Agenda

Meeting Title: BRCP WEM Procedure Review Working Group

Meeting Number: 2024_02_22 – Meeting 3

Date & Time: Thursday, 22 February 2024 1:30PM – 3:00PM (AWST)

Location: Online, via TEAMS

DMS: D273012

Item	Responsibility	Action	Time
1. Welcome by Chair 1.1 Conflicts of interest 1.2 Competition law obligations 1.3 Meeting protocol 1.4 Meeting apologies/attendance	Chair	Noting	5 minutes
2. Minutes of Meeting 2024_02_06	Chair	Approval	5 minutes
3. Preliminary advice from GHD	GHD	Discussion	50 minutes
4. Approach for determining transmission and land costs	Secretariat	Discussion	20 minutes
5. Next steps	Chair	Discussion	5 minutes
6. General business	Chair	Discussion	5 minutes
Meeting close			

Please note this meeting will be recorded.

Item 1.2: Competition and consumer law obligations

Members of the MAC's BRCP WEM Procedure Review Working Group (**Members**) note their obligations under the *Competition and Consumer Act 2010* (Cth) (**CCA**).

If a Member has a concern regarding the competition law implications of any issue being discussed at any meeting, please bring the matter to the immediate attention of the Working Group's Chair.

Part IV of the CCA (titled "Restrictive Trade Practices") contains several prohibitions (rules) targeting anti-competitive conduct. These include:

1. **Cartel conduct:** cartel conduct is an arrangement or understanding between competitors to fix prices; restrict the supply or acquisition of goods or services by parties to the arrangement; allocate customers or territories; and or rig bids.

2. **Concerted practices:** a concerted practice can be conceived of as involving cooperation between competitors which has the purpose, effect or likely effect of substantially lessening competition, in particular, sharing Competitively Sensitive Information with competitors such as future pricing intentions and this end:

    a. a concerted practice, according to the ACCC, involves a lower threshold between parties than a contract arrangement or understanding; and accordingly; and

    b. a forum like the MAC is capable being a place where such cooperation could occur.

3. **Anti-competitive contracts, arrangements understandings:** any contract, arrangement or understanding which has the purpose, effect or likely effect of substantially lessening competition.

4. **Anti-competitive conduct (market power)**: any conduct by a company with market power which has the purpose, effect or likely effect of substantially lessening competition.

5. **Collective boycotts:** where a group of competitors agree not to acquire goods or services from, or not to supply goods or services to, a business with whom the group is negotiating, unless the business accepts the terms and conditions offered by the group.

A contravention of the CCA could result in a significant fine (up to $500,000 for individuals and more than $10 million for companies). Cartel conduct may also result in criminal sanctions, including jail terms for individuals.

Sensitive Information means and includes:

1. commercially sensitive information belonging to a Member's organisation or business (in this document such bodies are referred to as an **Industry Stakeholder**); and

2. information which, if disclosed, would breach an Industry Stakeholder's obligations of confidence to third parties, be against laws or regulations (including competition laws), would waive legal professional privilege, or cause unreasonable prejudice to the Coordinator of Energy, the State of Western Australia or the Economic Regulation Authority.

Guiding Principles – What not to discuss

In any circumstance in which Industry Stakeholders are or are likely to be in competition with one another, a Member must not discuss or exchange with any of the other Members information that is not otherwise in the public domain about commercially sensitive matters, including without limitation the following:

1. The rates or prices (including any discounts or rebates) for the goods produced or the services produced by the Industry Stakeholders that are paid by or offered to third parties;

2. The confidential details regarding a customer or supplier of an Industry Stakeholder;

3. Any strategies employed by an Industry Stakeholder to further any business that is or is likely to be in competition with a business of another Industry Stakeholder, (including, without limitation, any strategy related to an Industry Stakeholder's approach to bilateral contracting or bidding in the energy or ancillary/essential system services markets);

4. The prices paid or offered to be paid (including any aspects of a transaction) by an Industry Stakeholder to acquire goods or services from third parties; and

5. The confidential particulars of a third-party supplier of goods or services to an Industry Stakeholder, including any circumstances in which an Industry Stakeholder has refused to or would refuse to acquire goods or services from a third party supplier or class of third party supplier.

Compliance procedures for meetings

If any of the matters listed above is raised for discussion, or information is sought to be exchanged in relation to the matter, the relevant Member must object to the matter being discussed.

If, despite the objection, discussion of the relevant matter continues, then the relevant Member should advise the Working Group's Chair and cease participation in the meeting/discussion and the relevant events must be recorded in the minutes for the meeting, including the time at which the relevant Member ceased to participate.

Item 1.3: Meeting protocol

1. Attendees are encouraged to keep their video on.
2. Please place your microphone on mute, unless you are asking a question or making a comment.
3. Please state your name and organisation when you ask a question.
4. Please keep questions/comments relevant to the agenda item being discussed.
5. If there is not a break in discussion and you would like to say something, you can ‘raise your hand’ or type your question/comment in the meeting chat.
6. Questions and comments can also be emailed to market.monitoring@erawa.com.au after the meeting.
7. The meeting will be recorded to assist with drafting minutes. Minutes will be circulated to Members for comment prior to being finalised.

Item 2: Minutes of Meeting 2024_02_06

Minutes

Meeting Title:	BRCP WEM Procedure Review Working Group	
Meeting Number:	2024_02_06	
Date & Time:	Tuesday, 6 February 2024; 2:00PM – 3:00PM (AWST)	
Location:	Hybrid: • Online via Teams • ERA office (Level 4, Albert Facey House, Perth)	
Attendees:	Matt Shahnazari	Economic Regulation Authority (Working Group Chair)
	Wesley Medrana	Synergy
	Ben Tan	Tesla Holdings
	Oscar Carlberg	Alinta Energy
	Hari Sridhar	Transalta Corporation
	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
	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
	Lachlan Bunyan	Economic Regulation Authority
Apologies	Noel Schubert	WA Expert Consumer Panel
DMS:	D272970	

1. Welcome

- The Working Group Chair, Shahnazari, opened the meeting at 2:00PM.
- 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 2023_12_18

- The Chair sought feedback on the minutes of the 18 December 2023 meeting. Working Group Members did not raise any concerns.
- The minutes of the 18 December 2023 meeting were endorsed as a true and accurate record of the meeting. The minutes will be published on the Working Group website.

