30 August 2023

Ms Anna Collyer
Australian Energy Market Commission
60 Castlereagh Street
Sydney NSW 2000
Submitted online: https://www.aemc.gov.au/contact-us/lodge-submission

Dear Ms Collyer

Consultation Paper: National Electricity Amendment (Clarifying Mandatory Primary Frequency Response Obligations for Bi-Directional Plant) Rule 2023

Equis Australia Management Pty Ltd and related entities ("**Equis**") appreciates the opportunity to provide the Australian Energy Market Commission ("**AEMC**") with feedback on its consultation paper regarding clarification of mandatory primary frequency response ("**PFR**") obligations for bi-directional units ("**BDU**").

Equis is Asia Pacific's leading renewable infrastructure developer and is helping Australia to deliver its energy transition ambitions to sustainable energy infrastructure within the National Electricity Market ("**NEM**"). Within this objective, Equis is committed to delivering its portfolio of Battery Energy Storage Systems ("**BESS**") and renewable energy projects across Victoria, New South Wales, Queensland, South Australia, and Tasmania on time and on budget for the benefit of all Australians.

BESS have demonstrated the ability to provide rapid and accurate response to control frequency in the NEM[1] and are the most cost-effective way to provide frequency control, manage the constant fluctuations between supply and demand and they can, being BDUs, deliver and absorb power from the system at significantly faster speeds than thermal or hydroelectric generators. Lithium-ion BESS are, however, manufactured with a finite, warranted amount of energy throughput – or cycling – capacity for their operating life and each time a BESS charges or discharges, this finite energy cycling capacity is reduced. BESS manufacturers provide performance warranties which are linked to an agreed amount of energy throughput of the BESS.

[1] https://www.aemo.com.au/-/media/Files/Media_Centre/2018/Initial-operation-of-the-Hornsdale-Power-Reserve.pdf

Background

In its rule change request, the Australian Energy Market Operator ("**AEMO**") is proposing to clarify that AEMO should be able to mandate BDUs to provide PFR when:

- BDUs are charging and discharging; and
- when BDUs are not being dispatched, for example when holding reserves to participate in frequency control ancillary services ("**FCAS**") markets.

Equis notes that this proposal has already been rejected twice by the AEMC[2], most recently in September 2022 and that the AEMC should not consider the same request again within a 12-month period. Furthermore, imposing this obligation on charging or un-dispatched BESS is costly and inconsistent with the concept of technological neutrality. If BDUs are considered loads when allocating TUOS charges (as per the AEMC's final IESS rule change[3]), then it follows that they should only face the same obligations as loads, when charging, and loads are under no PFR obligations when they are consuming power from the power system.

Equis' submission focuses on the proposed obligation on BDUs to provide PFR, not when charging or discharging, but when only enabled to offer FCAS or market ancillary services as per the NER.

Under the current rule, BDUs only provide PFR if they are already dispatched above zero in the energy market which means they just vary their output and do not deplete their allocation of charge and discharge cycles. Mandating a BDU to provide PFR when the BDU is not being dispatched but only enabled for FCAS services would force the BESS to cycle at all times and thereby consume its finite energy throughput capacity a lot faster than anticipated without being renumerated for the additional cost of energy throughput. It is akin to forcing an open cycle gas turbine to generate electricity during energy market trading intervals where the electricity price is below its short run marginal cost (i.e. during the vast majority of the year) only to be able to mandate it to provide PFR.

The AEMC needs to consider the potential effects the proposed rule could have in the market and that these outcomes are not compatible with the National Electricity Objective, which is *to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:*

- *price, quality, safety and reliability and security of supply of electricity; and*
- *the reliability, safety and security of the national electricity system*.[4]

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[2] https://www.aemc.gov.au/sites/default/files/2020-03/ERC0274%20-%20Mandatory%20PFR%20-%20Final%20Determination_PUBLISHED%2026MAR2020.pdf p.46.
https://www.aemc.gov.au/sites/default/files/2022-09/PFR%20Incentive%20Arrangements_%20Final%20Determination_8SEPT2022.pdf p. 29.

[3] https://www.aemc.gov.au/sites/default/files/2021-12/1._final_determination_-_integrating_energy_storage_systems_into_the_nem.pdf pp. 51 – 63.

