Agenda

Meeting Title: BRCP WEM Procedure Review Working Group

Meeting Number: 2024_04_19 – Meeting 4

Date & Time: Friday, 19 April 2024 10:30AM – 11:30AM (AWST)

Location: Online, via Microsoft Teams

DMS: D275490

Item		Responsibility	Action	Time
1.	**Welcome by Chair** 1.1 Conflicts of interest 1.2 Competition law obligations 1.3 Meeting protocol 1.4 Attendance	Matt Shahnazari	Noting	5 minutes
2.	**Minutes of Meeting 2024_02_22**	Matt Shahnazari	Approval	5 minutes
3.	**Summary of the ERA's procedure change proposal and draft WEM Procedure: BRCP**	Lipakshi Dhar Jason Dignard	Discussion	40 minutes
4.	**Summary of feedback received out of session from the Working Group on draft WEM Procedure in March 2024**	Lipakshi Dhar	Noting	5 minutes
5.	**Next steps**	Matt Shahnazari	Noting	2 minutes
6.	**General business**	Matt Shahnazari	Discussion	3 minutes
Meeting close				

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BRCP WEM Procedure Review Working Group

Meeting 4 | 19 April 2024

Agenda

1. Welcome
2. Minutes of Meeting 2024_02_22
3. ERA's procedure change proposal & draft WEM Procedure
4. Out of session feedback on draft WEM Procedure
5. Next steps
6. General business

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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.

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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.

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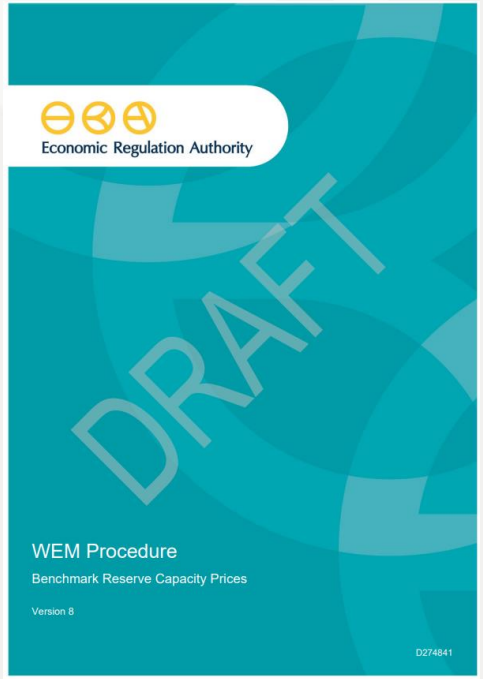
2 Minutes of Meeting 2024_02_22

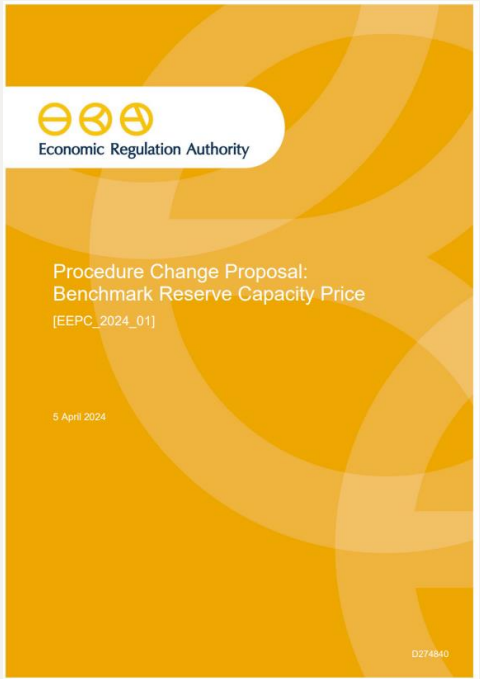
3 ERA’s procedure change proposal and draft WEM Procedure: BRCP

The ERA is seeking feedback on its proposal

- Published a procedure change proposal and draft WEM Procedure for consultation (online)

- **Submissions due by 6 May (online)**





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The ERA's review framework

Objectives of Procedure review

1. Reflect Coordinator's determination of Benchmark Capacity Providers.
2. Includes all reasonable and material capital costs and fixed O&M costs expected to be incurred in developing and operating a BESS in the WEM.
3. Allows the ERA to annually undertake a technical bottom-up cost evaluation of the BESS to determine a Flexible BRCP and Peak BRCP.
4. Is clear and unambiguous; provides certainty on how BRCP will be determined; complements energy market reforms; and consistent with WEM Rules.

