

Ms Anna Collyer  
Chair, Australian Energy Market Commission  
By online submission

31 August 202331 August 2023

Dear Ms Collyer,

**RE: Consultation Paper – Clarifying mandatory primary frequency response obligations for bi-directional plant (ERC0364)**

**Introduction**

Eku Energy welcomes the opportunity to provide a submission to the Australian Energy Market Commission's (AEMC) Consultation Paper *Clarifying Mandatory PFR Obligations for Bidirectional Plant* (ERC0364).

Eku Energy is a specialist global battery energy storage business dedicated to advancing the energy transition. Jointly owned by a Macquarie Asset Management managed fund and British Columbia Investment Management Corporation, Eku Energy's purpose-built team brings together specialist technical capabilities, with experience across origination, development, system design, power markets and software optimisation. Eku Energy's 1GWh Australian portfolio in delivery includes the 150MW / 150MWh Hazelwood BESS in the Latrobe Valley, Victoria; the 200MW / 400MWh Rangebank BESS in Cranbourne, Victoria; and the 250MW / 500MWh Williamsdale BESS in the Australian Capital Territory.

**Matters under consultation**

Eku Energy recognises the importance of maintaining the safe, secure and reliable operation of the power system and acknowledge AEMO's concerns regarding the need to maintain these outcomes as the generation fleet transitions. However, Eku Energy does not support the rationale or approach to alter the current regulatory framework for the mandatory provision of PFR from scheduled bidirectional units (BDU) when charging or enabled for market ancillary services.

Regarding the two separate matters under consultation, Eku Energy shares the following perspectives for the AEMC's consideration.

**Issue 1 – Proposal to include scheduled bidirectional units in the Primary Frequency Response obligations when discharging**

Eku Energy views that the proposal to require scheduled BDU to provide Primary Frequency Response (PFR) when generating (following the commencement of the IESS rule on 3 June 2024) addresses an inadvertent drafting omission and is largely an administrative matter.

## Issue 2 – Future provision of consistent and predictable PFR

AEMO's rule change proposal seeks to require scheduled BDUs comply with AEMO's Primary Frequency Response Requirements (PFRR) when charging from the network (acting as a load) or enabled for market ancillary services (e.g. Regulation FCAS and Contingency FCAS). This is in addition to the current National Electricity Rules (NER) requirements for scheduled generators to provide PFR when discharging.<sup>1</sup>

Eku Energy disagree that there will be insufficient frequency control capability across the NEM to support power system security to warrant the change, as proposed, to the current and incoming primary frequency control arrangements.

Fundamentally, any shift in regulatory frameworks should consider some key design principles:

- Transparent and stable regulatory frameworks will drive well-functioning markets, support investor certainty and underpin timely project delivery.
- Mandatory services should only be considered where there is risk of market failure and threats to power system security.
- Simple, defined market products will best support price discovery, allowing for the lowest cost provision of a service.
- Technology neutral regulatory principles promote the supply of essential system services.

Responses to targeted consultation questions regarding Issue 2 are provided below.

### **Misalignment with the Assessment Criteria (Consultation Paper Question 9)**

#### *'Principles of good regulatory practice'*

At its core, transparent, predictable and stable regulatory arrangements are foundational in supporting projects to ensure proponents understand and value risks, helping them reach final investment decision and proceed to delivery.

The Mandatory PFR Final Determination (March 2020) established the regulatory arrangements within which scheduled generators would be required to provide PFR, further given operational effect within AEMO's PFRR Procedure.<sup>2</sup> Furthermore, the publication of the Primary Frequency Response Incentive Arrangements Final Determination<sup>3</sup> (September 2022) and AEMO's Frequency Contributions Factors Procedure<sup>4</sup> (June 2023) detail the operational requirements and methodology against which frequency performance payments will be calculated.

These frameworks and other changes have established the parameters against which risk can be understood, valued and managed. Importantly, project investors, debt financiers, developers and asset managers can form a view of the regulatory framework, assess and optimise operational requirements and value liabilities and revenues associated with wholesale market participation.

<sup>1</sup> In response of receipt of a non-zero dispatch instruction when cleared in the energy market.

<sup>2</sup> 'When the system is dispatched for a value greater than zero MW, the applicable control settings would need to comply with AEMO's PFRR, whereas at other times the PFRR would not apply.' Source: AEMC, 2000, National Electricity Amendment (Mandatory Primary Frequency Response) Rule 2000, p.88.

<sup>3</sup> AEMC, 2022. National Electricity Amendment (Primary Frequency Response Incentive Arrangements) Rule 2022.

<sup>4</sup> AEMO, 2023. Frequency Contribution Factors Procedure.

By reinterrogating these regulatory frameworks, all of which were only recently determined and mechanised within procedures,<sup>5</sup> additional uncertainty, complexity and risk is being inserted into the project development lifecycle. Adding additional uncertainty and complexity will dampen investment and impact project delivery in an environment that requires urgent and pressing action to accelerate projects and deliver additional firm supply.

