



31 August 2023

Mr Victor Stollman
Project Leader
Australian Energy Market Commission

Submitted electronically at: www.aemc.gov.au/contact-us/lodge-submission

Dear Mr Stollman

**Stanwell Corporation Limited Response to
Clarifying Mandatory Primary Frequency Response Obligations for Bidirectional Units
Consultation Paper**

Stanwell Corporation Limited (Stanwell) welcomes the opportunity to respond to the Australian Energy Market Commissions' (AEMC's) Clarifying Mandatory PFR Obligations for Bidirectional Plant Consultation Paper (Consultation Paper).

Stanwell is a major provider of electricity to Queensland, the National Electricity Market (NEM) and large energy users throughout Australia. We own and operate two coal-fired power stations, providing reliable and affordable energy, with a pipeline of renewable generation and storage technologies to reduce our emissions intensity and create future opportunities for our people and communities. In addition, Stanwell's retail business, Stanwell Energy, services the ongoing energy requirements of some of Australia's biggest industrial and commercial customers along the eastern seaboard of Australia.

This submission contains the views of Stanwell in relation to the Consultation Paper and should not be construed as being indicative or representative of Queensland Government policy.

Introduction

Stanwell acknowledges the role that Primary Frequency Response (PFR) plays in ensuring the ongoing security and stability of the power system but strongly oppose the proposed changes.

Stanwell appreciates the Australian Energy Market Operator's (AEMO's) interest in addressing the impact on frequency performance of the continuing withdrawal of thermal capacity, as well as the significant investment in battery storage to date and expected future battery investment. However, the proposed changes take the market further from an enduring solution on the issue and appear inconsistent with the National Electricity Objective (NEO). Stanwell is one of many market participants that has consistently advocated for an efficient, enduring solution that incentivises and adequately compensates the efficient volume of PFR provision.^{1,2,3,4}

¹ Stanwell Corporation, [Primary Frequency Control - Response to the AEMC Consultation Paper](#), October 2019, page 2

Key issues

Stanwell's concerns with the proposed changes can be summarised as:

1. AEMC considering this request continues the trend of incremental movements away from an enduring market-based solution.
2. The lived experience of mandatory PFR confirms participant's views prior to its introduction that frequency control can be achieved without universal provision. This confirms that there should be some workable form of market based PRF procurement, whether that is contractual or a real-time market.
3. Given that frequency is currently tightly controlled and the fleet providing it will only gradually change over the next few years, resources would be better directed at developing an enduring solution.
4. AEMO as proponent does not provide any evidence of the benefits of the proposed change in line with the NEO other than a high-level conceptual preference.
5. AEMO as proponent does not provide any information as to what has materially changed since the rule determination in September 2022 which clarified that generators which are not dispatched in the energy market to generate electricity are not required to operate in a frequency response mode.

These issues are expanded upon in the remainder of this section.

Mandatory Primary Frequency Response

In the five years since the Frequency Control Frameworks Review Final Report was published, no material progress has been made on developing an enduring mechanism for adequately incentivising and compensating the provision of an efficient volume of PFR. The goalposts for PFR provision have moved considerably over this period, as illustrated by the key quotes reproduced below:

July 2018, Frequency Control Frameworks Review Final Report: *"This report therefore does not recommend any regulatory change in the immediate term to address the deterioration [of frequency performance under normal operating conditions], but concludes that there is a need to find a more permanent solution to the issue."*⁵

March 2020, Mandatory Primary Frequency Response Final Determination: *"The final rule includes a sunset on the mandatory PFR requirement three years in the future on 4*

² Stanwell Corporation, [Mandatory Primary Frequency Response - Response to AEMC Draft Determination](#), February 2020, page 3

³ Stanwell Corporation, [2020 Energy Security Board Post 2025 Market Design - Response to Consultation Paper](#), October 2020, page 18

⁴ Stanwell Corporation, [Submission to Primary Frequency Response Incentive Arrangements Draft Determination](#), November 2021, page 2

⁵ Australian Energy Market Commission, [Frequency Control Frameworks Review Final Report](#), July 2018, page iii