Adopt perspective of prospective investors in grid-scale BESS → Identify capital cost and fixed O&M cost components of BESS → Consider which parameters to fix in Procedure

Sought advice from technical consultant (GHD), financial institutions that finance BESS projects, Western Power, Landgate and MAC Working Group.

Draft WEM Procedure for consultation

1. BESS technical specs

- Sub-chemistry
- Operational assumptions

2. Cost components

- Capital cost
- Fixed O&M cost

3. Cost estimation method

4. Annualisation

- Annuity period
- WACC
- Annuity tilt

5. Procedural & administrative drafting

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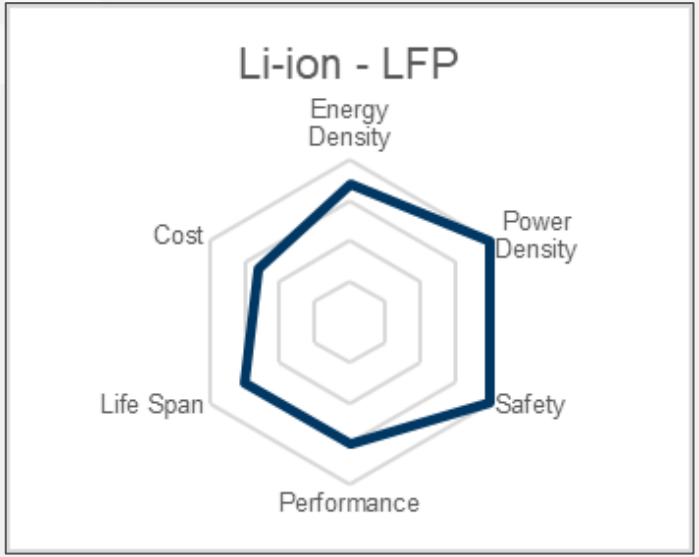
1. BESS technical specs: Sub-chemistry

- Propose to specify lithium iron phosphate BESS in Procedure
- Considered benefits of specifying sub-chemistry in the Procedure:
  - Provide certainty to industry
  - Costs & cost recovery period (warranties) depend on chemistry
  - LFP has preferred characteristics

WEM Procedure: Clause 2.1.6(a)



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1. BESS technical specs: Design assumptions

- Propose BESS be sized to achieve:
  - 200 MW injection / 800 MWh storage capacity on 1 October of Year 3 of RCC → account for energy and power capacity degradation
  - Minimum level of equipment/systems as required by WEM Rules
- Sizing requirements **not** specified in Procedure as it varies based on BESS design and WEM Rule requirements
- Specify some factors to consider for BESS sizing as part of annual BRCP determinations → ERA may engage consultant to advise annually

WEM Procedure: Clauses 2.1.6(b) – (d) and 2.1.7

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2. Cost components

Capital cost components

- BESS supply and installation costs
- Land costs
- Transmission connection costs
- Other costs (previously ‘Margin M’)

~95% of total BRCP

Fixed O&M cost components

- Fixed costs of service, inspection & maintenance of BESS
- Fixed corporate overhead costs
- Local govt rates
- Transmission connection asset maintenance costs
- Transmission storage service charges

~5% of total BRCP

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2. BESS supply and installation costs

- Propose to specify costs:
  - Battery containers/modules
  - Power conversion systems
  - Electrical and civil BoP
  - Installation labour and temporary equipment hire

- ERA may engage consultant to estimate costs in annual determinations

WEM Procedure: Clause 3.3

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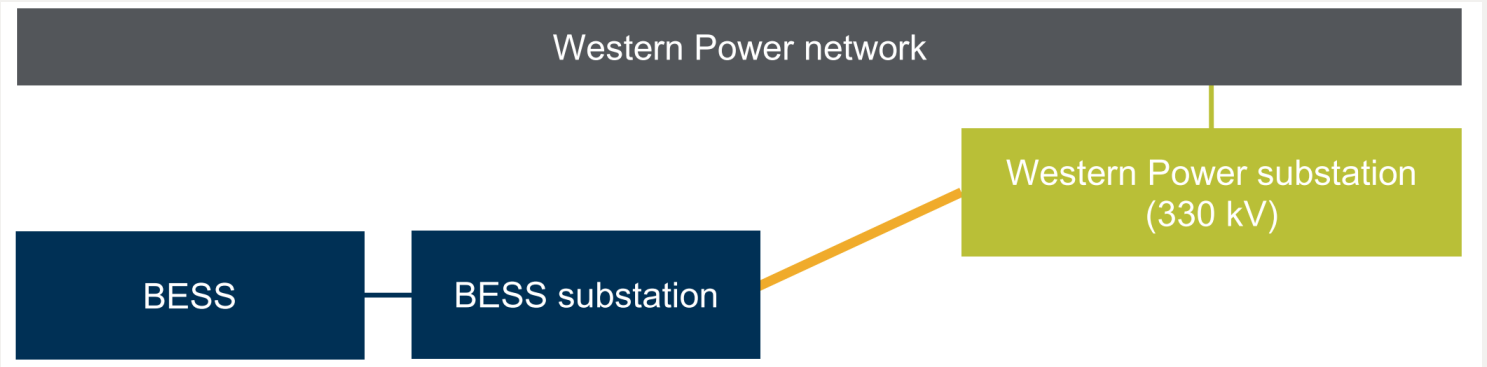
2. Transmission connection costs

