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Australian Energy Market Commission
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Mandatory primary frequency response Draft rule determination

Snowy Hydro Limited welcomes the opportunity to comment on matters raised in the Draft rule determination from the Australian Energy Market Commission (the Commission) on the Mandatory primary frequency response.

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

Snowy Hydro understand that the frequency performance under normal operating conditions has been declining in recent times however we are disappointed with the draft rule to mandate all scheduled and semi-scheduled generators in the NEM to respond to changes in primary frequency control. Mandating primary frequency response (PFR) with no specifications on headroom is more likely to result in a random effect on frequency performance. In addition, the increase in the provision of PFR from generators will represent a cost in terms of wear and tear and efficiency with the mandatory proposal increasing the 'workload' on the remaining generators providing this service which in turn encourages these generators to stop providing the service.

Snowy Hydro is concerned that the constitutional validity of the proposed rule has not been established by the Commission. If the Commission proceeds with the proposed rule notwithstanding this unresolved issue, for the reasons outlined in our original submission, changes to primary frequency control should be based on the National Electricity Objective (NEO) and the NER's market design principles and not through mandatory requirements in reaction to a low probability contingency event (the lightning strike on QNI 25 august 2018). Since the 2018 August event, and also including recent summer bushfire events we do not believe the system performance warrants this proposal to still go ahead. This indicates that AEMO should adapt market processes to cater for the new environment of greater variable renewable energy penetration and generation units' governor responses consistent with the NEO.

There are serious costs which have not been properly acknowledged by the Commission. However, to the extent the draft rule is implemented, the inclusion of the sunset is an important step to work on the implementation of further reforms prior to June 2023 to appropriately value and reward the provision of frequency control services. Appropriately structured incentives that align with existing market structures continue to be the most cost effective and efficient means of supporting the provision of primary regulating response and addressing the current concerns with frequency performance.

The Commission has correctly recognised *"that a mandatory requirement for narrow band PFR is not a complete solution and, on its own, will not incentivise the provision of primary frequency response".* Snowy Hydro believes that the Commission should consider a market based mechanism, appropriately aligned with power system stability fundamentals that enables a technically sound solution through the most efficient allocation of resources in the long term. We therefore support the deferral of the draft determination of ERC0263 – Removal of disincentives to PFR which enable markets to be analysed as part of the new work plan.

Constitutional Validity

The Commission has not adequately established the constitutional validity of the proposed rule. It acknowledges that s51(xxxi) of the Constitution applies to the NER as applied in the offshore areas of the States, and in the Territories, but appears to disclaim this prohibition on the basis that it does not "*constitute a general limit on the AEMC's rule-making power*." However, the fact that the s51(xxxi) does not apply to every jurisdiction in which the NER is imposed does not resolve, and is in fact irrelevant to the resolution of, the constitutional issue at hand. The Commission has conceded that the proposed rule enlivens s51(xxxi), and it is therefore incumbent on the Commission to address this issue before it issues a final determination on this rule change.

The Commission's consideration of whether or not the proposed rule constitutes an "acquisition of property" for the purposes of s51(xxxi) is devoid of legal analysis and insufficient, amounting to no more than a mere declaration that no such acquisition will take place. However, it is accepted authority that the types of property to which s51(xxxi) applies "extends to every species of valuable right and interest, including real and personal property, incorporeal hereditaments such as rents and services, rights of way, rights of profit or use in land of another, and choses in action. And to acquire any such right is rightly described as an "acquisition of property."[1] The proposed rule requires the forcible provision of primary frequency control from Generators and such provision will result in a identifiable benefit relating to the use of property (being the power stations from which the primary frequency control is supplied).[2] As such, the proposed rule is likely to give rise to a relevant acquisition.

If the Commission fails to adequately address this issue before rendering a final determination, Snowy Hydro will consider further measures to resolve this uncertainty.

Deadband

Snowy Hydro is concerned by the proposal for effective control and resilience of the power system through a narrow response deadband. The suggested allowable deadband to be set at ±0.015Hz is very narrow and a significant change to Australian standards.

The Draft Rule Determination notes that the tight deadband would align with standard international practice. Although these standards are similar to ISO New England and PJM, care must be taken on the unintended consequences which would eventuate from changes such as this as they are costly and risky for the NEM. The generation mix with the international markets are different which would lead to undesirable outcomes to those witnessed overseas.

