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Australian Energy Market Commission  
EPR0059  
Sydney South, New South Wales 1235

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Dear Claire

### **Frequency Control Frameworks Review**

Meridian Energy Australia Pty Ltd and Powershop Australia Pty Ltd (MEA Group) thank the AEMC for the opportunity to provide comments in relation to its review of the frequency control frameworks.

MEA Group is the owner and operator of the Mt Mercer and Mt Millar Wind Farms as well as Powershop Australia, an innovative retailer committed to providing lower prices for consumers which recognizes the benefits for consumers of a transition to a more renewable-based and distributed energy system.

MEA Group seeks to ensure the focus of the frequency control frameworks review continues to seek a desirable outcome for consumers – both business and residential as without consumers there would be no energy market. Consumers are interested in three things:

1. the quality of the electricity they consume (including emissions intensity);
2. the reliability of the supply of the electricity they receive; and
3. the price for which they pay for the electricity they consume.

Fundamentally, this review should focus on the balance of supply and demand of electricity and the things that are necessary to allow this to happen. Clearly, there is a range of solutions that can improve both the demand and supply imbalance with any final outcome requiring input and support from generators, retailers, AEMO and the AER.

It is critical that the ultimate solution be technology neutral and focuses on the benefits to the consumer and the balance of supply and demand. MEA Group also notes that whilst there has been a clear degradation of the frequency over time the market continues to meet the frequency operating standard (FOS).

MEA Group recognises that it may be tempting, in the face of significant public pressure, to jump straight to the reintroduction of primary frequency control for all generators at a local level with an incentive for those generators to provide those services. However, this may not lead to the best possible outcome for consumers.

MEA Group suggests there should be a combination of mandating generators to reinstate primary governor control within the normal operating frequency band (NOFB) and a narrowing of the NOFB requiring contingency raise/lower services in excess of those currently supplied today.

Any ultimate solution should be implemented in a phased and coordinated approach to ensure we can measure any improvement or further degradation in frequency performance before moving to the next phase of the solution.

Clearly, there is a perception within the industry that whilst we are experiencing the highest ever FCAS prices we are observing further degradation in frequency across the NEM and therefore the causer pays mechanism must be broken. Noting the market continues to meet the FOS but that frequency continues to degrade we, therefore, must assume that something needs to be done to ensure consumers are receiving fair value for money. In that respect, the role of AEMOs automatic generation control system (AGC) cannot be ignored and must be improved as part of any solution to the frequency degradation in the mainland and Tasmanian NEM. The FCAS causer pays procedure needs to be addressed as part of this review such that it is relevant to the NOFB. Currently, frequency could be well within the NOFB but high causer pays costs apply. In this situation, there is no net benefit to the consumer paying high FCAS prices when the frequency remains within the NOFB.

MEA Group also notes that it supports the introduction of a stable and long-term energy policy at the national level with bi-partisan support such as the National Energy Guarantee (NEG) and believes that this framework review and the outcomes can work in tandem to produce a more stable and reliable power system.

Question	Response
Question 1 – Scope	
<p>Are there any other issues relating to frequency control that should be included within the scope of this review?</p>	<p>The rate of change of frequency over the same time period should also be closely investigated to provide the Commission with greater clarity on the responsiveness of local controllers and the operation of the AGC. MEA Group also suggests a review of every generator’s current settings is undertaken as a matter of priority to ensure they align with the parameters installed in the AGC.</p> <p>The review should also consider publishing all available data and the calculation methodology undertaken by the AGC together with the associated causer pays procedure (including AWEFS) to allow the industry to interrogate and where possible identify improvements to the systems or calculations. The release of such data and calculations with associated documentation may also help to identify better ways of meeting the challenge of balancing supply and demand in real time.</p> <p>MEA Group would like to suggest (as an alternative mechanism), that generators not be required to follow a straight line target to target set point. This would effectively make the actions of some participants in responding to local frequency fluctuations, the correct response and expected behaviour. This would solve any non-conformance issues and provide better frequency control and a more stable system – i.e. the way it was prior to 2005 and with lower FCAS costs.</p>
Question 2 – Drivers of degradation of frequency performance in the NEM	
<p>Do stakeholders agree with the drivers of the observed long-term degradation of frequency performance as identified by DigSILENT?</p>	<p>Generally yes. There has been a reduction in primary frequency response within the normal operating frequency band which aligns with the anecdotal evidence across the industry.</p>
<p>Are there any other drivers of frequency degradation in the NEM that are not mentioned here?</p>	<p>MEA Group is comfortable the Commission is cognizant of the full range of issues contributing to frequency degradation across the NEM. Given there is such a range of contributing factors MEA Group encourages the Commission to look at a range of solutions rather</p>