3. Progress update

The ERA Secretariat provided an update on its approach for determining the battery chemistry and annualisation elements of the BRCP calculation for the Working Group's feedback.

3.1 Battery chemistry

- Dignard noted that:
  - Capital costs are a major component of the BRCP. BESS chemistries and sub-chemistries have been evolving rapidly, which affect their capital costs and capabilities. Given the change in reference technology, the ERA will consider the appropriateness of the method to determine capital costs.
  - The Coordinator of Energy has determined the Benchmark Capacity Providers to be lithium-ion BESS, but there are many sub-chemistries. Traditional nickel-based lithium chemistries have been common in the past, while lithium iron phosphate (LFP) chemistries have been increasingly successful due to their operating characteristics and lower cost.
  - The ERA is considering which sub-chemistries are being commonly implemented across battery systems, what is the cheapest sub-chemistry and if there are multiple sub-chemistries that may be reasonable for the BRCP.
- Tan noted there is currently no mature market for second-hand batteries. Given the battery technology is quite new, the Australian Prudential Regulation Authority does not allocate any capital benefit to residual values. As a result, the cost of debt needs to account for technology risk.
- Dignard highlighted that one of the issues with BESS is that it is a new emerging technology that is slowly maturing, which has implications on project financing and risk. As a result, there is a challenge in identifying how parties finance these projects and whether it is managed through the life of the asset, warranty period or a longer technical life.
- Carlberg suggested that the selected sub-chemistry should be one that has been tested and seen in the market. Carlberg queried whether the choice of sub-chemistry affects assumptions on battery degradation and cycling costs.
- Dignard noted recent announcements of new battery projects across Australia have relied on LFP BESS. The sub-chemistry does affect operating characteristics. The Coordinator's determination of the lithium-ion chemistry precludes other chemistries (such as sodium); however, this may be reviewed in future triennial reviews conducted by the Coordinator.
- Shahnazari noted the ERA has engaged GHD to provide technical advice on the battery sub-chemistry suitable for the purpose of the BRCP determinations. Shahnazari noted the ERA Secretariat is considering whether the BRCP

Procedure will lock in the sub-chemistry or provide the framework for determining the sub-chemistry.

3.2 Weighted average cost of capital

- Dignard noted that:
  - Investors must be confident they can recover equity and debt funding costs to undertake an investment. The rate of return provides for funding costs required by investors to provide investment capital for the project. This rate is usually based on calculating debt and equity costs on a benchmark basis and weighting these costs to form a weighted average cost of capital (WACC).
  - In this review, the ERA will consider whether the previous form and parameters of the WACC remain appropriate for the risk associated with BESS. For instance, a BESS has different construction and operational cost components – and the resulting risk profile – compared to an open cycle gas turbine (OCGT). The BESS technology is relatively new compared to OCGT but there may be other commercial considerations that make it less risky for investors.
  - The ERA Secretariat's current working approach considers the nominal pre-tax rate of return remains appropriate. However, the underlying parameters must be updated to reflect the change in reference technology to BESS.
- Tan queried where the technology risk is reflected in the analysis.
- Dignard noted:
  - The new BESS technology may elevate investors' perceived level of risk and that may lead to a higher rate of return required by investors.
  - These risks may be managed through relatively conservative engineering, procurement and construction (EPC) contracts that guarantee fixed price of delivery, as well as robust warranties that provide clear degradation profiles that improve investors' confidence in the technology.
  - If the risk profile is different, the approach for the BRCP determination will have to consider if project specific factors, like credit rating, equity premium and gearing, may have to be updated.
- Chye reiterated Tan's point and noted the appropriateness of the risk rating depends on how the business case is modelled and whether it considers the residual value of the BESS. For instance, the risk rating may be appropriate if the rate of return is modelled by fully depreciating the BESS and assuming no residual value. However, the risk rating may be higher if the modelling assumes a greater residual value in the future.
- Chye considered GHD's scope should include the requirement to have a bankability model so the BRCP determination approach is aligned with the commercial lending for the bankability of the project. For example, the BESS is unlikely to have a 20-year warranty and there would be some assumptions on failure and replacement of parts. It would be useful to have advice on what factors a technical advisor like GHD would consider if they were modelling a financial close on a BESS asset. A potential investor could take a bankable model to a banking syndicate and identify if there is a disconnect between the way these projections are modelled by potential investors and banks. Dignard noted the ERA Secretariat is seeking GHD's advice on BESS warranties.