*June 2023. The inclusion of the sunset demonstrates 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.*⁶

September 2022, Primary Frequency Response Incentive Arrangements Final Determination: *"Confirmation that the mandatory primary frequency response (PFR) arrangements will endure beyond 4 June 2023. This will mean that all scheduled and semi-scheduled generators will continue to be required to support the secure operation of the power system by responding automatically to changes in power system frequency."*⁷

August 2023, Clarifying Mandatory PFR Obligations for Bidirectional Plant: *"AEMO's rule change request proposes amendments to the NER to clarify the obligations for batteries registered as scheduled bidirectional units to provide PFR when discharging, charging and when enabled to provide a frequency control ancillary service (FCAS)."*⁸

Stanwell is concerned about the approach the market bodies have taken in addressing PFR provision. Consistent with the need to find a permanent solution, mandatory PFR was implemented temporarily to give the market bodies time to develop an enduring solution. The sunset clause was then removed, turning a temporary solution into the permanent solution that Stanwell does not believe is an efficient market-based outcome. Now it is proposed that bidirectional units provide services beyond those provided by other scheduled and semi-scheduled generation (despite this being explicitly ruled out in previous rule determinations). Stanwell is concerned that each step away from an efficient, enduring solution becomes the foundation upon which further inefficient reforms are built.

Stanwell views the continued moving of goalposts as an admission that the changes to date (including the forthcoming primary frequency response incentive arrangements) do not constitute an efficient, enduring solution for PFR provision. Stanwell questions whether participants are being slowly walked to an outcome AEMO is ultimately seeking (in which case, AEMO should be clear with stakeholders about that final goal), or if this piecemeal approach has been adopted in lieu of a well-defined objective and development of an efficient, enduring solution for this aspect of frequency control (which market participants have been consistently advocating for over the last four years).

Both the imposition of mandatory PFR and the additional obligations proposed for bidirectional units do not appear to be consistent with the NEO. Instead of reproducing the arguments against mandatory PFR in their entirety, Stanwell has summarised our key issues as:

- Appropriating PFR for compensation that is not commensurate with the value of these services to the market is not efficient;
- Appropriating a volume of PFR beyond that required to maintain frequency performance is not efficient;

⁶ Australian Energy Market Commission, [Mandatory Primary Frequency Response Rule Determination](#), March 2020, page ii

⁷ Australian Energy Market Commission, [Primary Frequency Response Incentive Arrangements Rule Determination](#), September 2022, page i

⁸ Australian Energy Market Commission, [Clarifying Mandatory PFR Obligations for Bidirectional Plant Consultation Paper](#), August 2023, page ii

- Utilising high-cost PFR when low-cost PFR could satisfy the requirement is not efficient;
- Requiring batteries to provide services beyond those required by other technologies does not promote efficient investment in the technologies required to support the decarbonisation of the network (e.g., firming, intertemporal renewable energy shifting); and
- Acknowledging there will be significant costs to this change without demonstrating commensurate benefits is not in the long-term interest of consumers.

Of particular concern to Stanwell is AEMO's insistence that PFR is required from all generators (and bidirectional units when acting as load or enabled for FCAS under the proposed changes) to manage frequency. As noted in the Consultation Paper, *"AEMO identified that it is the aggregate frequency responsiveness provided by a broad base of frequency responsive plant that is required to provide effective frequency control. High levels of aggregate frequency responsiveness have been shown to deliver improved control of system frequency, increased system resilience and an overall reduction in the total cost of system operation"*.⁹

AEMO's assertions about the level of frequency responsiveness and improvement of system frequency control warrant further examination. Frequency control improved markedly in the early months of mandatory PFR implementation, as illustrated in AEMO's Primary Frequency Response Implementation Reports. However, most of the improvement was attained by mid-December 2020 (refer Figure 1, below), when settings changes were implemented for between 71% and 76% of Tranche 1 installed capacity.^{10,11} There does not appear to have been material improvements in frequency control over the subsequent 18 months (refer Figure 2, below) despite further capacity implementing settings changes over that period. This plateau was noted in GHD's Enduring Primary Frequency Response report, which stated *"[f]requency performance continues to increase, with more narrowing of the distribution around 50 Hz, until there is an apparent saturation in tightness of the frequency distribution around December 2020."*¹²