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	than try and identify a silver bullet to resolve this issue.
Question 3 - Materiality of frequency impacts from non-dispatchable capacity	
What are the likely impacts on frequency of increasing proportions of non-dispatchable capacity, and reducing proportions of scheduled generation?	MEA Group doesn't believe the impact on frequency necessarily has to be detrimental and is dependent upon whether the Commission decides to narrow the NOFB. If the NOFB is narrowed and we 'scatter' frequency response strategically throughout the NEM then frequency control should be tighter. Tighter frequency control is expected to reduce the flows across the interconnectors enabling a higher limit on the interconnectors thereby providing greater capacity in the system which is a clear benefit to the market and consumers.
Are there any significant impacts on frequency that may occur from changes in output from individual large scale semi-scheduled generation (large solar and wind farms)?	This is subject to the generators location within the system and the characteristics of the system at the time. AEMO's proposed rule change to the Generator Technical Obligations could help to deal with these large fluctuations and their signalling of these fluctuations to the market. MEA Group reminds the Commission of some much larger disturbances in the system, such as the disconnection of 1,000MW at Loy Yang after which frequency dropped to 49.7Hz. This suggests it is not only the semi-scheduled generating units that should remain the focus of this review.
Does the proposed change represent an unnecessary barrier to entry, having regard to the costs imposed by the change and the technical capabilities of different technologies?	It shouldn't so long as the focus remains on the balance of supply and demand of electricity into the system in real time. This broadens the ability for a range of participants to become actively involved in the improvement of the supply and demand imbalance.
Does the analysis for wind generation above hold true for large-scale solar PV? Does large scale solar PV output change more rapidly than wind output? Are changes in solar output more difficult to forecast?	MEA Group doesn't have any relevant experience in the operation of large-scale solar generators and so cannot comment on this question.
Question 4 - Drivers of change	
Are there other drivers of change affecting frequency control that are not set out in this section? If so, how material are they?	<p>Although considered in the Commission's review, forecasting improvements are an area MEA Group believes substantial (and easy) gains can be made when improving the balance of demand and supply across the NEM. This alone would substantially reduce the requirement for the procurement of additional regulation and contingency FCAS.</p> <p>MEA Group suggests that it would be beneficial for the AER to confirm its position in respect of the enforcement of compliance with generator dispatch targets in so far as they will also consider a generators contribution to frequency control prior to issuing any enforceable undertaking.</p>