3.3 Annuity tilt

- Dignard noted:
  - Investors expect to receive a return of (depreciation) and return on (financing costs) capital invested in a project over the life of the project. Capital recovery can be set such that each method will have the same present value but with different recovery profiles.
  - Given BESS projects are capital-intensive and there is an expectation that BESS capital costs will continue to reduce, the ERA Secretariat is considering which method is appropriate to incentivise BESS investments.
  - The current approach in the BRCP Procedure assumes a straight-line annuity, which provides equal payments for depreciation and the rate of return in the form of a constant annuity. The ERA Secretariat is considering the benefits of adopting a 'tilted' annuity, which is an accelerated depreciation approach and allows an investor to bring forward cash flows but recover the same amount in present value terms. The ERA Secretariat is considering whether a straight-line (simple) or tilted annuity approach is more appropriate for the BRCP Procedure.
- Devereux queried how the choice of cashflow profiles affects the BRCP determination. Dignard noted the capital cost of BESS technology has been decreasing over time and is likely to continue over time. Under the straight-line annuity approach that is updated annually to reflect expected lower costs, an investor may under-recover their depreciation and rate of return over the life of the project.
- Chye considered a better approach would be for an investor to procure enough reserve capacity based on the Australian Energy Market Operator's (AEMO) view on capacity requirements at a point in time, and then guarantee that reserve capacity price for projects that are accepted into the reserve capacity mechanism at that point in time. Chye expressed a preference to lock-in revenues from the capacity mechanism over a longer period. If the reserve capacity mechanism allows for fluctuation of return (through a changing price), investors will build in more risk and ultimately the system will pay less for a return on risk equity if the investment is de-risked.
- Dignard explained that the tilted annuity approach could be adopted until decreasing capital costs stabilise, at which point a straight-line annuity approach could be readopted. Tan considered there is no difference in either annuity approach if the net present value of the investment under both approaches is the same. Dignard clarified that a tilted annuity reduces the present value loss expected to occur from an annual reset of the BRCP and reducing capital costs. Tan clarified if the cashflows are bought forward, then the BRCP will be higher.
- Chye considered a tilted annuity is not the appropriate approach to address uncertainty in the cashflows for the BRCP determination process. Chye preferred entering into a longer-term contract that fixes revenues at the commencement of the BESS. Shahnazari clarified the annuity tilt is not intended to de-risk investment or address uncertainty about future reserve capacity cash flows, but to provide an investor with an expected cashflow profile that incentivises their entry into the market.
- Chye reiterated the issue raised in the previous Working Group meeting of adopting an approach that considers a fixed price period at the point in time the project is approved. If the current process is de-risked, it may provide greater certainty for investors.

- Dignard noted this review is conducted from the perspective of determining the BRCP and providing appropriate investment signals to the market through an annual update, not providing certainty on investment return or revenue.
- Guzleva noted:
  - The actual reserve capacity price (RCP) is determined annually using the BRCP and also considering whether the reserve capacity target as set in the Electricity Statement of Opportunities (ESOO) has been met.
  - Recently, and for the foreseeable future, the RCP will be going up the RCP curve due to shortfalls in capacity.
  - The RCP for an entrant will be fixed for five years, based on the price in the first capacity year and will be indexed annually.
  - The revenue from capacity credits is determined by both the duration of storage and the prevailing RCP.
  - The Coordinator determined the BRCP must be determined on a gross cost of new entry (CONE) basis, which means a BESS will get higher revenue from participating in the energy market for what it requires to be viable.
  - The Coordinator will review the technology underlying the Benchmark Capacity Providers every three years. The review may be conducted even more frequently as the electricity storage resource obligation duration (ESROD) changes.
- Chye acknowledged the BRCP is not the RCP, but the reserve capacity mechanism (RCM) is trying to encourage investment in a long-term asset based on a dominant revenue stream that changes annually. Investors will wait for a major shortfall to have the buffer of an RCP that is higher than their cost of capital. It is better to adopt an infrastructure investment approach, like an access arrangement for a gas pipeline, where the rate of return is not changed annually.
- Shahnazari noted:
  - The tilting annuity approach is not intended to manage risk, but to ensure the cashflow profile is consistent with investors' expectations of the cost of technology. An investor entering the capacity market will form an expectation of the BRCP, and ultimately RCP, in the future which will determine their cashflows in the RCM.
  - The WACC addresses the risks that will affect the BRCP, such as the expectation of future technology costs.
  - The ERA does not have the scope to lock-in the BRCP for a fixed number of years, which is a policy consideration. The ERA must determine the BRCP annually following the guidance in the WEM Rules.
- Dignard summarised the matters the ERA will consider:
  - What are the costs of the reference technology?
  - What is the rate of return required for a BESS BRCP?
  - What is the profile of cashflows for capital costs?

4. Next steps

- The Working Group Chair noted:

- The ERA has engaged GHD to support and provide technical advice for this review.
- The ERA may prepare an indicative BRCP to inform this review. This indicative BRCP will *not* be used for the next determination but is a high-level estimate derived for the purpose of developing the BRCP Procedure.
- The next Working Group meeting will be held during the week beginning 19 February 2024. Meeting papers will be circulated ahead of the meeting. The agenda will focus on seeking feedback on GHD's initial advice and the ERA's working approach to determine transmission and land costs.
- The ERA expects to publish a procedure change proposal for consultation in early April 2024.

5. General business

- No other items were raised.

6. Meeting closed at 3:00PM

Item 3: Preliminary advice from GHD

GHD Advisory

Progress update only. Outcomes not endorsed.

BRCP procedure update

→ Benchmark Lithium BESS costs

Presentation to the WEM Procedure Working Group (on behalf of the ERA)

