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Thursday, 13 February 2020

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

Dear Mr Pierce

**RE: ERC0274 – Mandatory Primary Frequency Response**

ERM Power Limited (ERM Power) welcomes the opportunity to provide this submission to the Australian Energy Market Commission's (the Commission) Draft Determination to the rule change requests submitted by the Australian Energy Market Operator (AEMO) and Dr Peter Sokolowski (the Proponents) for the implementation of Mandatory Primary Frequency Response (PFR) by generating units in the National Electricity Market (NEM).

**About ERM Power**

ERM Power (ERM) is a subsidiary of Shell Energy Australia Pty Ltd (Shell Energy). ERM is one of Australia's leading commercial and industrial electricity retailers, providing large businesses with end to end energy management, from electricity retailing to integrated solutions that improve energy productivity. Market-leading customer satisfaction has fueled ERM Power's growth, and today the Company is the second largest electricity provider to commercial businesses and industrials in Australia by load<sup>1</sup>. ERM also operates 662 megawatts of low emission, gas-fired peaking power stations in Western Australia and Queensland, supporting the industry's transition to renewables.

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<https://www.shell.com.au/business-customers/shell-energy-australia.html>

**General comments**

We acknowledge the work undertaken by the Commission in preparing the Draft Determination to introduce a mandatory obligation on generators to provide free frequency regulation services within the Frequency Normal Operating Band (FNOB). However, ERM Power remains of the view, as set out in our submission to the initial Consultation Paper, that AEMO already has sufficient tools to manage power system frequency outcomes in the NEM's power system and this rule change is unnecessary. We maintain that the historical under-procurement of frequency control ancillary services (FCAS) as power system operational conditions have changed over time, and the requirement as set out in the market ancillary services specification (MASS) that PFR is not allowed to provide regulation FCAS have been the primary reasons for the deterioration of power system frequency control.

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<sup>1</sup> Based on ERM Power analysis of latest published information.



We note that the Commission in the Draft Determination has to some degree acknowledged this to be the case<sup>2</sup>, but has considered due to the concerns raised by AEMO “*that mandated primary frequency response needs to be implemented as soon as possible to restore power system frequency outcomes to an acceptable level*” and based on this view, have determined to implement a mandated PFR requirement on a temporary basis.

We understand that whilst the Commission’s preference would be for market-based provision of the necessary services, the Commission feels obligated in this instance to implement a mandated PFR requirement on a temporary basis until the framework for provision of these market-based services can be provided. We understand that the issues raised in our submission to the Consultation Paper will be more closely considered during the next stage of the primary frequency response rule change process.

We also acknowledge the recent work undertaken by AEMO (12 September 2019 to 16 January 2020) to correct the under-procurement of contingency FCAS services and that increased procurement of regulation FCAS (March to May 2019) which actually improved the distribution of frequency outcomes under system normal conditions, despite reservations from AEMO that this outcome would be achieved. However, the capability for regulation FCAS to be provided by PFR in combination with the centralised automatic generator control (AGC) continues to remain an outstanding issue to be addressed by AEMO via a review of the MASS, and the ongoing review and adjustment of regulation FCAS procurement seems to have stopped post May 2019. It should be noted that the NEM power system operated with combined PFR/AGC at NEM commencement and for many years after the implementation of the eight FCAS markets. Also, if power system frequency has continued to deteriorate during late 2019 as indicated by AEMO, we question why the procurement volume for regulation FCAS has not been further adjusted given the improvement in power system frequency outcomes following the adjustments made to procurement values in March to May 2019.