Question	Response
Question 5 - Assessment principles	
Do stakeholders agree with the Commission's proposed assessment principles?	MEA Group is comfortable with the Commission's assessment principles but would encourage a particular focus on consumers.
Are there any other relevant principles that should be included in the assessment framework?	As above, the review must be consumer focused. MEA Group believes the necessary market frameworks and sufficient incentives are already in place to ensure the frequency degradation can be improved going forward without the introduction of new markets or incentives/frameworks. Any ultimate solution must ensure the best outcome for the consumer.
Question 6 - Assessment approach	
Are there any comments, or suggestions, on the Commission's proposed assessment approach?	MEA Group strongly supports the Commission's advice that "a change in technology should not require a change in regulatory arrangements".
Question 7	
Are stakeholders aware of any other costs or impacts linked to the degradation of frequency control performance in the NEM?	<p>Obviously, the main costs or impacts linked to the degradation of frequency control in the NEM include:</p> <ul style="list-style-type: none"> <li>• Additional wear and tear on generating units</li> <li>• Additional costs to consumers in the procurement of surplus regulation and contingency FCAS</li> <li>• Higher maintenance costs</li> <li>• More stringent connection requirements for new connections connecting to a grid that spends more time at the edges of the NOFB than has previously been the case</li> <li>• Distorted market signals for existing and new generating units leading to perverse economic outcomes</li> </ul> <p>MEA Group also believes the introduction of the 1,200MW constraint on wind energy output in South Australia to maintain system security is a clear cost associated with the degradation of frequency within the NEM and should be addressed as part of any ultimate solution.</p>
Question 8	
Are there any other risks that stakeholders are aware of with respect to degradation of frequency control as represented by the flattened frequency distribution within the normal operating frequency band shown in Figure 5.1?	<p>Clearly, the most significant risk associated with a flattening frequency distribution is the potential to not meet the FOS.</p> <p>However, flatter distribution whilst highlighting the degradation of frequency over the past decade doesn't necessarily show the change to the rate of change of frequency over the same period of time and this is</p>

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	something the Commission should be cognoscente of as part of this review.
Question 9	
Are stakeholders aware of any other international experience in relation to primary frequency control that is relevant for this review of frequency control frameworks in the NEM?	As noted above, the rate of change of frequency is as equally important in this review and as such should be included in the frequency control frameworks review. MEA Group is not aware of any other international experience that is relevant to this review.
Question 10 - Mandatory primary frequency control	
What are the advantages and disadvantages of mandating primary control for all generators in order to improve frequency control during normal power system operation?	<p>The reinstatement of primary frequency response within the NOFB will more than likely result in improved frequency control across the NEM.</p> <p>Advantages:</p> <ul style="list-style-type: none"> <li>• Lower risk to system security</li> <li>• Less wear and tear on generating units currently working to arrest the frequency when it reaches the boundaries of the band</li> <li>• Improved frequency control across the NEM and Tasmania</li> </ul> <p>Disadvantages</p> <ul style="list-style-type: none"> <li>• May not lead to improvements in the rate of change of frequency</li> <li>• This solution needs to be considered in its entirety which should include a review and potentially retuning of the AGC with the known parameters and ramp rates of all generating units</li> </ul>
What factors should be considered in the specification of a mandatory primary frequency control response?	The first issue that needs to be addressed is an audit of every generators governor settings and a full review of the AGC settings and parameters. AEMO needs to understand the current status of the system and the settings and the interactions between the generating system and the AGC. Without this, AEMO cannot make informed decisions on how best to proceed and address the frequency degradation across the NEM. Once these are known, primary frequency response should be mandated. MEA Group would support a scenario where the interests of current generators were respected by including, for example, a gradual implementation over time and/or allowing existing generators a wider operating band initially.
Are there any regional issues that should be considered in assessing whether primary frequency response should be a mandatory obligation for registered generators in the NEM?	This reviews interaction with the Federal Governments proposed NEG policy is important in this respect. Obviously, there are regions within the NEM that are in greater need of primary frequency response than others just as there are issues between the mainland and