22 February 2024

Purpose of engagement

1. **Recommend updates to the WEM procedure**

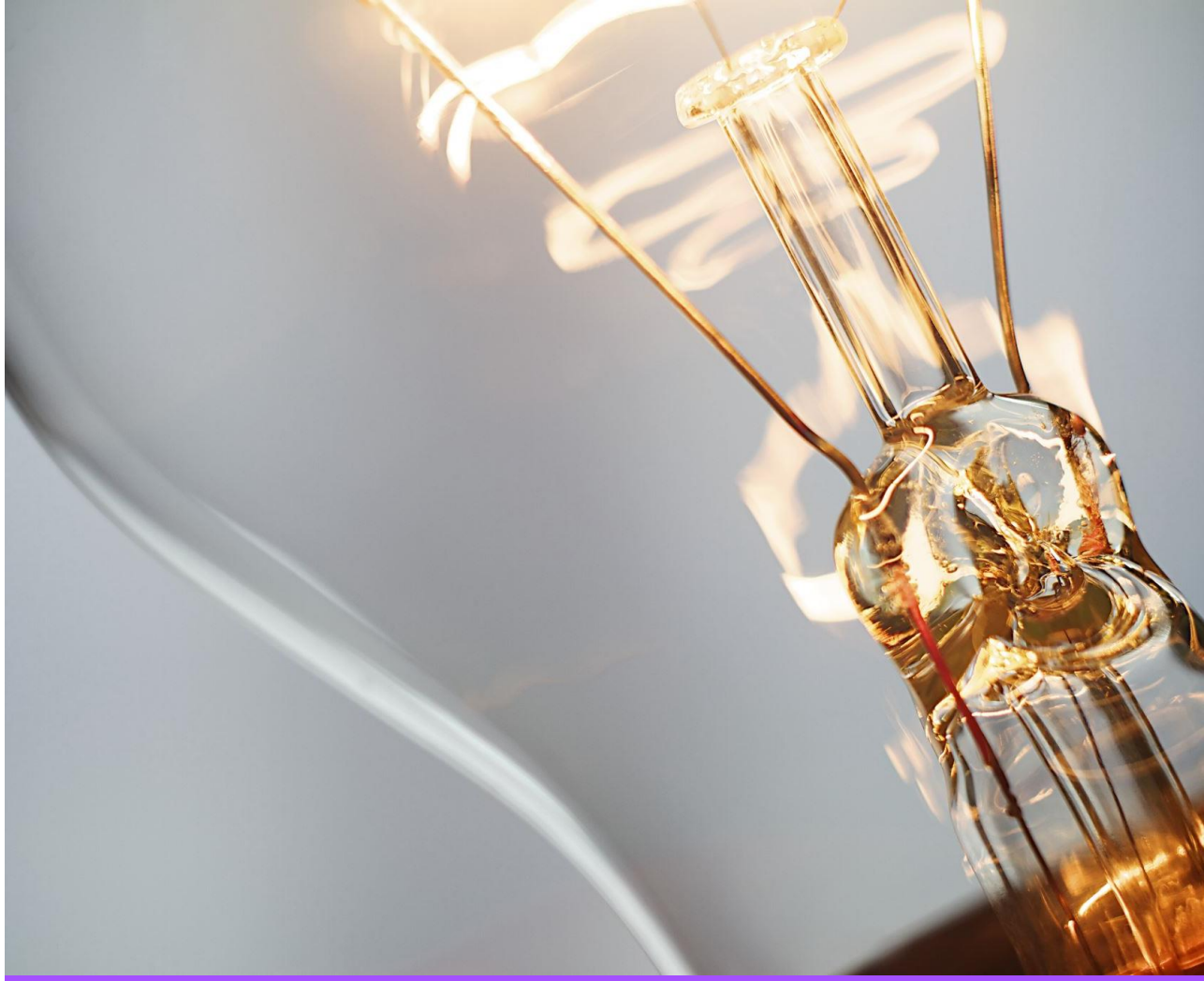
2. Identify the design specification and key cost components for a 200 MW/800MWh lithium BESS meeting the:
    i. Benchmark Peak Capacity Provider requirements
    ii. Benchmark Flexible Capacity Provider requirements

3. Develop +/- 50% cost estimate(s) based on identified cost components (to inform Procedure updates)

Disclaimer:

Cost estimate is a preliminary estimate only. For use in updating of the BRCP procedure only.

Results not endorsed by ERA.



Overview of process & today's session

Today's discussion:

- Method to determine WEM Procedure updates
- BESS specification
- Cost components
- BRCP based on preliminary costs (for indicative purposes only)

Lots to discuss, limited time!

Method

Taking the perspective of prospective investors in the reference BESS, our approach comprises:

1. Develop a conceptual design of the BESS based on WEM Rules and the Coordinators determination.
2. Identify cost components of the BESS using a bottom-up approach.
3. Develop broad cost estimate and produce an indicative BRCP.
4. Based on the cost estimates, recommend procedure updates that capture key cost elements that would need to be updated for the BRCP.

Why estimate costs?

Cost estimate process is being used to identify:

- Which costs are the largest?
- Which costs can be grouped?
- How should ‘buckets’ of costs be escalated (or not)?

The findings will enable the Procedure recommendations to appropriately identify or differentially cater to various capital and fixed O&M costs.

BESS specifications

→ **Overview of BESS requirements**

Coordinator determination

- In December 2023, the Coordinator of Energy (the Coordinator) determined the Benchmark Reference Technology would change.

- The Benchmark Peak Capacity Provider will be a Lithium battery energy storage system with
  - 200 MW injection
  - 800 MWh energy storage
  - a 330 kV connection near Kwinana or Pinjar

- The Benchmark Flexible Capacity Provider will be a Lithium battery energy storage system
  - 200 MW injection
  - 800 MWh energy storage
  - a 330 kV connection near Kwinana or Pinjar

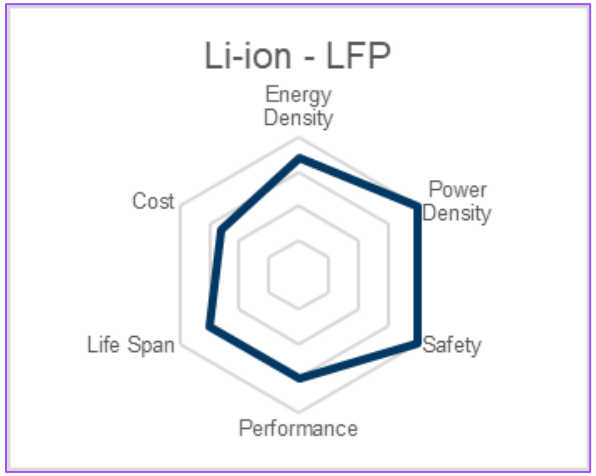
BESS specifications

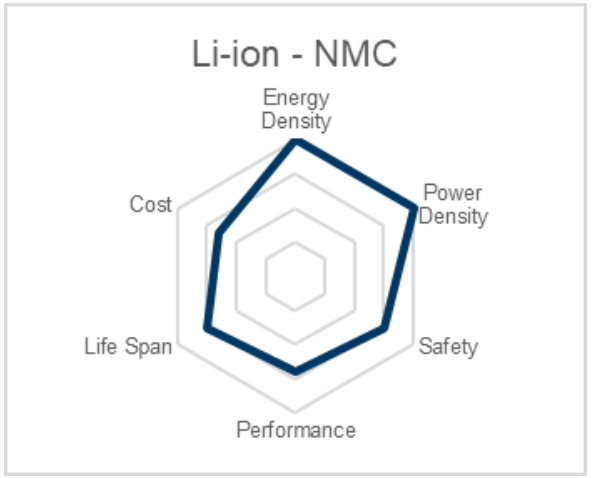
Parameter	BRCP service requirement
WEM Rule requirements	
Capacity	200 MW injection
Operational duration	4 hours
Operating temperature	41ºC
Additional specifications	
Lithium sub chemistry	Lithium iron phosphate (LFP)
BESS life (years)	Up to 20 years (warranty can be less depending on duty cycle)
Inverter power rating	4 MW
Battery container energy rating	4 MWh
Land requirements	3 ha
Operational assumptions	
Peak	1 cycle per day, full charge and discharge
Flex	1 cycle per day, full charge and discharge