We are concerned that the Commission continues to highlight the events of 25 August 2018 as a key reason for the introduction of a mandatory PFR requirement. As set out in significant detail in our submission to the Consultation Paper, the provision of PFR on generating units in New South Wales (NSW) and Victoria on that day would, in our view, not have prevented the under frequency load shedding (UFLS) outcomes observed in the New South Wales and Victorian regions due to a lack of available headroom capacity in these regions. In fact, the provision of PFR and fast acting battery response in the South Australia region, where significant capacity headroom and stored energy was available, was the major contributing factor in the trip of the Heywood interconnector which was ultimately the direct cause of the UFLS in NSW and Victoria. In our view, the events of 25 August 2018 highlight the impact of the uneven distribution of PFR that was apparent on that day between NEM regions, and the reducing availability of capacity headroom in a number of NEM regions at certain times. We note that this proposed rule does not address these outcomes.

#### **Length for which the proposed rule change will apply**

We support the proposed 3-year sunset provision. Notwithstanding, we believe the final rule should also include a provision that the proposed rule also lapse on the date when a market based solution(s) is implemented. As currently written, the proposed rule would continue to apply until the specified date. In the event that ERM Power’s preferred and easily implementable proposal to allow regulation FCAS to be provided via the combination of PFR and AGC in the MASS was implemented, which would of itself not require a rule change, we do not believe the proposed rule would need to continue. If a workable solution is found and implemented before the sunset date for this proposed rule, the proposed rule should lapse.

We believe the draft work plan should contain a provision that requires AEMO to consult on the ability for regulation FCAS to be provided by the combination of PFR and AGC as part of a MASS review and the work plan require that this review be completed by September 2020. To date, AEMO has not indicated it intends to consult on this provision in the MASS despite repeated requests to do so.

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<sup>2</sup> Page 112 AEMC Draft Determination – Mandated Primary Frequency Response



### **Potential impact on current FCAS and FCAS markets**

We remained concerned with regards to the potential impacts of this proposed rule on the current and future provision of FCAS and Energy services in the NEM.

The proposed rule provides the potential for the provision of primary frequency response to utilise and reduce the capability of procured contingency FCAS to respond to a credible or non-credible contingency event. Should this available capacity headroom, capacity foot room or stored energy be consumed by controlling frequency within a tight control error band within the frequency normal operating band (FNOB), insufficient contingency response may be available at a time of system need, leading to increased potential for a larger cascading event.

We are also concerned that following the operational commencement of this rule, the proposed rule has the potential for AEMO to reduce procurement of regulation FCAS and remove the economic signal for the need for ongoing provision of frequency regulation services.

Either of these outcomes would be counterproductive for the provision of adequate power system frequency control and potentially other power system services, to meet the ongoing needs of the power system over short-, medium- and long-term timeframes and the provision of new capacity to the energy market. Reductions in FCAS revenue resulting from a change in procurement values whilst appealing from AEMO's perspective, may result in changed unit commitment, battery energy storage systems (BESS) charging and discharging profiles and investment decisions. Investment decision which were made on the basis of FCAS and energy revenue will be undermined by the proposed rule change which introduces a form of retrospective rule change which will create uncertainty with regards to similar future investment decisions. We believe this uncertainty will be damaging for overall future investment in the NEM due to the retrospective nature of this rule change. It is unclear to ERM Power that the Commission has adequately considered these factors when preparing the Draft Determination.

We believe that the Final Rule must contain provision that during the period that this proposed temporary rule change applies, AEMO must not reduce FCAS procurement values from their current values. Notwithstanding, FCAS procurement values may increase if required as determined by AEMO.

### **No requirement for provision of headroom, foot room or stored energy**

We support the draft determination that generating units are not required to provide capacity headroom or foot room or stored energy in meeting any obligation imposed under this rule change. We believe however that additional clarity is required in the final rule regarding each of these terms as each has its own specific meaning. Just as a generating unit should not be required to operate below its maximum operating capacity to provide capacity headroom, a generating unit should not be required to operate above stable minimum loading to provide capacity foot room. Similarly, a unit operating below its operating maximum capacity should not be required to maintain additional stored energy above that which a generating unit would normally provide based on its internal operational decisions.