*'Safety, security and reliability'*

As identified in the Consultation Paper, the introduction of the mandatory PFR obligations in 2020 has driven significant improvements in system security outcomes including:

- A restoration of tight frequency control around the normal operating frequency band (NOFB) due to the coordinated reinstatement of narrow deadbands by a majority of the generation fleet.<sup>6</sup>
- Improved resilience in the power system and reduced the impact of contingency events on power system frequency where average recovery times of frequency to return within the NOFB following large generation events have reduced by about 90% and average frequency nadirs following large generation and load events have moved closer to 50 Hz.<sup>7</sup>
- A decline in the number of departures from the NOFB dramatically, while the number of times frequency crossed 50 Hz increased, corresponding with the tightening of the frequency distribution around 50 Hz. No exceedances of the FOS in the mainland since the implementation of mandatory PFR in late 2020.<sup>8</sup>

These system outcomes demonstrate how the current mandatory PFR requirements have delivered the objective of the Mandatory PFR Final Determination to support and enhance frequency control and system security obligations across the NEM.

Furthermore, other imminent changes to the regulatory and market environment will continue to improve frequency control in the NEM and there remains strong rationale to let these frameworks take effect before introducing further market change. These include:

- The introduction of the Very Fast Frequency Control Ancillary Service raise and lower services (October 2023)
- The commencement of the Frequency Contribution Factors Procedure, further incentivising the voluntary provision of PFR

As these changes have already been implemented in the NER and assessed and valued by investors this further supports our view that the proposed rule change is not required.

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<sup>5</sup> Ibid.

<sup>6</sup> AEMC, 2023. Consultation Paper Clarifying MPFR for scheduled BDU, p.42.

<sup>7</sup> Ibid, p.42.

<sup>8</sup> Ibid, p.43.

**Views on AEMO’s proposal for scheduled bidirectional units to be required to provide PFR when they are consuming electricity from the grid (Consultation Paper Question 4); or when enabled to provide a market ancillary service (Consultation Paper Question 5)**

Eku Energy does not support the proposal to require scheduled BDUs provide PFR when they are consuming electricity from the grid or when enabled to provide a market ancillary service.

*Impacts on energy availability and market participation*

Market Participants structure energy and ancillary service market bids from BDUs across a trading day to optimise a range of contract and revenue objectives alongside system operation requirements. At an asset-specific level, these objectives may include intraday cycling to actively manage state-of-charge; monitoring manufacturer-warranted cycles; protecting contracted positions; or reserving capacity to meet network support contracts. At a portfolio level, these objectives may extend to managing geographic diversity with consideration of network constraints; or balancing contracted positions.

Changing scheduled BDU requirements to provide PFR could influence market behaviour and the intraday allocation of energy across energy and ancillary service markets. For example:

- By providing mandatory PFR while enabled for contingency FCAS, a BDU could be required to discharge energy during the middle of the day, when energy is valued at its lowest, while limiting available stored energy at future times of tightening supply.
- Participation rates in some markets may reduce as BDUs seek to maintain compliance with manufacturer-warranted cycle limits.
- A BDU may reduce bids in contingency FCAS markets (i.e. lowering availability of reserves for contingency events) to preserve energy market arbitrage opportunities.

The following inferences are highlighted for the AEMC’s consideration.

- As BDU cells degrade over the asset’s useful life, mandatory PFR requirements represent an increasing proportion of useful throughput and cycles.
- Depending on size of the BDU energy capacity (i.e. 30 MWh, 50MWh, 400MWh), mandatory PFR across all operating modes would present a larger or smaller proportional effect.

To illustrate this a high-level model of the potential impact of mandatory PFR on BDU throughput if progressed per the rule change proposal is presented in the case study below.

### Case study

#### Desktop modelling of the throughput impact on a BDU providing PFR during discharge, charge and FCAS enablement

A desktop model was run to estimate the proportion of throughput (MWh) that a BDU would provide if its droop settings were always on to provide PFR when charging, discharging or when enabled for Contingency FCAS or Regulation FCAS.

#### Model assumptions

- BDU useful asset life = 20 years
- BDU cell degradation at end of life = 60%
- Historical frequency measure = Mainland NEM, calendar year 2022
- BDU energy capacity and warranted throughput = confidential

#### Model outcomes

- Range of impact on throughput (year 0 – year 20) = 4% - 6.7%

#### *Technology-neutral regulatory framework*

Finally, Eku Energy is concerned that this rule change proposal adopts and further embeds asset-specific requirements within the regulatory framework.

With the introduction of the Integrated Resource Provider (IRP) registration category, the AEMC's 2021 Integrating Energy Storage Systems (IESS) Final Determination established the narrative and set in motion the move towards a technology-neutral rules framework, whereby technical obligations would be placed on services and not participant categories or asset classes.<sup>9</sup> This rule change proposal is at odds with this construct, as it pursues and seeks to mandate the provision of PFR services at the unit level (i.e. BDU). If it were to progress, an impractical precedent may be set that unwinds much of the first-principles theory behind the earlier IESS rule.

In conclusion, we support measures to deliver system security but for the reasons outlined above, these proposed rule changes do not deliver those outcomes, but instead, potentially have the opposite effect.

Eku Energy are pleased to discuss any aspects of our submission with the AEMC. Please do not hesitate to contact Rachel Rundle (Rachel.rundle@ekuenergy.com) at any time.

Kind regards,



**Elias Saba**  
Chief Product Officer

<sup>9</sup> AEMC, 2021, *Rule Determination Integrating Storage into the NEM*. pp.ii.