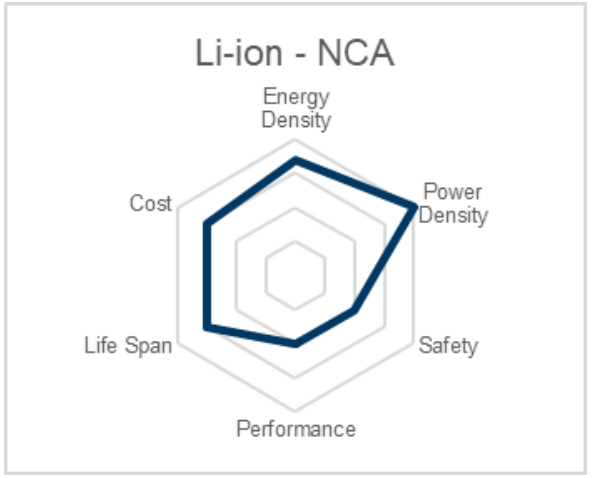
Lithium sub chemistries

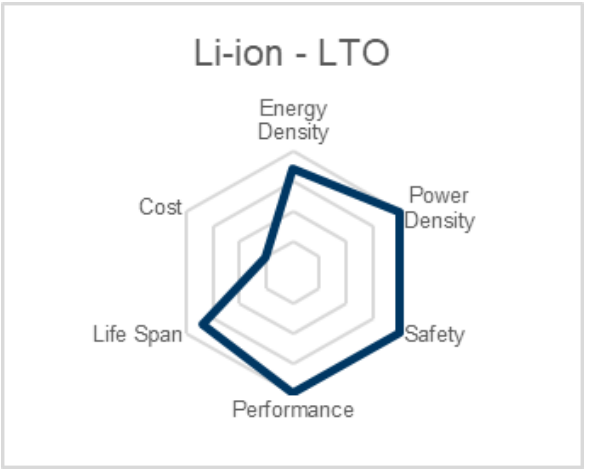
- Lithium iron phosphate (LFP) is the recommended sub chemistry
  - More cost-effective, safer and higher life cycle than other sub-chemistries.
  - High power and energy density.

- Widely used in utility-scale BESS in Australia including:
  - KBESS 1 &2
  - Collie BESS
  - Wagerup BESS









Cost components

→ **Cost estimates for testing of the procedure**

BESS capital and installation costs

- **Battery modules** are containers that include racks of modules, thermal management system, control equipment and fire suppression.
- **Power conversion system (PCS)** is comprised of multiple inverters that covert DC power to AC, one inverter will be connected to multiple battery containers in uniform groups.
- **Civil/structural BoP** consists of the foundations, transformer bunds and equipment pads for the batteries and substation.
- **Electrical and control BoP** includes all enabling electrical infrastructure, cables and conduit, transformers, switchgear, protection, and control equipment for the batteries and the substation.
- **Installation labour & equipment** are included in EPC costs and required for the installation.

Item	% of total
Lithium-ion battery modules	68.1%
Power Conversion System	6.6%
Structural BOP	7.8%
Electrical BOP	5.8%
Installation labour & equipment	11.7%
Total cost	**100%**

BESS capital overhead costs

- **Initial spares** for scheduled and corrective maintenance of battery, PCS, BoP and substation. Subsequent spares considered variable cost.
- **Connection agreement, market registration and licensing** covers connection application and GPS with Western Power, registration and capacity credit certification with AEMO, ERA generation licensing.
- **Environmental and development approvals** driven by development approvals (including conditions) and building approvals. Minimal environmental approvals.
- **Owner's design and project management** covers pre-feasibility and feasibility, engagement of owner's engineer and legal/financial services, and owner's engineering costs (FEED and construction).
- **Legal, financing and construction insurance** includes:
  - Legal negotiation of contract and tender, PPA/offtake, grid connection agreement, financing/ loan, construction contracts.
  - Financing costs – capital raising costs and cost of setting up project vehicle for financing in construction
  - Construction insurance for loss due to damage and lengthy delays to commissioning

Item	% of total
Initial spares	18.6%
Connection agreement, market registration and licencing costs	3.5%
Environmental and development approvals	8.9%
Owner's design and project management	29.2%
Legal, financing and insurance costs	39.8%
Total	**100.0%**