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	Tasmania that need to be addressed.
<p>Should an obligation for generators to be responsive to changes in system frequency outside a pre-defined dead band include a required availability reserve, such as 3 per cent of a generators registered capacity, as is the case in Argentina?</p>	<p>MEA Group thinks it is difficult to believe that this arrangement would result in the most efficient market outcome for consumers. Rather than mandating this, MEA Group would expect the market to identify the most efficient means of ensuring sufficient capacity is available once the requirement for frequency response within the NOFB has been mandated.</p>
Question 11	
<p>What are the advantages and disadvantages of procuring primary control through bilateral contracting as a means to improve frequency control during normal power system operation?</p>	<p>The obvious disadvantage of this approach is the creation of a new market that will only result in higher costs for consumers. That said, MEA Group would be supportive of such an approach if the Commission were able to demonstrate the net result of this markets introduction was the same cost to consumers (reduction in FCAS costs) and an improvement in frequency control within the NOFB. This new market may also have the effect of creating a forward market for frequency response which would provide a clearer price signal and allow market participants to better manage their risk.</p>
Question 12 - Market based options for primary frequency control	
<p>What are the advantages and disadvantages associated with the two options presented for earlier provision of primary frequency control:</p>	
<p>(a) Using the existing contingency FCAS for provision of primary frequency control and narrow the normal operating frequency band to trigger a primary frequency response closer to 50 Hz.</p>	<p>This option represents, in MEA Group’s view, the preferred approach to correcting the continued frequency degradation within the NEM as the lowest cost solution to consumers within the existing market frameworks.</p> <p>This option maintains a technology-neutral approach allowing for the participation of fast frequency response technologies as well as the existing synchronous plant.</p> <p>This approach recognises that the frequency of the NEM has historically held close to 50Hz until more recently when the distribution toward the fringes of the NOFB began to increase. From this, we can surmise the framework remains relevant today, however, the tightening of the NOFB is expected to have the effect of encouraging generators to more closely confine the frequency to a tighter range during normal operating conditions.</p> <p>A disadvantage of this approach is that it potentially ignores the rate of change of frequency within the NOFB and therefore we may see a scenario where frequency deviates rapidly within the NOFB causing greater wear and tear on units responding to frequency deviations in real time. However, MEA Group considers this to be an unlikely outcome and in any case no worse than the current situation where we are seeing conflicting signals</p>

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	<p>between local control systems and the AGC.</p> <p>Some may argue that the use of a greater amount of contingency services to ensure the narrower NOFB is maintained will result in a rise in the price of contingency FCAS. However, MEA Group believes this behaviour would represent a correctly functioning market. If prices were to rise then this would provide the investment signal to the market that greater long-term investment is required in the contingency FCAS market.</p>
<p>(b) The establishment of a new primary regulating service to provide primary frequency control within the normal operating frequency band, separate from contingency FCAS</p>	<p>As discussed above the establishment of “new” markets to address a problem that has until recently been non-existent does not seem like a rational or least cost approach or the best outcome for consumers.</p> <p>MEA Group believes the use of existing market mechanisms would be sufficient to send the necessary investment signals to the market where required.</p> <p>AEMO has confirmed there is already sufficient enabled capacity within the market to meet current and forecast future demand for FCAS services. This is effectively energy the consumer is already paying for. Why should the consumer have to pay for it again?</p>
<p>Question 13</p>	
<p>Are there any aspects of the existing Causer pays procedure that stakeholders believe are acting to discourage the voluntary provision of primary frequency response?</p>	<p>Whilst the philosophy underpinning the causer pays mechanism is clear it may not be serving the market as well as it could. If the approach were changed to measure a participant’s contribution to any frequency excursion at the time of the frequency excursion with the resulting costs apportioned on that basis then this would send a clearer disincentive to generators as opposed to the current system. Under the current arrangements, a generator may not be generating and still incur causer pays costs. MEA Group believes this is in contrast to the philosophy of the mechanism and contradicts even the name of the mechanism when clearly that generator could not have caused any frequency excursion during the time it was disconnected from the grid with corresponding bids.</p>
<p>Question 14 - Frequency monitoring and reporting</p>	
<p>What are the potential benefits or costs associated with a requirement for AEMO to produce regular frequency monitoring reports?</p>	<p>MEA Group would support any proposal that provides participants and consumers greater visibility on any aspect of the market. Any associated costs would be negligible in MEA Group’s view.</p>
<p>What metrics should such frequency monitoring reports include?</p>	<p>For each participant, the report should identify the periods where that participant did not meet their target and contributed to the frequency deviating outside of the NOFB. This would serve two purposes:</p> <ol style="list-style-type: none"> <li>1. allow each participant to identify the periods where they are not meeting their dispatch</li> </ol>

