



Minutes

Meeting Title:	BRCP WEM Procedure Review Working Group	
Meeting Number:	2024_02_22 – Meeting 3	
Date & Time:	Thursday, 22 February 2024; 1:300PM – 3:00PM (AWST)	
Location:	Online via Teams	
Attendees:	Matt Shahnazari	Economic Regulation Authority (Working Group Chair)
	Wesley Medrana	Synergy
	Ben Tan	Tesla Holdings
	Oscar Carlberg	Alinta Energy
	Tessa Liddelow	Shell Energy
	Gerry Devereux	Australian Energy Market Operator
	Vincent Chye	AGL/Perth Energy
	Dimitri Lorenzo	Bluewaters Power
	Jake Flynn	Collgar Renewables
	Dora Guzeleva	Energy Policy WA
	Noel Schubert	WA Expert Consumer Panel
	Jason Dignard	Economic Regulation Authority
	Jimmy Tran	Economic Regulation Authority
	Lipakshi Dhar	Economic Regulation Authority
	Richard Cheng	Economic Regulation Authority
	Jesse Barker	Economic Regulation Authority
	Elena Mikhaltsevitch	Economic Regulation Authority
	Lizzie O'Brien	GHD Advisory
	Henry Le	GHD Advisory
	Abhey Kumar	GHD Advisory
Apologies	Hari Sridhar	Transalta Corporation
DMS:	D273520	

1. Welcome

- The Working Group Chair, Shahnazari, opened the meeting at 1:30PM.
- The Chair acknowledged that the Working Group members did not have a lot of time to go through the meeting papers due to the procedure review's tight timeframes.
- The Chair noted the Competition and Consumer Law obligations of the Working Group and invited members to bring to his attention any issues should they arise.

Working Group Members did not raise any conflicts of interest or competition law issues.

- The Chair noted the attendance and apologies as listed above.

2. Minutes of Meeting 2024_02_06

- The Chair sought feedback on the minutes of the 6 February 2024 meeting. Working Group Members did not raise any concerns.
- The minutes of the 6 February 2024 meeting were endorsed as a true and accurate record of the meeting. The minutes will be published on the [Working Group website](#).

3. Preliminary advice from GHD

- Shahnazari explained GHD is assisting the ERA Secretariat to identify costs to be included into the BRCP determination, as well as advising on an appropriate framework to estimate these costs and recommending amendments to the Procedure.
- Shahnazari noted that indicative BRCP and cost estimates are developed for the purpose of informing the development of the BRCP Procedure and identifying any potential issues with implementation. Shahnazari flagged the indicative BRCP is only a rough estimate which is not endorsed or determined by the ERA as part of the annual determination process.
- O'Brien explained GHD's method to develop the WEM Procedure updates and noted that GHD's draft report will be published along the ERA's procedure change proposal for consultation. The Working Group members will have an opportunity to comment on that report. The report will be updated based on the submissions.
- Schubert suggested the bottom-up cost estimates be checked against actual recent BESS project costs. O'Brien explained GHD used their battery energy storage system (BESS) costs database to compare cost components. The estimate is currently +/- 50 per cent. O'Brien noted this is a reasonable estimate for the purpose of updating the BRCP Procedure.

3.1 Technical specifications

- O'Brien noted achieving 200 MW injection at 41 degrees (as per the Coordinator of Energy's determination and the WEM Rules) requires oversizing the BESS.
- Le explained that it is necessary, under practical operating conditions, to have an uplift in the BESS's energy capacity to compensate for any energy capacity losses and achieve 800 MWh at the beginning of life. Le noted a BESS's typical lifecycle profile is approximately 20 years but that will be adjusted based on the actual usage of BESS.
- Chye queried how GHD considered the allocation of capacity credits and battery degradation in its analysis. Chye observed that BESS are more likely to degrade compared to an open cycle gas turbine.
- Shahnazari noted that costs associated with battery degradation do not need to be considered in the BRCP through the capacity market as they can be recovered through the energy market. The capacity credits allocated to a BESS may decrease if there is any degradation in the BESS's capacity. A BESS operator can factor in the costs of maintaining battery cells into their offers into the energy market, and then use these recovered costs to increase capacity by replacing the affected cells or bolt on additional cells.