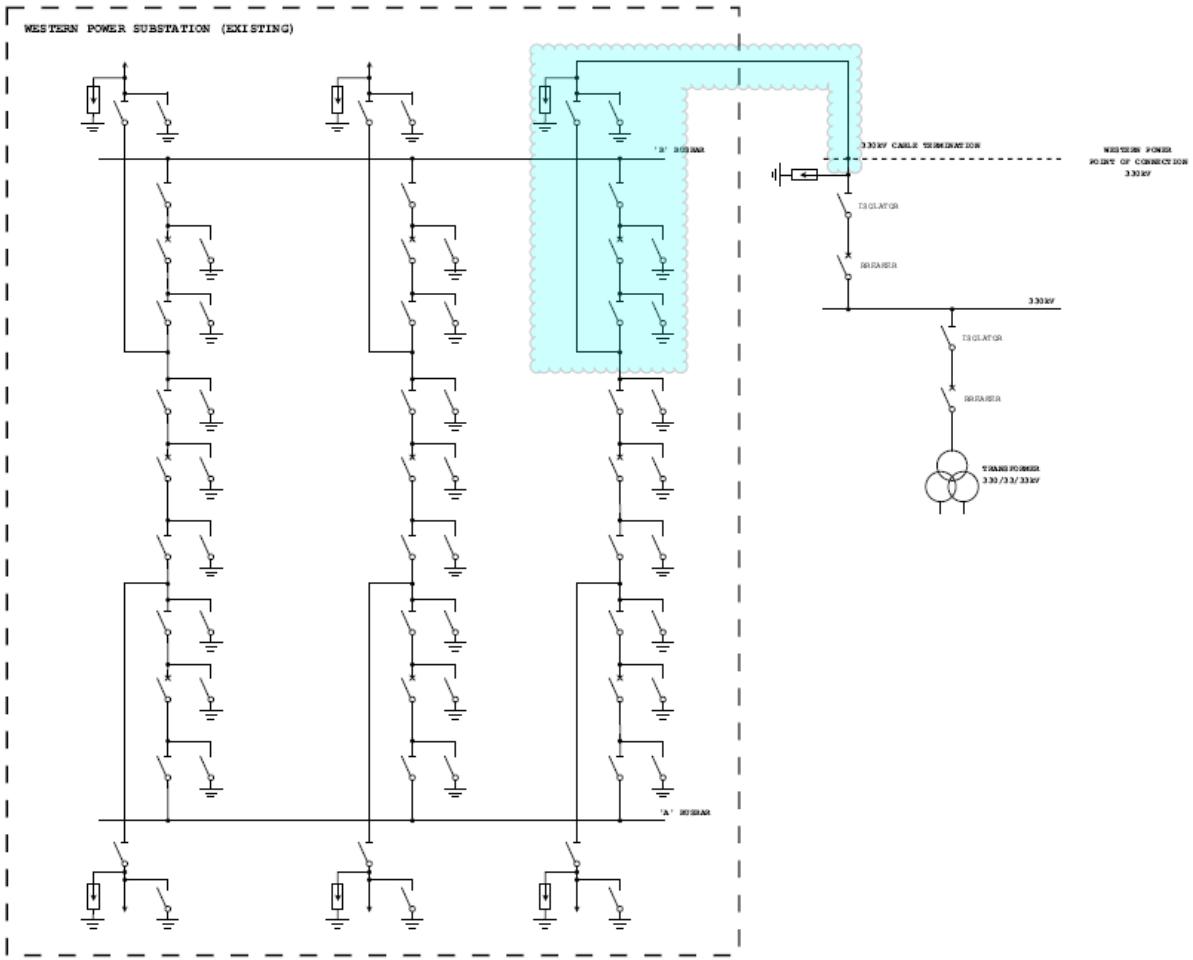
Connection and land costs

Connection cost inputs from Western Power

– Changed direction – from bay in substation (left) to own substation.
– Current (to be updated) numbers based on the same connection arrangement as OCGT:
  • a substation
  • 2 km of overhead line to the power station
  • an overhead line easement.

Land cost inputs from Landgate (based on GHD land area)

– The indicative land costs for a BESS occupying 3 hectares
– Land area includes:
  • BESS and BoP
  • 330/33 kV substation for the BESS interconnection, and
  • an uplift for distance between the BESS and the grid connection.



Fixed operating & maintenance costs

- Fixed O&M for the BESS include:
  - BESS substation and BESS and BoP maintenance
  - Local government rates
  - Corporate overheads
  - Additional professional costs (legal and regulatory, subcontractor costs, engineering support – only fixed costs)
  - Security

- Connection and network ongoing costs include:
  - Connection switchyard and overhead transmission line O&M costs (to be updated as currently based on OCGT)
  - Transmission storage service charges

Item	% of total
Fixed O&M for BESS	68.5%
Connection switchyard and OHL O&M	2.6%
Transmission storage service charges	28.9%
Total	**100.0%**

Summary of costs

→ **Preliminary BRCP**

Summary of costs

Development & capital costs

Item	% of total
Lithium-ion battery modules	57.16%
Power Conversion System	5.51%
Structural BOS	6.53%
Electrical BOS	4.90%
Installation labour & equipment	9.80%
Initial spares	1.01%
Connection agreement, market registration and licencing costs	0.19%
Environmental and development approvals	0.48%
Owner's design and project management	1.59%
Legal, financing and insurance costs	2.17%
Connection capital costs **(WP input)**	9.32%
Land cost **(Landgate input)**	1.33%
Total cost	**100.00%**

Fixed O&M

Item	% of total
Fixed O&M for BESS	68.5%
Connection switchyard and OHL O&M	2.6%
Transmission storage service charges	28.9%
Total	**100.0%**

Disclaimer:

Cost estimate is a preliminary estimate only.

For use in updating of the BRCP procedure only.

Results not endorsed by ERA.

BRCP Calculation

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For use in updating of the BRCP procedure only.
Results not endorsed by ERA.

– The calculation of the BRCP requires the division of annualised costs by the capacity credits allocated to the benchmark capacity provider.

$$BRCP = \frac{ANNUALISED_{Fixed\ O\&M} + ANNUALISED_{CAPEX}}{Capacity\ Credits}$$

– Based on preliminary costs, BRCP is currently estimated as $366,500. Noting:
  - Several smaller cost inputs are yet to be finalised
  - Preliminary WACC and annuity calculation are not confirmed

Item	Preliminary estimate
Annualised capital cost	$69,600,000
Annual fixed O&M cost	$3,700,000
Capacity Credits	200
Benchmark Reserve Capacity Price ($/MW/year)	**$366,500**