⁹ Australian Energy Market Commission, [Clarifying Mandatory PFR Obligations for Bidirectional Plant Consultation Paper](#), August 2023, page 39

¹⁰ Australian Energy Market Operator, [Mandatory Primary Frequency Response Implementation Report](#), December 2020, page 4

¹¹ Australian Energy Market Operator, [Mandatory Primary Frequency Response Implementation Report](#), December 2020, page 4

¹² GHD, [Enduring Primary Frequency Response](#), September 2021, page 23

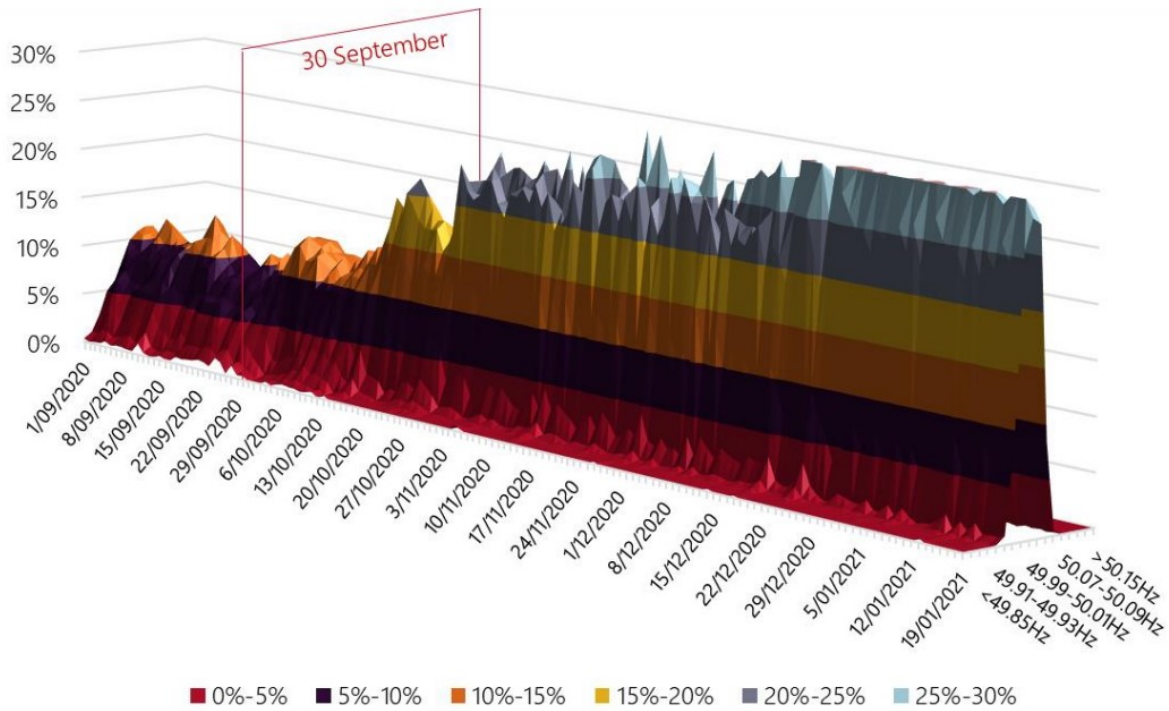


Figure 1: Daily frequency distribution (data from 1 September 2020 to 20 January 2021)¹³