[1] *Minister of State for the Army v Dalziel* (1944) 68 CLR 261

[2] See *Georgiadis v Australian and Overseas Telecommunications Corporation* (1994) 179 CLR 297 at 305

A narrower deadband will lead to additional operational and maintenance costs, greater control burden to AEMO and lower operating efficiencies. For these reasons, Snowy Hydro supports the concept of a temporary "safety-net" wide deadband closer to ±0.50 Hz for the case of a very large, non-credible contingent event where current market based methods fail to procure and enable sufficient, geographically separated contingent FCAS. .

A very tight deadband (±0.015Hz) that is well within the frequency range where Regulating FCAS operates (±0.15Hz) will clearly result in commands from the Primary Frequency Control of individual machines interfering with AEMO's AGC - as they are both acting to correct frequency within the same frequency range, at different rates. This interference of control schemes, without significant tuning, heightens the risk of oscillatory behaviour in frequency. Furthermore, Primary Frequency Control of different fuel types have different response curves due to physical differences in actuating governor commands (compare hydro to coal for example). This can lead to further oscillatory behaviour in frequency as the Primary Frequency Control from one fuel type "fights" or interferes with the actions taken by Primary Frequency Control from another fuel type. Thus an overly simplified approach of tightening deadbands without consideration for the interaction of different control schemes is likely to result in more oscillation in frequency within the NOFB which runs counter to Undrill's 2019 advice.

Existing frequency control arrangements were designed around the generation mix at the time, which was around the late 1990s and early 2000s, that included predominantly coal, gas and hydro. The markets have worked well however the arrangements may not reflect the reality of the evolving power system and the increased ability of new technologies to assist in frequency control. It is for this reason Snowy Hydro believes that the market and incentives can provide AEMO's desired tighter governor control of frequency. This would be done through:

- Compensating generators via a spot market to provide Primary Frequency Control within the NOFB;
- and determining a better cost allocation than the current "causer pays" for regulation

Sunset to the rule and forward work plan

The inclusion of the sunset does demonstrate the Commission's commitment to the implementation of further reforms prior to June 2023 to appropriately value and reward the provision of frequency control services. Snowy Hydro believes the Commission should take a clear leadership role through a new review that sets out a pathway to the development of future arrangements to appropriately incentivise and reward frequency control in the NEM. It is important that the Commission work with the ESB, AEMO and industry for a long term solution.

Rule changes have been extended if proposals have not been underway. The Long Notice Reliability and Emergency Reserve Trader (RERT) was originally designed with a sunset clause, with the Commission extending indefinitely. Allowing the mandatory PFR requirement to be extended indefinitely or in any way would increase uncertainty about future market design changes and what they may look like. This uncertainty will only cost consumers in the end. There needs to be a clear review that provides accountability to all the market bodies before that date.

The Draft rule determination fails to highlight that providing primary frequency response through the mandatory approach represents a cost in terms of wear and tear and efficiency and the mandatory proposal increases the 'workload' on the remaining generators providing this service which in turn encourages these generators to stop providing the service. Snowy Hydro would be cautious about any mandatory mechanism that would actually reduce costs.

"The Commission recognises that the evolution of the FCAS markets has not kept pace with the system requirements for frequency control and that the implementation of mandatory PFR is now required to support the secure operation of the power system."[3] Snowy Hydro has kept pace with the FCAS markets that have been provided and should not be made to pay for the consequence of no further work undertaken by AEMO and the Commission to understand the power system requirements for maintaining good frequency control and to reform the existing frequency control frameworks to meet these needs now and in the future. We strongly encourage the Commission to therefore work on a market approach for the PFC market.

The Commission should prioritise the development of a market framework, and if developed earlier than expected then the Commission should sunset the mandatory requirement early. Under no circumstances should the sunset approach be extended.

Transparency

Snowy Hydro agrees with the Commission that "*the market and regulatory arrangements for frequency control should promote transparency and be predictable, so that market participants can make informed and efficient investment and operational decisions. Simple frameworks tend to result in more predictable outcomes and are lower cost to implement, administer and participate in."*[4] The Commission introduces a greater degree of prescription into the exemption framework in the context of improving the practicality, flexibility and transparency of the exemption framework. Snowy Hydro however believes the transparency required from the mandatory PFC rule change on the market is not detailed enough.

Snowy Hydro supports the publishing of a list of exemptions, whether it is the mandated solution or a future appropriate market solution, as there needs to be significant performance reporting from AEMO. We would support a number of live reports that should be presented as part of the obligation. If the Commission and AEMO believe the mandated solution is critical then the market needs transparency on applied frequency deadbands, droop settings, response times, stored energy headroom at all locations so as to display the support delivered.