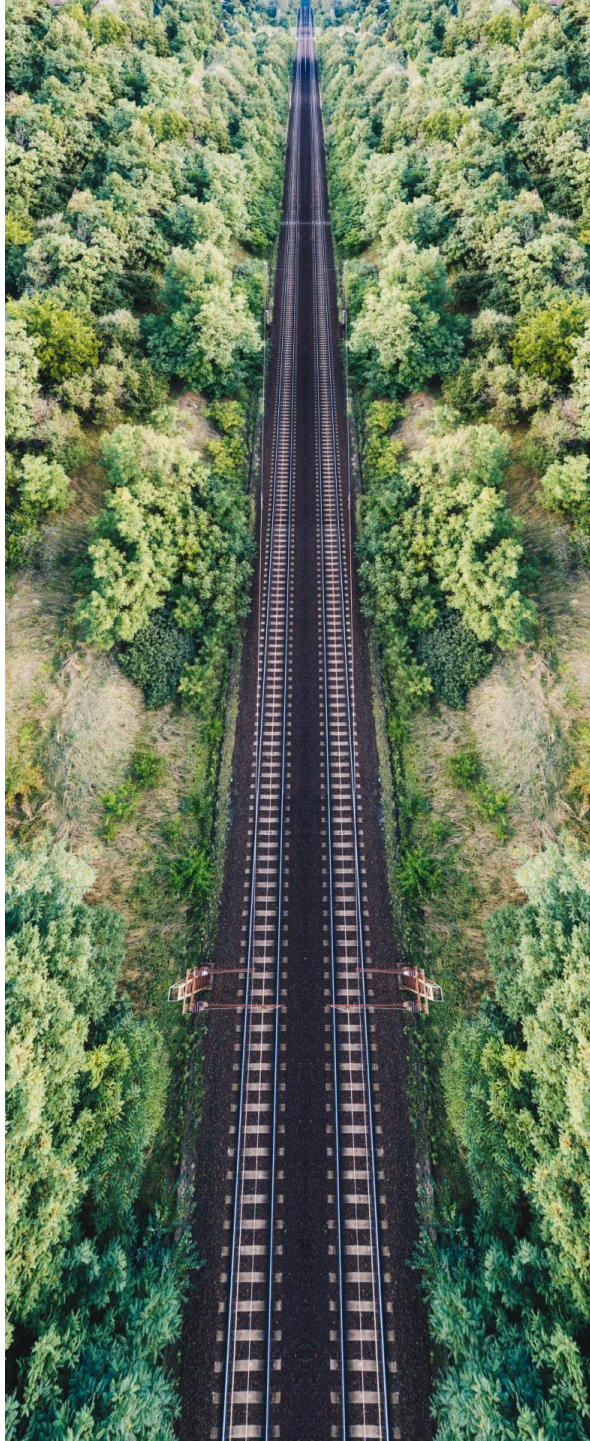
Next steps

Develop recommendations on:

- Specifications to be made solidified in the procedure
- Costs to be separately identified and estimated
- Groupings of smaller costs where appropriate

GHD report will be published as a draft alongside the ERA procedure change proposal.

Following public submission process, GHD may revise or otherwise update our report (if needed).



Thank You

ghd.com/advisory

Item 4: Approach for determining transmission and land costs

Economic Regulation Authority

Determining transmission and land costs

22 February 2024

Issue and concept

Issue - determine the approach for estimating:

- Land costs
- Transmission capital costs

Context: These combined costs are < 10% of BRCP

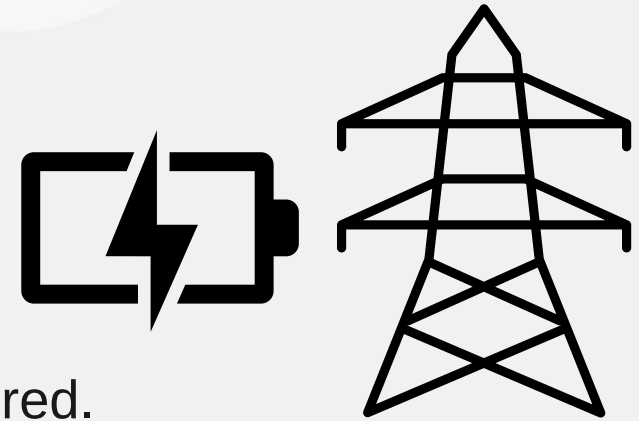
Aim: to provide transparency, certainty and include reasonable costs.

Economic Regulation Authority

Requirements

Coordinator's determination:

- 330 kV connection
- Located 'near' Pinjar or Kwinana



ERA to determine if substation is required.