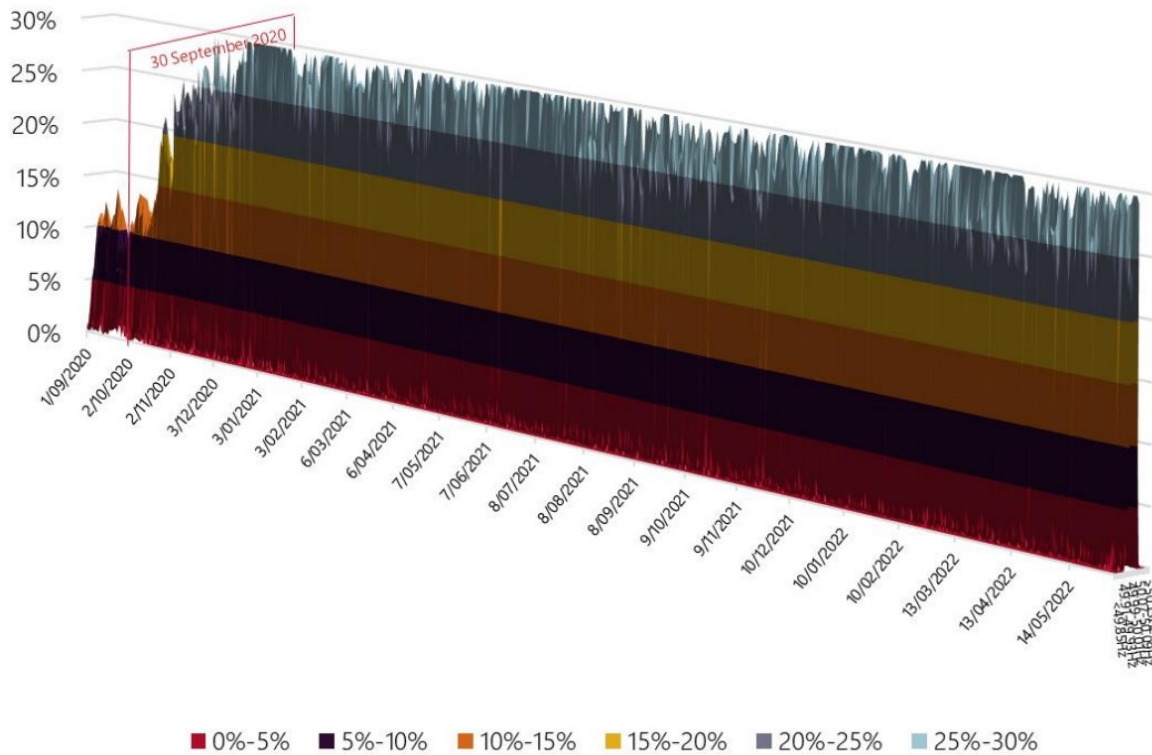


Figure 2: Daily Frequency Distribution (data from 1 September 2020 to 8 June 2022)¹⁴

¹³ Australian Energy Market Operator, [Implementation of the National Electricity Amendment \(Mandatory Primary Frequency Response\) Rule 2020, Status as at 20 January 2021](#), January 2021, page 18

¹⁴ Australian Energy Market Operator, [Implementation of the National Electricity Amendment \(Mandatory Primary Frequency Response\) Rule 2020, Status as at 10 June 2022](#), June 2022, page 23

For an efficient, enduring solution, Stanwell again recommends the market bodies examine the development of a market based approach (e.g., as an additional system service equivalent to inertia or system strength) for PFR to ensure both the quantity procured and the price at which it is procured is efficient.^{15,16,17,18} This would enable the lowest-cost PFR providers to satisfy AEMO's requirements, clarifying and minimising the cost of PFR provision in the face of the continued withdrawal of thermal capacity and investment in renewable energy and storage.

Technology neutrality

The AEMC was very clear about bidirectional units' mandatory PFR obligations in previous rule determinations; they would not be required to provide mandatory PFR while charging or when not dispatched in the energy market to generate electricity. The relevant sections of previous rule determinations (**emphasis added**) have been included below for reference:

MPFR Rule Determination, March 2020:

"Treatment of battery energy storage systems

*In response to stakeholder concerns, the Commission has considered the impact of a mandatory PFR requirement on the operation of battery energy storage systems. Under the final rule, when generating (discharging), battery energy storage systems will be treated the same as other scheduled and semi-scheduled generators and will be required to provide PFR in accordance with the conditions set out in the PFRR. **When operating in a charging mode, battery energy storage systems will be treated the same as other scheduled loads, which are not required to provide PFR.***