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	<p>target; and</p> <p>2. provide participants with the opportunity to interrogate the AEMO causer pays data and calculations,</p> <p>both of which should encourage improvements in respect of frequency control within the NEM.</p>
Question 15 - Defining FFR	
<p>What are your views on AEMO's advice on how and when FFR might emerge in the NEM?</p>	<p>MEA Group generally agrees with AEMO's assessment that FFR is complimentary to the existing traditional types of frequency response currently available in the NEM. That is to say that FFR should help with the primary frequency response as the inertial response of synchronous generators' response begins to tail off.</p> <p>MEA Group would expect that FFR could replace, to some extent, the requirement for contingency FCAS services – particularly R6 and L6 resulting in a net benefit to consumers particularly if the commission were to adopt a narrower NOFB.</p>
Question 16 - Potential options for making changes to FCAS frameworks	
<p>What are your views on the above indicative approaches to varying the design of FCAS services, and on other potential changes?</p>	<p>One of the issues with the FCAS market is that it doesn't measure each participant's contribution to a particular frequency excursion into the normal operating excursion frequency band or the operational frequency tolerance band or the extreme frequency tolerance excursion limit. In contrast, under the current framework, a participant could incur a causer pays payment when they are in fact not generating and their plant has no bearing on the particular frequency excursion at that point in time. This fundamental issue with the causer pays procedure must be resolved with a participant's contribution to a particular frequency excursion being the metric by which the causer pays calculation cost be calculated.</p> <p>For the same reasons, unless a participant's deviation causes a frequency excursion outside of the NOFB then there should be no causer pays factor applied as the recovery of costs would be minimal and would, therefore, represent the least cost solution for consumers, noting that primary frequency response would be mandated to a degree and the NOFB would be narrower.</p>
Question 17 - Technical characteristics of emerging sources of FCAS	
<p>What other emerging sources of FCAS should the Commission be aware of?</p>	<p>MEA Group encourages the Commission to continue its investigations into the capability of demand response programs to participate in the restoration of demand and supply across the NEM.</p>
Question 18 - Managing the frequency impacts of non-dispatchable capacity	



Question	Response
<p>Is the existing FCAS framework sufficient to maintain frequency as greater proportions of non-dispatchable capacity enter the power system?</p>	<p>It is MEA Group's view that there is sufficient FCAS to meet current and projected future demand. It is important to remember the FOS is being met and so the degradation of frequency across the NEM isn't a result of insufficient FCAS supply but rather the inefficient utilization of the available capacity. MEA Group reiterates its earlier comments that any improvements to the demand-supply imbalance will reduce the magnitude and number of frequency events across the NEM. The existing framework should allow for the inclusion of FFR technologies.</p>
<p>Would it be more efficient to improve the forecasting of non-dispatchable capacity to reduce imbalances in supply and demand, or to rely on higher levels of regulating FCAS to manage those imbalances?</p>	<p>MEA Group agrees that it is always desirable to continue to strive for improved forecasting methodologies and on that basis, this in conjunction with mandated primary frequency response within the NOFB, should both be included as part of the ultimate solution. There are a number of systems within the NEM including AWEFS which provide a questionable forecast that feeds directly into the dispatch engine.</p>
<p>What other efficient options are there to manage imbalances in supply and demand resulting from the variability of non-dispatchable capacity within the five-minute dispatch interval?</p>	<p>We could meter solar installations so that we could better forecast their output during each 5 min dispatch interval.</p>
<p>Question 19 - Cost recovery arrangements</p>	
<p>Do you consider existing cost recovery arrangements for contingency FCAS to be appropriate?</p>	<p>MEA Group would prefer to see a cost recovery mechanism that was linked to a participant's contribution to a frequency excursion rather than an indicator that was applied 28 days post the calculation of the frequency indicator. This would also address the unfair treatment of semi-scheduled and non-scheduled generating units that for obvious reasons cannot meet a straight line target from the start to the end of the dispatch interval.</p>
<p>If not, how should cost recovery arrangements be changed?</p>	<p>As discussed above recovery costs should be on the basis of actual costs incurred to maintain frequency at 50Hz.</p>
<p>Question 20 - Co-optimisation with other markets</p>	
<p>Are there other system services, such as inertia, system strength or system stability, that should be co-optimised with FCAS markets?</p>	<p>In the context of co-optimisation, it is important to remember that inertial response can only provide a very short-term response to any frequency degradation. Once the inertial response tails off the system is reliant upon contingency and then regulation FCAS raise and lower services to arrest any continuing deviation from the NOFB. This inertial response is inherent in any synchronous generator and should be mandated to be available within the NOFB.</p>
<p>If so, can one service (such as inertia) be optimised first and, if so, why?</p>	<p>As discussed above inertia should be optimised first given its inherent availability.</p>

