Technical Memorandum

December 22, 2025

From	GHD Pty Ltd	**Project No.**	12681909
Project Name	ERA - Benchmark Reserve Capacity Price 2028/29		
Subject	GHD response to Stakeholder Feedback on the recommendations for the update to the WEM Procedure - BRCP		

1. Introduction

1.1 Purpose of this Memorandum

The purpose of this technical memorandum is to provide GHD's analysis and perspective on stakeholder feedback received by the Economic Regulation Authority (ERA) with respect to the BRCP update workshop. This document is intended to inform and support the ERA's consideration of the feedback by presenting technical insights and advisory commentary. It does not represent the ERA's formal response and should be regarded as advisory input only.

1.2 Scope and limitations

This technical memorandum has been prepared by GHD for the Economic Regulation Authority. It is not prepared as, and is not represented to be, a deliverable suitable for reliance by any person for any purpose. It is not intended for circulation or incorporation into other documents. The matters discussed in this memorandum are limited to those specifically detailed in the memorandum and are subject to any limitations or assumptions specially set out.

Accessibility of documents

If this Technical Memorandum is required to be accessible in any other format this can be provided by GHD upon request and at an additional cost if necessary.

GHD has prepared the responses set out in Section 2 of this Technical Memorandum ("Responses") using information reasonably available to the GHD employee(s) who prepared this Technical Memorandum; and based on assumptions and judgments made by GHD.

The Responses has been prepared for the purpose of addressing stakeholder feedback on the Draft BRCP Procedure Change Report and must not be used for any other purpose.

The Responses are provided for advisory purposes only. Unless as otherwise specified in this Technical Memorandum, no response has considered the individual stakeholder's specific situation. GHD disclaims any responsibility or liability for any decisions, publications, or communications made by the Economic Regulation Authority (ERA) or any other party that rely on, reference, or incorporate the opinions and commentary provided in this memorandum.

2. Stakeholder responses

2.1 Perth Energy (AGL)

Stakeholder Commentary

Thank you for the opportunity to comment on the procedure change proposal – Benchmark Reserve

Capacity Price. As a significant generator and retailer within the SWIS, Perth Energy is keen to ensure that the BRCP is set at a level that provides adequate incentive for new generation without imposing unnecessary costs on our customers. We support the proposed changes to the BRCP Procedure which were well explained at the recent Market Advisory Committee meeting. We suggest, however, that there is one matter that should be given further consideration.

The GHD report that was published to support the BRCP determination in 2024 noted that BESS operators do not usually fully discharge these facilities. Rather, a minimum charge of around 20% or so is held at all times. We understand that this is now happening in the SWIS. This means that the MWh capacity of a BESS needs to be defined as its deliverable or usable capacity rather than its installed capacity.

The proposed procedure acknowledges that a facility needs to be oversized to address factors such as calendar fade during construction. Clause 2.1.6(c) states that the BESS must have enough energy storage capacity to enable 1200 MWh charge and discharge. Perth Energy suggests that direct reference to the minimum charge level may be appropriate. We suggest that consideration be given to modifying clause 2.1.6(d) to read:

Include the minimum level of equipment or system required by the ESM Rules and to sustain the maximum discharge level. and modifying Clause 2.1.7 by adding an obligation on the consultant to determine (c) the maximum discharge level

GHD Commentary

We note your support for the proposed changes and your suggestion regarding the definition of BESS energy capacity and the consideration of minimum charge levels. The current BRCP Procedure clearly states the required charge and discharge energy capacity (800 MWh, to be updated to 1200 MWh), which relates to the usable energy capacity of the BESS.

The maximum discharge level for a BESS is an operational consideration and is dependent on the use case for any given facility. In addition, the system recommended minimum charge can vary between OEMs. The value quoted in the previous report was for illustrative and indicative purposes only and is not reflected explicitly in the Procedure (Version 8).

We appreciate your suggestion to reference minimum charge levels and maximum discharge levels in the Procedure. Given the operational variability and the emphasis on usable energy capacity (required MWh charge/discharge), we do not propose updating or revising the BRCP Procedure update report.

2.2 Alinta

Stakeholder Commentary

1. We support the proposal to continue to “over-size” the BESS to ensure the battery has sufficient power and energy capacity to meet the Benchmark Capacity Provider requirements at the start of its first year of operation.
2. The WEM Procedure should specify the degree of “over-sizing” required for the Benchmark Capacity Providers (BCP) to achieve 200 MW of injection capacity and 1,200 MWh of energy storage at the start of its first year of operation.
3. The provisions to recover ‘Direct and Upfront’ and ‘Fixed O&M’ costs should recognise and include the requirement to set-up and provide ongoing Community benefit sharing arrangements as well as any compulsory monetary contributions to third parties, such as the Construction Training Levy Fund.
4. We recommend that the ERA consider whether the annuity tilt should be modifiable - not fixed as a set value in the Procedure - subject to certain criteria being met.

GHD Commentary

1. No response required

2. Specifying the degree of oversizing in the WEM Procedure is not recommended. The extent of oversizing to meet ESM Rule requirements needs to be determined on an annual basis and updated if needed based on the most reliable information at the time. Therefore, specifying the "over-sizing" parameters to achieve 200 MW injection and 1200 MWh nominal energy capacity would be overly prescriptive. An overly prescriptive approach may conflict with various considerations, such as BESS sizing calculations (which may differ between consultants), and the recommended amount of plant installed for appropriate nominal operation which can vary based on OEM specifications, location, or project specific considerations.

3. The current BRCP Procedure already includes allowances for a range of indirect and compliance-related costs. The estimate for environmental and development approvals was originally developed to account for compulsory contributions, including the Construction Training Fund.