- *However, unlike other generation technologies, battery energy storage systems are capable of providing a frequency response when they are neither charging nor discharging, ie neither supplying nor consuming energy from the grid. Under the final rule, generators that are not dispatched in the energy market to generate electricity are not required to operate in a frequency response mode in accordance with the PFRR. As such, the final rule includes a provision that **generators are only required to provide PFR when they have received a dispatch instruction to generate at a volume greater than 0 MW. The Commission considers that the application of the mandatory PFR requirement to battery energy storage systems that are not dispatched to generate electricity would be discriminatory, as other generation technologies cannot provide PFR unless they are online and generating.**"¹⁹*

¹⁵ Stanwell Corporation, [Primary Frequency Control - Response to the AEMC Consultation Paper](#), October 2019, page 2

¹⁶ Stanwell Corporation, [Mandatory Primary Frequency Response - Response to AEMC Draft Determination](#), February 2020, page 3

¹⁷ Stanwell Corporation, [2020 Energy Security Board Post 2025 Market Design - Response to Consultation Paper](#), October 2020, page 18

¹⁸ Stanwell Corporation, [Submission to Primary Frequency Response Incentive Arrangements Draft Determination](#), November 2021, page 2

¹⁹ Australian Energy Market Commission, [Mandatory Primary Frequency Response Rule Determination](#), March 2020, page 46.

PFR Incentive Arrangements Rule Determination, September 2022:

“The final rule includes a minor amendment in response to stakeholder feedback

The final rule includes a minor amendment to NER clause 4.4.2(c1) to clarify that the mandatory PFR requirement applies to “each Scheduled Generator and Semi-Scheduled Generator that has received a dispatch instruction in accordance with clause 4.9.2 to generate a volume greater than zero MW”. The reference to a dispatch instruction in accordance with clause 4.9.2 has been included in the final rule in response to stakeholder feedback that there was some ambiguity as to the application of the mandatory PFR obligation to battery energy storage systems that have a zero dispatch target in the energy market but are dispatched to provide contingency (or regulation) FCAS.

The amendment to clause 4.4.2(c1) is consistent with the Commission’s final determination for the Mandatory primary frequency response rule. It clarifies that generators which are not dispatched in the energy market to generate electricity are not required to operate in a frequency response mode in accordance with the Primary frequency response requirements (PFRR), determined by AEMO.”²⁰

Given the clarity of the language used in these rule determinations, it is disappointing that the AEMO has lodged a rule change request on bidirectional units providing mandatory PFR under these modes of operation.

The Consultation Paper notes the proposed change would result in bidirectional units providing services beyond the existing obligations for scheduled and semi-scheduled generators but does not explain what has changed that warrants the about-face on these issues beyond noting “AEMO’s view is that a battery’s frequency control system should remain consistent whenever it is operating (whether dispatched to generate, charged or enabled for FCAS), subject to variations approved by AEMO”.²¹ The purported need for control systems to remain stable is questionable given the entry and exit of units with different control systems from the market over the course of the day. A battery switching control systems between charging and discharging states does not appear to be materially different from a battery that is generating, ceasing to generate around the same time another battery commences charging.

Further, the AEMC acknowledges the material costs of the proposed changes, noting “*these proposed changes... are likely to impose material costs for batteries operating in the NEM*”.²² In order for these costs to be justified, commensurate consumer benefits must be demonstrated. This has not occurred in this instance; the marginal benefits are not detailed, and the current consultation process is seeking input on the magnitude of the expected high costs. It is extremely challenging to quantify the potential magnitude of the proposed changes on future investment both within the 20-business day consultation period and given the PFR incentive scheme is not yet operational. Stanwell fears there is no estimate of costs of the impact of the proposed changes that market participants could provide that would

²⁰ Australian Energy Market Commission, [Primary Frequency Response Incentive Arrangements Rule Determination](#), September 2022, page 29

²¹ Australian Energy Market Commission, [Clarifying Mandatory PFR Obligations for Bidirectional Plant](#), August 2023, page 1

²² Australian Energy Market Commission, [Clarifying Mandatory PFR Obligations for Bidirectional Plant](#), August 2023, page iii

dissuade AEMO from pursuing the proposed rule change. Further, the speed at which this significant rule change is being pursued seems at odds with the abundance of PFR currently available in the market.