### **Proposed deadband**

The proposed  $\pm 0.015$  Hz deadband for mandatory PFR is unprecedented in Australia and we believe is unreasonably narrow. We are concerned that AEMO will move to implement this narrow deadband from the start and unforeseen consequences, both from a technical and economic perspective may occur. Alternatively, we propose that an interim deadband of  $\pm 0.050$  Hz be imposed and that this deadband then be reviewed at 3 monthly intervals by the Reliability Panel based on observed power system frequency outcomes. Whilst not as tight as that currently proposed, we believe that this outcome will achieve an improvement in power system frequency outcomes based on the needs of the power system at this time. We believe that any imposed mandated requirement should only be that which is reasonably required to restore power system frequency outcomes to a sustainable rather than a perfect level. This will reduce the cost imposed on generating units in complying with the proposed change and will flow through as reduced costs to consumers.



Our selection of the  $\pm 0.050$  Hz deadband is based on the deadband imposed on generating units in the NEM at commencement of the NEM and aligns with the tight frequency distribution in 2005 shown in Figure 1.1 of the Draft Determination. We believe this provides a sustained and reasonable level of power system frequency outcomes which is technically proven in the NEM, can be quickly implemented and allows further assessment by the Reliability Panel with regards to the technical and economic tradeoffs for any further adjustment.

We support the proposed governance framework that changes in the “*primary frequency control band*” (PFCB) would be subject to review and setting by the Reliability Panel. We are however concerned that this good governance framework is then undermined by the proposed rule which sets the initial PFCB at  $\pm 0.015$  Hz. We believe that the initial setting should instead be at what was the historical norm and when the Reliability Panel is convinced it is safe to do so, they will have the power to subsequently adjust the PFCB based on technical and economic considerations.

### **Exemptions framework**

ERM Power supports the proposed exemptions framework and broadly supports the five listed criteria. The need for a clear exemptions framework, including explicit recognition of the costs of conversion, is particularly essential since the Commission has proposed to delete any compensation for conversion or ongoing service provision.

In addition to the proposed criteria, we submit that in some instances, a generating unit may be capable of operating in “frequency response mode” but may not be able to provide the required rate of response at all operating conditions. A gas turbine for example may be limited to lower than AEMO’s proposed 5% droop response when operating above 90% of rated capacity. A closed cycle gas turbine may be incapable of providing any response when operating in “duct burner mode” at a time when power system conditions requires this increased output to meet reliability outcomes. It is unclear how this is catered for in the proposed criteria. In considering the proposed exemptions framework, the framework should allow for both total and partial exemption from the proposed primary frequency response obligations.

ERM Power supports a structured exemptions framework, however, we consider that it should be operated by the Australian Energy Regulator (AER) rather than AEMO. This would be more consistent with the AER’s technical compliance enforcement responsibilities across the Rules. We believe a framework where AEMO solely determines exemptions would be unfair upon a generator, as its only recourse to reverse an AEMO decision is to launch a lengthy and costly Chapter 8 dispute. In contrast, a framework governed by an AER process would have a more transparent and cost-efficient dispute mechanism, requiring that all parties present robust justifications for their positions before an independent third-party, in this case the AER.

### **Staged approach to generating unit inclusion**

We note that AEMO has proposed a staged approach to requiring participation of generating units in the provision of PFR, with generating units above 200 megawatt (MW) capacity required to participate initially with other lower capacity units to follow at a later date. We support this approach. However, we are concerned that a “blanket” inclusion approach may not provide the least cost approach of provision of the mandated service and result in unnecessary increased costs to consumers. This is particularly the case as the mandatory provision of PFR is only planned to be required for a relatively short timeframe. We believe this proposed staged approach should be further modified and included in the Final Rule.

We propose that following implementation of stage 1, stage 2 should consist of those units in the 30 to 200 MW capacity range that currently have capability to provide regulation and fast contingency FCAS. Following implementation of stage 2, we recommend the Reliability Panel be required to conduct a review of power system frequency outcomes to determine if actual outcomes are sufficient to provide sustained frequency outcomes in the NEM for the remainder of the maximum 3-year period for which the mandatory PFR requirement is expected to operate.



