sincerely,

[signed]

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