Question	Response
Would co-optimisation impact on cost recovery and, if so, how?	It shouldn't. Any offset in FCAS costs would likely be recovered by the generators participating in the energy-only market.
Question 21 - Consistency in the provision of system security services	
To what extent is it important that the NER arrangements for the provision of system security services are consistent between providers of such services, e.g. large, transmission-connected generators and distributed energy resources?	It is vitally important as the industry shifts toward a distributed energy market that large generators are not treated preferentially due to their ability to meet onerous technical standards. That said the increase in small generators, not in the least rooftop solar PV, is having a significant impact on AEMOs ability to balance demand and supply. For this reason, it is important that NER arrangements require a minimum level of visibility to AEMO to ensure they can sufficiently manage demand and supply especially during periods of stress on the grid such as during non-credible contingent events.
Question 22 - Frameworks for the connection and operation of distributed energy resources	
Do the existing connection frameworks inhibit the ability of the owners of distributed energy resources to provide system security services?	Yes because the system requires SCADA level data that is difficult for distributed generators to provide. Some consideration should be given to allow smaller distributed generation to effectively participate in the causer pays process without the requirement for uneconomic metering.
If distributed energy resources are to play a bigger role in supporting power system security, would it be more appropriate for the distributed energy resources to be required to provide system security services, or to be incentivised to provide them?	Required to provide them where appropriate metering is available and only to the extent necessary. Incentivised to install such metering.
Are there any other regulatory barriers or opportunities relevant to the provision of system services via distributed energy resources that are not discussed in this section?	There are always difficulties for distributed energy resources to participate in the market due to the friction associated with excessive requirements from distributors etc. which are out of balance with the associated consequences.
Question 23 - Frameworks for distributed energy resources to participate in the NEM	
Are there any other regulatory barriers or opportunities relevant to the provision of system services via distributed energy resources that are not discussed in this section?	Following the rule change allowing for the classification of loads as ancillary services loads, MEA Group does not see any further barriers to entry in this section of the market.
Question 24 - Technical challenges	
Is the aggregated capability of distributed energy resources sufficiently 'firm' for aggregators to provide the system security services that AEMO needs?	It can be depending on developments in control systems and monitoring equipment and is likely to be available in the near future.
Are there any other technical challenges relevant to the provision of system services via distributed energy resources that are not discussed in this section?	There are always technical challenges associated with any change in the system but we are not aware of any that would be a significant barrier to participation that

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	would be insurmountable.
Question 25 - Commercial challenges	
Are there any other commercial challenges relevant to the provision of system services via distributed energy resources that are not discussed in this section?	There are always commercial challenges associated with competing commercial players, differing market objectives and complex commercial drivers but we expect the market to resolve these issues provided there is a stable framework in place.

As an administrative matter, MEA Group notes it would be helpful if all questions in AEMC issues papers were consolidated at the beginning of the paper to ensure consistent responses from all respondents that address the issues the AEMC are seeking feedback on.

If you have any further questions please feel free to contact me.

Yours sincerely



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 Meridian Energy Australia Pty Ltd and Powershop Australia Pty Ltd