- O'Brien noted GHD evaluated a BESS's degradation curve as well as the BESS's operational assumptions to provide Peak and Flexible Capacity to inform their assessment of the typical life of the BESS. O'Brien noted GHD's working approach excludes variable operating and maintenance costs like battery module replacements.
- Chye queried if GHD's model for the indicative BRCP could be evaluated. However, due to time limitations this discussion could be continued offline.
- Carlberg queried the effect of AEMO's possible increase of the Electric Storage Resource Obligation Duration (ESROD) on the allocated capacity credits and the BRCPs. Shahnazari indicated that the BRCP will be higher provided the reference technology (BESS) remains the same while the number of capacity credits will reduce. Shahnazari noted the ESROD is locked in for five years from the time the BESS enters the market. Shahnazari clarified that a new BESS entering the market will be exposed to the Reserve Capacity Price, which can change depending on several factors such as excess capacity in the market.
- Cheng noted that EPWA is required to review the Benchmark Capacity Providers if AEMO changes the ESROD. Cheng noted that if EPWA determines a change to the Benchmark Capacity Providers, then the ERA must review the BRCP Procedure.
- Guzeleva added that:
 - The issues raised were discussed by the Reserve Capacity Mechanism Working Group when the Coordinator of Energy was reviewing the Benchmark Capacity Providers. The Group concluded that degradation was the incremental cost related to electricity production and could be included into the formation of price offers. Guzeleva provided an excerpt from the Group's meeting minutes.
 - The Coordinator of Energy determined the BRCP must be calculated on a gross cost of new entry (CONE) basis. Guzeleva noted the BESS is likely to make more revenue in the capacity market in its initial years of operation, and therefore market participants will over-recover their costs through the energy market and the reserve capacity mechanism.
 - As noted by Cheng, if AEMO increases the ESROD, the Coordinator must review the Benchmark Capacity Providers within six months. Further, even if there is no change to the ESROD, EPWA must review the Benchmark Capacity Providers at least once every three years.
 - EPWA included some analysis of the load duration gap in its papers for the Reserve Capacity Mechanism Review Working Group. EPWA does not expect the ESROD to be extended before the Coordinator's next review of the Benchmark Capacity Providers – and potentially for a few years after that – as the load duration gap is expected to eventuate when coal baseload plants are retired in 2030.
- Schubert noted that full charge and discharge are not likely to happen every day while at other times there may be more than one cycle per day. Shahnazari acknowledged this but noted that the ERA must form some assumptions on the number of cycles for modelling.
- O'Brien agreed that a BESS might operate differently in practice. GHD has made various operational assumptions to advise on the expected life of BESS in the unlikely scenario where a BESS is required to operate daily.

- Chye suggested depth of discharge and charge/discharge cycle allowances should have regard for warranty conditions.
- Le observed that typical warranty arrangement provided by most BESS original equipment manufacturers (OEM) gives an intended duty cycle. The cycle defines the depth of discharge, the state of charge window and the number of cycles and even the ambient conditions sometimes. It will guarantee an energy capacity as a percentage of its beginning of life capacity for typically 20 years. However, the way in which BESS is used is project specific. As such, OEM manufacturers will give purchasers adjustment formulas or correction curves that will act as an overlay to the energy capacity performance warranty. This will provide the purchaser an adjusted warranty based on the actual project conditions, usage cycle and how BESS is going to be operated.
- O'Brien observed that lithium iron phosphate (LFP) is currently considered the best BESS sub-chemistry based on power density, cost, life span, safety, and performance. There are multiple examples on this technology on grid scale in Western Australia and the Australian east coast.

3.2 BESS cost components

- O'Brien noted GHD's working approach groups BESS cost components differently to the current procedure. For instance, costs previously grouped under 'Margin M' have been split into upfront capital costs and fixed O&M cost as appropriate. The biggest cost component is the BESS supply and installation costs.
- Le observed that the main driver of BESS costs is the price of battery modules. It is challenging to pin the exact price of these modules. BESS price can be driven by the spot price of lithium carbonate. Le noted spikes in prices of lithium carbonate result in noticeable increases in the costs of the BESS.
- O'Brien noted GHD's working approach split BESS supply and installation costs into battery modules costs, power conversion system costs and balance of plant (BoP) costs. O'Brien noted these costs may have different price trajectories or may be adjusted to reflect future prices in different ways. Installation labour and equipment costs were also added as they may be included in engineering, procurement and construction (EPC) contract costs.
- O'Brien noted GHD's working approach on BESS overhead capital costs included costs of initial spares. O'Brien noted the costs of subsequent spares are considered variable and can be recovered through the energy market. Other capital overhead costs relate to connection agreement, market registration and licencing; environmental and development approvals; owner's design and project management; and legal, financing and construction insurance.
- O'Brien noted GHD is refining the legal, financing and construction insurance costs and identifying what development and regulatory approvals are required. However, the environmental approval process for recently developed or developing Western Australian BESS indicates that minimal environmental approvals are required.
- O'Brien noted its analysis on connection and land costs are at a preliminary stage and the costs for the indicative BRCP are based on the OCGT costs from the previous BRCP determination. O'Brien noted GHD is refining its analysis regarding the BESS transmission connection arrangement, obtaining updated costs from Western Power, and identifying the total land area required.

- O'Brien explained fixed O&M mostly comprise of substation costs and BoP maintenance costs. This is consistent with the approach used for the OCGT. Additionally, fixed O&M include local government rates, corporate overheads, additional professional costs (fixed costs only) and a security. Inclusion of the security is consistent with the current approach. Connection switchyard and overhead transmission line O&M costs for the indicative BRCP have not been updated from the OCGT. Transmission storage service charges relate to use of Western Power network and are based on Western Power's current pricing list.
- O'Brien invited the Working Group members to provide feedback on BESS costs.