   Given these existing provisions, the Procedure is considered sufficiently robust to capture the typical compliance and administrative costs associated with project delivery. Introducing explicit new categories for community benefit sharing or additional third-party contributions is not recommended.

4. **Refer to ERA report**

2.3 WA Expert Consumer Panel (ECP)

Stakeholder Commentary

1. The assumed BESS discharge limit (minimum operational charge level), which affects the useable energy storage capacity (which must be 1200 MWh) and therefore the BESS capital cost;
2. The allowance for energy storage (MWh) oversizing assumed – proposed by GHD and the ERA to remain at 10% (which seems high) to allow for degradation up to initial operation
3. GHD's proposal to update its cost estimate accuracy class, from +/-50% in its previous report (last year), to AACE Class 5 (+100% / -50%). It is concerning that this would allow GHD's new cost estimate to be up to 100% higher than actual costs. We ask the ERA to consider whether this is reasonable, and suggest that GHD's cost estimate accuracy class should be revisited to avoid the possibility of the estimate being so much higher than likely actual costs
4. The risk premiums applied in calculating the Weighted Average Cost of Capital (WACC) should reflect the actual level of risk associated with BESS projects. In our view, these risks are relatively low for both debt and equity, as BESS revenue streams are more certain under the Reserve Capacity Mechanism even though Reserve Capacity Prices do vary. The RCM provides a relatively stable and secure source of income, significantly reducing uncertainty and risk compared to other energy projects (especially in different regulatory markets that do not have a capacity market). Given this relatively strong revenue certainty, we urge the ERA to review the risk premiums currently assumed and consider lowering them to better align with the true risk profile of BESS investments if this is appropriate. Doing so would ensure that the WACC calculation is fair, cost-reflective, and does not unnecessarily inflate costs that need to be recouped through higher consumer electricity bills
5. **Minimum operational charge level**
   In the 20 November MAC meeting, it was suggested that a discharge limit down to 20% of charge (minimum discharge level) should be assumed in the procedure. This seems an unnecessarily high minimum and would add materially to the capital cost of the BESS for extra capacity to make up for it, when we understand that with current technology BESS are capable of discharging to much lower charge levels (like 3 - 4%) without degrading the life and performance of the BESS unacceptably. The ERA's energy price Offer Construction Guideline also allows price offers to include costs associated with maintaining the capacity of the BESS over time to manage any operational degradation, so there is no need to include an upfront capital cost in the procedure for extra capacity to cover operational degradation over time. This indicates that there is no need to assume 20% extra initial energy storage capacity of the BESS to allow for such a high proposed minimum operational charge level. A 10% oversizing of energy storage capacity is already assumed, and we consider that this may be higher than necessary to cover degradation up to the point of initial operation of the BESS. This 10% oversizing is likely to already cover a more realistic minimum discharge level without adding one. We suggest that the ERA ask GHD to investigate whether an allowance for a minimum discharge level is really needed given the 10% oversizing already proposed.
6. Proposed Fixed Capital Charge - This is concerning as currently, the costs reported in the BRCP includes the development of transmission assets on the SWIS being funded by the developer.
7. Additional net revenue being earned by BESS from the WEM energy and ESS markets – not taken into account by the ERA

GHD Commentary

1. The procedure only goes so far as to explicitly state the required useable energy capacity and duration of the BESS at "200 MW Injection". As such no change to the procedure is proposed with respect to this query. The maximum discharge level for a BESS is an operational consideration and is dependent on the use case for any given facility. In addition, the system recommended minimum charge can vary between OEMs.
   We appreciate your suggestion to consider the BESS minimum operational charge levels in the Procedure. Given the operational variability and the emphasis on usable energy capacity (required MWh charge/discharge), we do not propose updating or revising the BRCP Procedure update report.

2. The current Procedure does not prescribe a minimum state of charge (SOC) that must be maintained for BESS operation. As you have noted, industry practice and current BESS sizing approaches typically assume a more aggressive depth of discharge, with minimum SOC levels often much lower than 20%. The oversizing figures reported in the documentation are indicative only and were provided in the absence of a detailed concept design.

   At present, the Procedure explicitly specifies requirements for power capacity (200 MW injection) and usable energy storage capacity (1,200 MWh charge and discharge, 6-hour duration). Considerations such as energy storage and power capacity uplift are discussed in the report but are not prescribed in the Procedure, recognising that BESS design may account for a range of operational factors and constraints. No changes to the Procedure are proposed in relation to minimum SOC or additional oversizing requirements.

3. While GHD engages with the market to obtain present-day pricing, these figures only reflect current market conditions for a concept-level design. Market sentiment remains highly variable due to uncertainties for equipment supply and for contract execution.
   The application of AACE Class 5 accuracy (+100% / -50%) in the BRCP Procedure aligns with industry-recognised standards for early-stage project definition, where a feasibility study has not yet been conducted. This classification reflects the inherent uncertainty at this stage of development and is consistent with best practice conceptual estimates.

   Additionally, adopting a broader accuracy range mitigates the risk of underestimating costs, which could result in insufficient capacity pricing. A more refined estimate allows for more definition of project detail for a BESS but risks being overly prescriptive for a hypothetical BESS. While vendor quotations provide more accurate figures, the AACE Class 5 range primarily accounts for contingency and uncertainty at this early stage.

   For the purposes of the Procedure, a broader range is appropriate to maintain robustness in the BRCP.

4. **Refer to ERA report**

5. Similar to item 2 above, the current Procedure does not prescribe a minimum state of charge (SOC) that must be maintained for BESS operation. As you have noted, industry practice and current BESS sizing approaches typically assume a more aggressive depth of discharge, with minimum SOC levels often much lower than 20%. The oversizing figures reported in the documentation are indicative only and were provided in the absence of a detailed concept design.

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6. **Refer to ERA report**
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