Exemptions

Snowy Hydro supports the rule for an exemptions framework under 4.4.2B and broadly supports the below criteria listed:

1. *"the capability of the generating system to operate in frequency response mode;*
2. *the costs that are likely to be incurred in augmenting the generating system to be able to operate in frequency response mode, relative to the turnover derived from, and operating hours of, the generating system in relation to its operation in the national electricity market;*
3. *the stability of the generating system when operating in frequency response mode, and the potential impact this may have on power system security;*
4. *the ongoing costs of operating the generating system in frequency response mode; and*
5. *any other physical characteristics of the generating system which may affect its ability to operate in frequency response mode, including (but not limited to) dispatch inflexibility profile, operating requirements, or energy constraints"*[5]

[3] AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019, ppiv
[4] AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019, pp20
[5] AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019, pp47

The Commission has correctly acknowledged that *"in the absence of an exemption framework some generators may be forced to incur substantial costs for plant upgrades to comply with the PFR requirement."* If the mandatory obligation proceeds then generators can have the degree of flexibility that avoids excessive compliance costs for eligible generation plant with the exemption based on technical and practicality grounds with no inclusions of any technology-type exemptions.

Snowy Hydro believes that the Commission should provide more guidance on what will be exempt, who is eligible and how decisions will be made to exempt certain technologies and require others to provide PFC. Further clarification would provide more certainty and clarity for the market.

Performance measurement

"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."[6] Snowy Hydro understand the intent for Generators who have not installed the high-speed metering equipment as required to verify performance in the FCAS markets should not be obliged to install it however it is unclear how this would appear to remain open as AEMO will be able to oblige such equipment through its Primary Frequency Response Requirements (PFRR).

Adding high-speed metering equipment across the NEM may improve the situation but the NEM will still remain inflexible and performance will depend on how well the service matches the actual dynamics of the sub-region power system. Snowy Hydro previously noted there is little point in having a very fast service in a part of the NEM that has sufficient inertia. Location of fast acting primary frequency control providers is mainly needed in potential sub-regions, which have low inertia. In stronger parts of the system, the higher costs associated with very fast responding systems is difficult to justify

Under the current market arrangements the AER's approach to strict compliance of dispatch targets has meant that that generators face a regulatory compliance risk with deviations from dispatch targets when providing primary frequency control. The AER however has suggested, consistent with Snowy Hydro's views, that some challenges may arise in implementing and monitoring a mandatory obligation on generators and that this could lead to additional upfront and ongoing costs. Further to this the AER is *"concerned that a requirement for generator to comply with the conditions of the PFRR would mean that the PFR characteristics of each generator would need to be recorded in order to assess compliance and that this may require the installation of high speed monitoring equipment for verification purposes, and associated protocols for data retention."*[7] We believe the concern is warranted and believe the requirement to install high speed monitoring equipment will add further costs to participants.

Long term impacts

As highlighted above, there are generators which can provide primary frequency control at little cost while there are other generators not well set up to provide primary frequency control that would require the installation of specific technology making the projects unviable and could stall the development of new capacity. This in the long term would affect the economic recovery of assets that would impact investment.

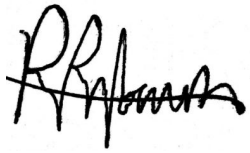
[6] AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019, pp76
[7] AEMC, Mandatory primary frequency response, Draft rule determination, 19 December 2019, pp66

In addition to negatively impacting investment, the mandatory proposal will be violating the technology neutrality principle that underpins the NEM which will lead to inefficiencies, as it would not encourage other technologies to contribute to a solution. This is further exacerbated through AEMO's suggestion to who would be required to provide primary frequency response noting the requirements should only apply to scheduled and semi-scheduled generators, which effectively limits the obligation to generators with capacity greater than 30MW. This would occur while generators greater than 30MW required to make a trade-off between supplying energy and PFC services resulting in a potential loss of revenue, with the proposal clearly favouring one technology over another.

Snowy Hydro therefore supports a market based approach for primary frequency control that can be competitively provided. The performance of the frequency control markets have worked quite well. The main issue has been that the current categorisations are not always fit for purpose, particularly in potential islanding areas where there can be large amounts of variable renewable energy generation and low inertia.

Snowy Hydro appreciates the opportunity to respond to the Draft rule determination and any questions about this submission should be addressed to me by e-mail to panos.priftakis@snowyhydro.com.au.

Yours sincerely,



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