Only where the Reliability Panel determines that observed power system frequency outcomes remain unsatisfactory should implementation proceed to a third stage where the remainder of the generation fleet is required to implement mandatory PFR requirements.

This proposed change to the staged approach will ensure that costly modifications to generating unit control systems are only implemented on the basis of a demonstrated required technical need as opposed to a “blanket” inclusion. This will ensure that overall cost pass through to consumers will be minimised where possible.

### **Performance monitoring**

We support the Commission’s decision that generating units are not required to install any additional specific performance monitoring equipment as a result of this proposed rule, to that currently available on the generating unit.

“The Commission has made a draft rule that does not require the installation of any new or additional equipment for the purpose of verifying compliance with the mandatory PFR requirement, rather AEMO is required to document the audit and testing requirements for the purpose of verifying compliance through its PFRR”.<sup>3</sup>

The high-speed metering and monitoring equipment necessary for demonstrating delivery of fast contingency FCAS do not retain a continuous record as would be necessary to demonstrate ongoing compliance with the proposed PFR provision. Consistent with the Commission’s statement above, there should be no ability to require the modification of existing monitoring equipment. However, it is not clear how draft rule 4.4.2A (b) (4) achieves the Commission’s intent. The draft rule appears to leave open to AEMO to oblige such equipment through its Primary Frequency Response Requirements (PFRR). The final rule should specifically set out the exclusion of any such requirement being imposed on a generator.

### **Reporting requirements**

In July 2019, the Commission made a Rule requiring AEMO and the AER to report on outcomes with regards to power system frequency and the FCAS markets.<sup>4</sup> We believe that the Commission should consider additional updates to this Rule (4.8.16) as part of this rule change process to ensure that the reporting requirements remain suitable following the introduction of any mandated PFR requirement. We believe AEMO should in addition to the current reporting requirements also be required to report on;

- The amount of PFR that AEMO considers to be active in each dispatch interval
- The spread of within-Normal Operating Frequency Band frequency outcomes and any observed oscillations.
- The effectiveness of PFR obligation. Most particularly with regards to informing future work on the appropriate minimum quantities of PFR and stored energy that should be acquired by a future market arrangement.

### **Future workplan**

We acknowledge the work undertaken by the Commission to review and amend the Frequency Control Frameworks Review (FCFR) workplan as set out in Table 3.1 in the Draft Determination<sup>5</sup>.

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<sup>3</sup> Page 76 AEMC Draft Determination – Mandated Primary Frequency Response

<sup>4</sup> <https://www.aemc.gov.au/rule-changes/monitoring-and-reporting-frequency-control-framework>

<sup>5</sup> Pages 39 to 43 AEMC Draft Determination – Mandated Primary Frequency Response



We support the inclusion of a detailed work plan in the Final Determination with aligned provisions in the Rules which require AEMO and other stakeholders to demonstrate ongoing commitment to achieving the stated objectives. Unfortunately, this was not the case with regards to the work plan as set out in the FCFR and the work plan failed to progress to achieve its objectives.

Whilst the Commission has set out a draft timetable for the future work plan in the Draft Determination, we are concerned that in our view, this appears to be only a combination of broad research and matters associated with implementation of the existing three rule changes and there appears to be no set timetable towards the achievement of market-based solutions to replace any temporary mandated PFR requirement. The draft work plan contains no set dates for the completion of interim stages to implement a market-based solution for the provision of primary frequency response. We believe a more dedicated focus is required to achieve the implementation of a market-based solution in a timely manner. The most appropriate platform for its development would be the Primary Frequency Control Technical Working Group, led by the Commission. The workplan should identify specific deliverables, allocated to specific parties, by specific dates with the AER required to monitor and report on the achievements of the stated objectives or the reasons for non-achievement.