There also appear to be logical inconsistencies behind the expansion of PFR obligations on bidirectional units, including:

- If bidirectional units have both the incentive and ability to charge, that suggests there is sufficient generation (and hence PFR from generators) in the market. To the extent that AEMO is concerned about future periods where most or all generation is variable renewable energy, which is not required to maintain headroom, we note that:
 - Those generators would still be providing “lower” PFR and supported by regulating and contingency FCAS markets; and
 - It is unlikely that during such strong supply conditions all generators would be at their absolute maximum capability simultaneously.
- If all scheduled and semi-scheduled generators are required to provide PFR and charging bidirectional units were also required to provide PFR when charging, then there would be twice the volume of PFR concurrently being appropriated from market participants for the energy being stored in bidirectional units for later use; and
- Intertemporally, bidirectional units would be required to provide PFR twice on the same energy, once while charging and later when discharging.

If the proposed changes were to proceed, bidirectional units would be treated differently from other technologies on both the generation and load sides of the market.

Bidirectional unit investment and operation

It is Stanwell’s view that the market bodies do not appear to appreciate the magnitude of the negative impact the proposed changes will have on bidirectional unit investment and operation. We expect that investment will continue to occur, but at a higher cost than would be the case without these proposed changes.

On an operational timescale, there are economic costs (both financial and opportunity costs) to providing mandatory PFR from bidirectional units that will not be adequately remunerated. The lower energy available for arbitrage and the higher prices at which this energy must be bid into the market to recover the costs of mandatory PFR provision will materially affect the business cases of existing and potential bidirectional units. If investors do not anticipate that the opportunity costs stemming from mandatory PFR provision can be sufficiently recovered via other revenue streams, it will have a negative impact on the volume of battery investment and the speed at which these investments are rolled out.

We believe that these costs will have an adverse effect on both the investment and operation in bidirectional units and the efficient operation of the market. Key concerns for Stanwell include:

- The micro-cycling required to meet mandatory PFR obligations when not dispatched for energy will necessitate increasing prices that other services are bid into the market at in order to recover the uncompensated cost of mandatory PFR provision;

- The micro-cycling will also reduce the expected life of the bidirectional unit and adversely affect bidirectional unit with warranties that restrict cycle rates;
- The obligation to provide mandatory PFR when enabled for FCAS would be expected to either reduce the volume of bidirectional unit capacity that offers contingency FCAS or increase the price at which they are willing to offer FCAS services; and
- The use of energy to provide mandatory PFR will reduce the volume of energy available to provide services at higher-value times (e.g., ramping into evening peak).

The potential impacts of the proposed changes on the investment in and operation of bidirectional units appears to dissuade investment in the storage technology required as part of the energy market's decarbonisation. Stanwell implores the AEMC to consider the broader impacts of the proposed changes on the efficient investment in and operation of the market.

Conclusion

Stanwell does not support the continued efforts of market bodies to further expand mandatory PFR provision. In particular, we are concerned that the market bodies are proposing to treat bidirectional units differently from other technologies in the market with little justification, when this was explicitly ruled out in previous rule determinations. In addition, we believe the proposed changes are likely to have an adverse effect on the cost of investment in bidirectional units at a time when we need to be encouraging further investment in these technologies to assist in the transition of the energy market.

While the concerns about future PFR provision following the withdrawal of thermal capacity are justified, the current abundance of PFR means there is time to develop an efficient, enduring solution. That the past five years have been wasted is not an excuse to give up on striving for a better outcome for PFR procurement. Stanwell looks forward to engaging with the AEMC to develop an efficient, enduring solution but does not consider this proposal should be continued.

Stanwell welcomes the opportunity to further discuss the matters outlined in this submission. Please refer any questions to Evan Jones, Market Regulation Analyst, on 0419 667 908 or to evan.jones@stanwell.com.

Yours sincerely



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