

1 September 2023

Lodged via AEMC website

NATIONAL ELECTRICITY AMENDMENT (CLARIFYING MANDATORY PFR OBLIGATIONS FOR BIDIRECTIONAL PLANT) RULE 2023 – ERC0364

Dear Ms Collyer,

The Clean Energy Council (CEC) is the peak body for the clean energy industry in Australia, representing over 1,000 of the leading businesses operating in renewable energy, energy storage, and renewable hydrogen. The CEC is committed to accelerating the decarbonisation of Australia's energy system as rapidly as possible while maintaining a secure and reliable supply of electricity for customers.

We welcome the opportunity to comment on the *Clarifying Mandatory PFR obligations for Bidirectional Units rule* change request.

The CEC recommends the AEMC **does not make a rule** to:

- extend a mandatory PFR obligation to apply to BDUs that are enabled for provision of market ancillary services (FCAS).
- extend mandatory PFR obligations to apply to BDUs that are charging

The CEC is comfortable with the initial set of changes proposed by AEMO to update the wording of the NER to recognise the new category of BDU in the PFR processes.

Basis of issues with proposed changes

We are opposed to these extensions of mandatory PFR on the basis that this will increase the extent of cycling – or repeat energy 'throughput' – basically the total amount of charge and discharge asked of battery storage assets over time.

Lithium ion batteries are designed to deliver a finite amount of cycling / throughput across their operating life. Each time a battery charges and discharges, this finite amount is eaten into. As we understand it, battery warranties and support agreements are linked to an agreed amount of throughput on the battery.

It follows that any change to the operation of the battery that increases this energy throughput, will also shorten the operating life of Lithium ion batteries and the associated warranty period.

Industry concerns therefore centre around the extent to which the proposed changes will result in increased throughput obligations placed on the battery. The magnitude of this impact is affected by several factors:

- By simply increasing the number of DIs where a battery is asked to go through microcycles – ie, by asking batteries to cycle even when they are sitting at zero energy dispatch but enabled for contingency FCAS
- Additionally, a broader frequency distribution may result as synchronous thermal units are retired from the system. This may translate to greater obligations on batteries that are enabled to provide PFR. That is, depending on individual droop settings, batteries will be asked to absorb or generate increased volumes of active power as the frequency distribution spreads.

- We also note that the wear and tear / throughput impacts on batteries from micro cycling are far greater than the equivalent effects experienced by large synchronous thermal units.
- Finally, while there is currently no headroom requirement to make active power available for the provision of PFR, we understand that any changes to this requirement would markedly increase the cost burden faced by BDUs.

There are a few further points to note here

- Other battery chemistries may be less affected by requirements to go through more cycles and increase total throughput. For example, we have been advised that battery technologies that utilise lithium titanium oxide in its anode may be less subject to the degradation effects of repeat cycling. However, we also understand that these technologies have a lower energy density than carbon based anode batteries, which may affect total project costs.
- There is also a question of technology neutrality raised by the rule change. Pumped hydro, the other predominant form of storage in the NEM, is not captured by an equivalent requirement to provide PFR when at zero energy dispatch. Imposing this additional requirement, and costs, only on batteries is not consistent with equal treatment of technologies.
- We also acknowledge the importance of maintaining a stable frequency for efficient and secure power system operation. However, we urge the AEMC to consider whether the likely increased costs imposed on battery developers through expanding the mandatory provision of PFR, and the associated material inefficiencies this will create, would justify this approach to the procurement of PFR. This is especially the case given the frequency performance payment frameworks have not yet even come into effect.

Obligation to provide PFR when charging

The CEC does not support this proposed requirement, on the basis that it may see an increase in the degree of throughput and therefore cost imposed on batteries.

We understand that auxillary loads and other balance of plant behind a connection point can make a battery appear to be charging when it is in fact at zero energy dispatch. This would have the same effect as described above.

Obligation to provide PFR when enabled for FCAS

The CEC does not support this proposed requirement, on the basis that it will impose material additional costs on battery developers, reducing efficiency of investment and operation of the NEM.

There are various effects that could flow from AEMO's proposed change

Firstly, batteries may face incentives to remove their assets from contingency FCAS markets, if the costs of increased cycling outweigh the revenues earned through those markets. Given that FCAS markets are already thin, with prices easily suppressed as the supply side expands, this is a likely outcome.

Secondly, if increased cycling means that the batteries' stored energy is depleted and unavailable for expected high price periods, battery operators may face strong incentives to remove their assets from FCAS markets. This latter effect may be particularly pronounced, given the relative magnitude of potential revenues available through energy vs FCAS markets.

Thirdly, depending on the magnitude of any depletion of stored energy that occurs due to the mandatory participation in a 'raise' PFR, storage assets may not be able to provide the same volume of contingency

response when called upon. This may be particularly problematic if battery droop settings are set at a more aggressive level.

Finally, and over the longer term, storage providers may face incentives to select different storage technologies and/or battery chemistries that are better attuned to increased cycling. While a diversity of storage technologies is likely to be desirable in the NEM, we consider this should be driven by market price signals, not as a result of a regulation induced disincentive. More to the point, the outworking of this regulatory disincentive could be to increase investment costs, in turn increasing wholesale costs over the long term.

Investors need clear policy and regulatory settings and are already adjusting to a broad array of change as the NEM transforms. This uncertainty on what may be required in the future, specifically the additional throughput impact on batteries, directly impacts current decisions of asset owners and investors.

Beyond this, we also note the importance of a stable and predictable regulatory environment. The AEMC has previously ruled against requiring batteries to provide PFR when at zero energy dispatch. To be reconsidering this concept creates the perception that the regulatory environment is unstable and subject to regular, unjustified changes. Increases in regulatory risk flow through into

Potential alternatives:

The CEC's general position has always been that the capabilities of renewable technologies which support reliable and secure operation of the power system should be properly recognised and valued.

We understand that the frequency performance payments framework, due to commence in 2025, will provide some signals to deliver better frequency performance, including PFR. These frameworks should be given the chance to be properly implemented, before any expansions are made to the mandatory arrangements.

The creation of significant new regulatory mandates, as proposed by AEMO in this rule change, will simply create incentives for inefficient behaviour. Investors will seek to minimise their exposure to the non-remunerated cost, or simply pass that cost on to consumers through whatever means possible.

We also note the suggestion from Shell Energy, discussed in further detail in their submission, for an expansion to the regulation FCAS service to allow this service to be provided in response to locally sensed frequency deviations. Such a service procurement model could be used to procure a 'broad' supply of PFR across a majority of the fleet, simply by AEMO determining the volumes and locations of this service. Competition for the provision of the service would drive prices to efficient levels.

However, there has already been significant reform of the frequency control frameworks over the last few years. Investors now need certainty, if we are going to have a realistic chance of hitting emissions reduction and renewable energy targets. We recommend the AEMC weight this need for regulatory certainty and stability, when considering whether to introduce any new measures related to PFR.

Further queries can be directed to **Christiaan Zuur** at the CEC on czuur@cleanenergycouncil.org.au

Kind regards

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