3.3 Preliminary BRCP

- O'Brien noted the disclaimers associated with the indicative modelling and presented GHD's preliminary BRCP of \$366,500 per capacity credit per year, on an annualised capital cost of \$69.6 million and annual fixed O&M of \$3.7 million. O'Brien noted the BRCP is sensitive to assumptions on annuity tilt and the weighted average cost of capital (WACC), which are under analysis.
- Carlberg queried how annualisation period is determined.
- Shahnazari noted the ERA is currently reviewing the method and value of the annualisation period. Shahnazari noted the ERA is considering funding practices for BESS projects, BESS warranties, and investor expectations. These considerations will inform what the appropriate duration is. Shahnazari noted the ERA Secretariat will seek feedback on its draft recommended changes to the BRCP Procedure before submitting to the ERA Governing Body for approval.
- O'Brien noted GHD is currently working on its recommendations to the ERA regarding which specifications should be hard-coded into the Procedure, which costs should be separately identified and estimated and which costs should be grouped together.

4. Approach for determining transmission and land costs

- Cheng explained the ERA aims to include reasonable land and transmission capital costs while providing certainty and transparency in the BRCP. These combined costs are expected to constitute less than 10% of the total BRCP.
- Cheng summarised the Coordinator's determination which states that a BRCP capacity provider is to be located in or near the Pinjar and Kwinana regions. Cheng presented research on what is being considered as 'in or near' the stipulated regions, which includes:
 - The Neerabup substation being the nearest substation on the 330 kV line in the Pinjar region. The Pinjar power station substation does not comply with the Coordinator's determination as it currently serves a 132 kV line only. Cheng stated that the 330kV lines in and near the Pinjar region are congested. Upgrades as part of the SWIS Demand Adequacy plan will alleviate these issues in the future however, the recent industry forum representations suggests that the upgrades may not be in place by 1 October 2027 (the start of the 2027-28 capacity year).
 - Multiple 330 kV lines in the Kwinana region are suitable for connection, however, the area around the Kwinana substation is built up. Cheng

indicated that this circumstance affects the availability of land which can affect land prices.

- Schubert observed that Synergy is building their 200 MW battery in Kwinana so although land was available, further land availability around the Kwinana substation is unclear. Cheng agreed that the land around the Kwinana substation was available but future availability of land is limited. It is unclear whether other landowners around the Kwinana substation will be willing to sell their land. It is also not clear how far to position a BESS away from that substation. For example, positioning a BESS 4 km away from the Kwinana substation will require 4 km of transmission lines and the associated land easements. As a result, the composition of the BRCP may vary from year to year.
- Guzeleva stated that the MAC received a presentation on the upgrades of the 132 kV line to 330 kV line between Northern Terminal and Three Springs. The presentation stated the commitment by Western Power to complete this upgrade by 1 October 2027. Cheng commented that the ERA would need to investigate the implications of these works and the associated timeline.
- Cheng explained the ERA's approach to assessing the lowest cost option within the two regions (Pinjar and Kwinana), which can consider the availability of substations, availability of land, restrictions on building near substations, and transmission line congestion.
- Cheng presented three options that the ERA could use in its annual BRCP determinations for arriving at land and transmission capital costs:
 - Option 1 examines specific and generic locations within the two regions which will require estimating transmission costs for four different scenarios – one for connecting at an existing Pinjar region substation, one for connecting at an existing Kwinana region substation, a generic connection in Pinjar without an existing substation, and a generic connection in Kwinana without an existing substation. This approach is likely to give more accurate cost estimates. However, there may be practical issues due to the assumptions made on land availability and significant workload on Western Power in providing these costs.
 - Option 2 examines average costs within each individual region. This approach allows for more flexibility than option 1, however it is a greater workload for Western Power relative to the current BRCP process. Congestion on the network may complicate comparing and evaluating the regions' costs. This option does not utilise existing substation infrastructure, and the BRCP approaches may not be as consistent from year to year, relative to option 3, if regions change regularly.
 - Option 3 considers a more 'generic' location and is an average across both regions. This approach assumes a substation must be built so that the BESS can access the network for anywhere along the 330kV line. The advantage of this approach is the flexibility of location and avoid issues around land availability. This approach allows for consistency from year to year and would have a similar workload for Western Power when compared with the current BRCP procedure.
- Schubert observed that from consumers' point of view, emphasis needs to be on minimising costs and using existing infrastructure where possible. Considering there are a lot of things causing the BRCP to increase, consumers would like to optimise

costs. Cheng agreed that this will be taken under consideration with substation costs likely to be only about 3%-4% of the BRCP cost.

5. Next steps

- Shahnazari noted that the ERA Secretariat is interested in the Working Group's feedback on proposed changes to the Procedure. Shahnazari queried if the Working Group sees benefit in providing feedback on the proposed drafting of the Procedure, prior to the Secretariat submitting the Procedure for the ERA Governing Body's approval. There was no opposition to this proposal.

6. General business

- There were no further matters raised for discussion.

7. Meeting closed at 2:50 PM