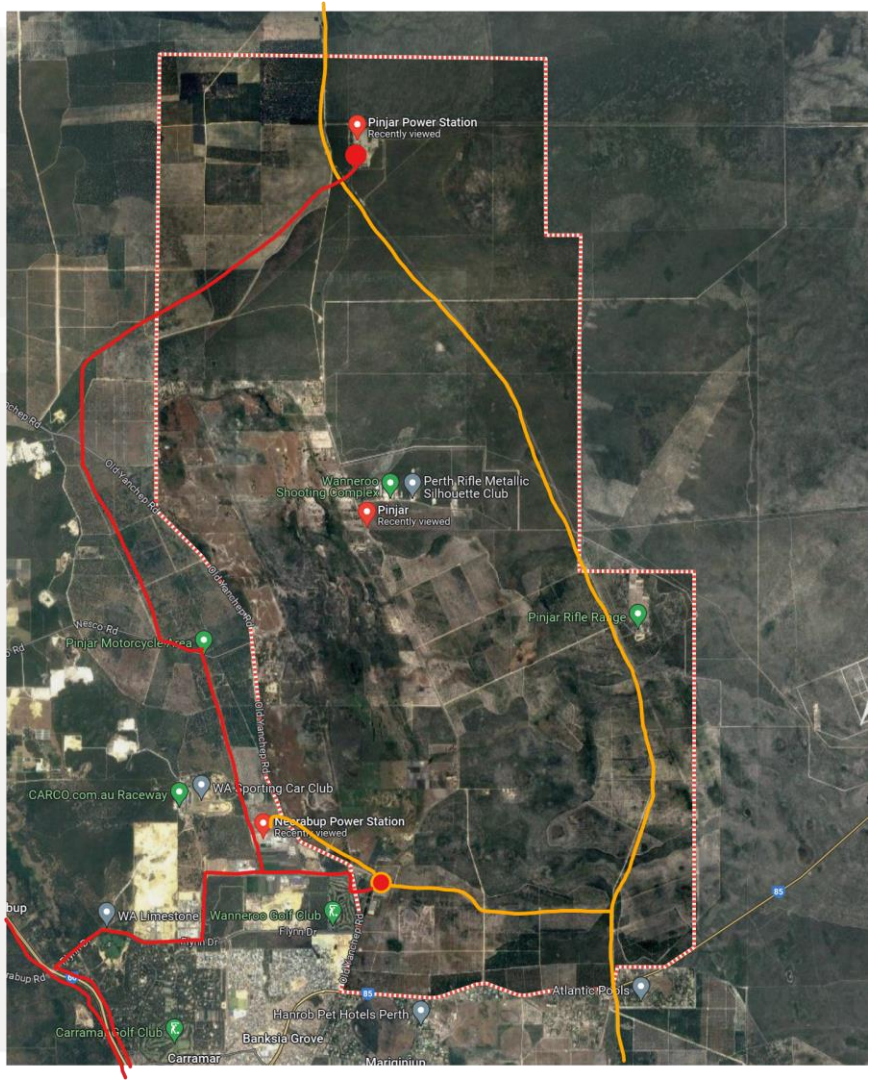
Economic Regulation Authority

Pinjar region

Orange line – 330 kV

Red line – 132 kV

- Pinjar substation 132 kV
- Nearest 330 kV substation is Neerabup
- Lines are congested until SWISDA Stage 1 complete



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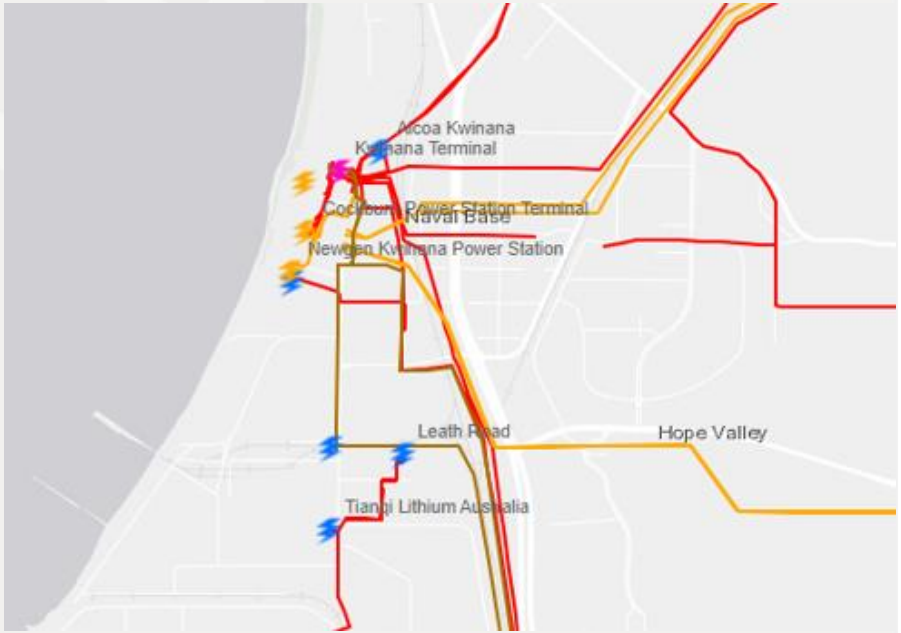
Kwinana region

Orange line – 330 kV

Red line – 132 kV

- 330 kV substations in Kwinana
- Land around substation is built up



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Considerations

Principle: Choose lowest cost option

Factors -

- Availability of substation
- Availability of land
- Restrictions on building near substation
  - underground vs overhead lines
- Congestion on lines

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Option 1 – ‘Specific location’ approach

Pinjar - substation	Pinjar - regional	Kwinana - substation	Kwinana - regional
• Substation available (Neerabup) • Land available • Congestion on network	• Build substation • Land available • Congestion on network	• Substation available (Kwinana) • Land built up • May require underground lines • Not congested	• Build substation • Land available • Not congested

Pick lowest cost option

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Option 1 – ‘Specific location’ approach

Advantages	Disadvantages
• Existing infrastructure can remove the need to build a substation.	• Significant imposition on Western Power to determine connection costs for each location.
• Specific approach gives the most accurate location and land cost option.	• Assumes land around a substation is available for purchase. • Prices of land around substation can be much higher than the rest of the region.
	• Can lead to varying BRCPs between years depending on whether a substation is included or not.

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Option 2 – ‘Region’ approach

Average Pinjar region cost	Average Kwinana region cost
• Build substation • Land available • Congestion on network	• Build substation • Land available • Not congested

Lowest cost region

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Option 2 – ‘Region’ approach

Advantages	Disadvantages
• Flexible location	• Assumes both regions are the same for access. Requires SWISDA Stage 1 to free up Pinjar line. • Pinjar is cheaper region but is congested.
• Allows connection anywhere on the 330kV line	• Including a substation increases costs if existing substation has availability
• Including a substation makes BRCPs consistent	• Western Power needs to determine connection costs for each region.

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Option 3 – ‘Generic’ approach

Average across both regions

- Build substation
- Land available
- Consistent valuations

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Option 3 – ‘Generic’ approach

Advantages	Disadvantages
• Flexible location.	• No specific costs for specific locations within the defined regions.
• Allows connection anywhere on the 330kV line.	• Includes substation which increases costs if existing substation has availability.
• Western Power to provide a single generic connection cost.	
• BRCP will consistently include a substation.	

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Assessment

Option	Assessment
1 – Specific location approach	• Practical implementation – significant increase in obligations on Western Power. • Limited impact on BRCP (<10%).
2 – Region approach	• Requires network upgrades to be in place to make suitable comparisons. • Limited impact on BRCP (<10%).
3 – Generic approach	• Simple approach (same as current BRCP process). • Allows flexible location within regions. • Provides consistency between annual BRCP determinations.

Feedback

thank you

Ask any questions

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