[4] s.7 National Electricity (South Australia) Act 1996

Impact on BESS projects

Such adverse impacts include:

- if the costs, including opportunity costs of increased cycling, outweigh actual revenues and forecasted revenues, market participants may simply withdraw their BESS from the contingency FCAS market to preserve the finite energy throughput capacity for the energy markets. This would reduce supply in the contingency FCAS markets and therefore increase contingency FCAS prices. Alternatively, BDUs may simply offer all their FCAS services at higher prices to compensate for their losses when providing mandatory PFR;
- increased cycling and faster degradation of the BESS means that the BESS' stored energy is depleted more quickly and possibly unavailable for expected high price periods. BESS operators may then have a strong incentive to withdraw their assets from all FCAS markets altogether which would again increase the price of FCAS; and
- alternatively, if the BESS operators choose to continue to provide FCAS but have less energy throughput capacity, then expected high price periods in the energy market will either last longer or have higher price outcomes as there will be less scheduled generation to meet demand.

Furthermore, the AEMC must also consider the impact of the proposal, if implemented, on the BESS projects that are being developed in the NEM and their ability to obtain project financing in a market environment where new financial commitments in generation projects recorded the slowest first half of a year since 2017[5]. Supply chain issues, shortages of qualified staff, a weak Australian dollar, inflationary interest rates markets and the complex exercise of forecasting energy and FCAS market revenue are just a few issues that make the development and financing of BESS in the NEM a challenge[6], even for well-funded companies like Equis with a relatively low cost of capital. This rule proposal would at the very least add more complexity to estimating future revenue streams for battery projects because:

- revenues from contingency FCAS markets need to be discounted to account for the possibility that the BESS operator may reduce enablement of the BESS in these markets to avoid having to provide for PFR to conserve energy for the participating high price evening peaks;
- revenues from energy arbitrage will be reduced as energy is required during the middle of the day at low or negative prices for the provision of PFR;
- the battery life will be reduced due to increased cycling; and
- warranty restrictions are likely to result in reduced participation in contingency and/or energy markets.

FCAS market revenue is a significant factor in ensuring the financial viability of BESS and the rule change request would introduce even more uncertainty to the already difficult task of forecasting FCAS revenue stream which would result in lenders applying even greater discount factors to FCAS revenue when sizing the debt of BESS projects. BESS projects already find themselves in very challenging financial markets where securing debt for project finance is becoming increasingly difficult unless projects are underwritten by long term contracts. Given this, the proposed rule change and its associated difficulties with forecasting revenue streams poses a serious risk of derailing a number of proposed BESS projects in the NEM which are currently targeting financial close and also further dampen the growth of new BESS projects.

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[5] https://reneweconomy.com.au/battery-storage-charges-on-as-new-wind-and-solar-projects-hit-new-low/ Equis acknowledges that BESS projects were leading the charge with respect to new financial commitments during the first half of 2023, however, the Collie Battery in Western Australia is backed by an AEMO contract for system strength, the Waratah Battery in NSW is also underwritten by a NSW government system strength contract and the extension of the Kwinana Battery is undertaken by a government owned corporation. They are therefore not representative of the market.

[6] https://www.cornwall-insight.com/our-thinking/chart-of-the-week/aus-proposed-changes-to-pfr-and-the-impact-on-battery-operations/

Recommendation

The AEMC also asked market participants for proposals to promote long-term, consistent, and predictable PFR. Equis refers to submissions by the market to the original rule change proposal for Mandatory PFR[7] and PFR incentive arrangements[8] where market participants suggested to establish a new FCAS market for PFR, i.e. a market driven solution to procure PFR. Alternatively, Equis also supports a capacity market design for PFR where market participants can offer their PFR capacity to AEMO via an auction mechanism on a long-term basis, for example 10 years. This would ensure that PFR is procured on a long-term basis and would at the same time underwrite PFR capacity, regardless of its technology, with a long-term revenue stream.

Yours faithfully
EQUIS AUSTRALIA MANAGEMENT PTY LTD

Thomas Schmitz
Director – Head of Energy Markets

REF: AEMC PFR Submission EAMPL – 31 August 2023

[7] https://www.aemc.gov.au/rule-changes/mandatory-primary-frequency-response
[8] https://www.aemc.gov.au/rule-changes/primary-frequency-response-incentive-arrangements