We are also concerned by statements as set out in the Draft Determination that even if a market-based solution is developed, AEMO will seek to continue the proposed temporary requirement for the provision of mandatory PFR from all scheduled and semi-scheduled generators in parallel with the market-based solutions. We are concerned that this may frustrate the development of market-based solutions and require an extension of this rule change beyond the current sunset date. We believe by including additional defined outcomes and dates for the interim steps to achieve a long-term market-based solution(s) and requiring all parties to work to meet these dates in the Final Rule, stakeholders will have more confidence that this temporary requirement will not transform to a permanent requirement in the National Electricity Rules (the Rules).

### **Principles for the frequency control work plan**

We support the principles for guiding the frequency control work plan as set out in section 3.4.2 of the Draft Determination<sup>6</sup>. In addition, we propose an additional principal with regards to cost allocation for the provision of primary frequency response. The provision of frequency control regulation services via PFR is not costless with providers incurring both direct and lost opportunity costs. We believe that the future framework should clearly provide the option for potential suppliers to choose to voluntarily supply PFR and that the cost incurred for the need for the provision of primary frequency response should be allocated to those parties that cause the service to be required, similar to how causer pays costs are allocated in the regulation FCAS markets.

### **West Australia electricity markets (WEM) case study**

We note that AEMO has provided a limited 24 hour period of frequency and generator PFR contribution outcomes to support their belief that expected outcomes for NEM generating units following introduction of a mandatory PFR requirement, will only be minor deviations from energy dispatch targets. In a power system undergoing such rapid transformation as the NEM, in our view, it is unclear how a single selective 24-hour time period from a different electricity market would provide a reasonably accurate indication of NEM generating unit output outcomes in the future where mandated PFR requirements were introduced. Far more extensive data from like power systems would need to be provided to support this assertion.

We believe that it is important to consider that from a revenue perspective, the economic impact of alteration to generating unit output outcomes in the NEM following imposition of a mandated PFR requirement will be far greater as the NEM is an energy-only market as opposed to the WEM which primarily rewards generators on a capacity mechanism basis.

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<sup>6</sup> Page 36 AEMC Draft Determination – Mandated Primary Frequency Response



Also, as demonstrated by outcomes in the WEM on 10 January<sup>7</sup>, the deployment of mandatory PFR requirements across all in-service generating units does not prevent the activation of UFLS under all potential multiple credible contingency events.

## Conclusions

ERM Power remains of the view, as set out in our submission to the initial Consultation Paper, that AEMO already has sufficient tools to manage power system frequency outcomes in the NEM's power system and this rule change is unnecessary. However, if the proposed rule is to be made, we support the Commission's determination that it should apply only for a limited 3-year period and that genuine progress must be made to implement market-based solutions for the provision of enhanced power system frequency regulation services.

To this end, we believe that the proposed work plan must include a more dedicated focus to achieve the implementation of a market-based solution in a timely manner. The most appropriate platform for its development would be the Primary Frequency Control Technical Working Group, led by the Commission. The workplan should identify specific deliverables, allocated to specific parties, by specific dates with the AER required to monitor and report on the achievements of the stated objectives or the reasons for non-achievement.

ERM Power supports a structured exemptions framework administered by the AER which allows both total and partial exemptions to be granted.

We believe that it is critical the Final Determination consider in greater detail the potential for unforeseen outcomes arising from the early implementation of the proposed  $\pm 0.015$  Hz deadband for mandatory PFR and that the Commission set out a staged approach governed by the Reliability Panel which commences from the implementation of a  $\pm 0.050$  Hz deadband.

Lastly, amendments to the draft rule should be made to clarify that generating units are not required to provide capacity headroom or capacity foot room or stored energy in meeting any obligation imposed under this rule change.

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

Yours sincerely

[signed]

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<sup>7</sup> <https://www.abc.net.au/news/2020-01-10/power-outage-perth-kalgoorlie-geraldton-western-power-says/11859526>