- Include costs to connect BESS to WP's network
- The ERA considered:
  - Access to existing shared transmission infrastructure
  - Availability and cost of acquiring land within Pinjar & Kwinana
  - BESS flexibility to connect anywhere along network



2. Transmission connection costs – Approach

ERA to ask provider (WP or alternative) to estimate TC

Provider to include cost of:

- new 330 kV substation
- Tx lines between BESS and new substation
- Indirect costs

Provider assumes:

- New substation dedicated to BESS and owned by WP (cost borne by BESS operator)
- BESS and substation located adjacent to existing Tx network → minimise costs
- Cut-in, cut-out of existing Tx line

Provider may use historical costs if appropriate

WEM Procedure: Clause 3.4

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2. Land costs

- Coordinator's determination: BESS in Kwinana or Pinjar
- Include costs for land sufficient for BESS, substation, Tx connection assets and buffer zones
- GHD advised 6.5 hectares is sufficient

Propose:

- WEM Procedure specify land size of 6.5 ha
- Land cost estimated as single average land cost based on average land prices across Kwinana & Pinjar

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WEM Procedure: Clause 3.5

2. Other capital costs

- Propose to include direct and upfront costs:
  - Connecting & registering BESS to the SWIS
  - Environmental & regulatory approvals
  - Project management & owner's engineer services
  - Legal, financing & insurance costs

- ERA may engage consultant to estimate costs in annual determinations

WEM Procedure: Clauses 3.6 – 3.9

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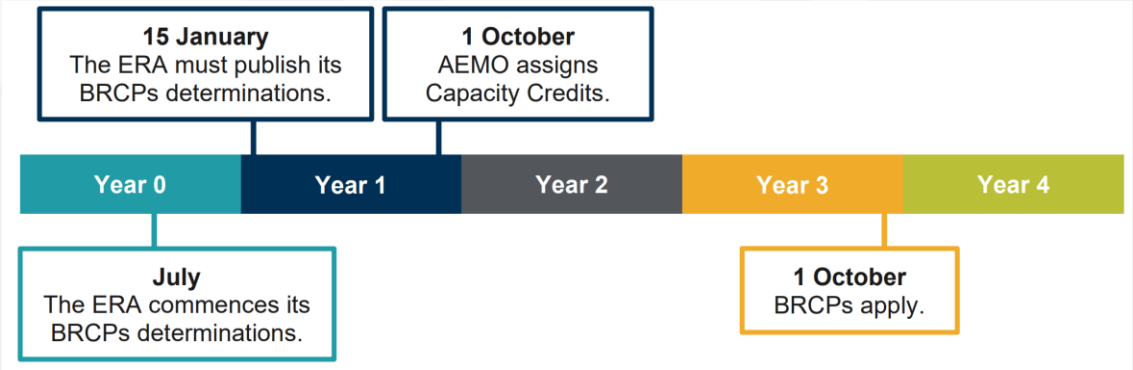
3. Cost estimation method



- BRCP determination must account for cost changes between the date of the BRCP determination and when the BRCPs apply.
- The ER considered:
  - Nature of the cost estimation approach.
  - Whether the costs are reasonably expected to change over time.
  - When costs are likely to be incurred.

3. Cost estimation method

Capital cost components

- Assume capital works are completed by **1 April** of a Reserve Capacity Year → allow for any construction overrun & certification process
- ERA to use a reasonable adjustment method to estimate capital costs as at **1 April.**

WEM Procedure: Clause 3.10

Fixed O&M cost components

- Assume costs are incurred after BESS commences operation and start receiving revenue from capacity credits on **1 October** of a Reserve Capacity Year.
- ERA to use a reasonable adjustment method to estimate fixed O&M costs as at **1 October.**

WEM Procedure: Clause 5.2

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4. Annualisation: Annuity period

The ERA considered:

- Why to specify an annuity period → provide certainty to industry on cost recovery period + provide appropriate price signals
- Factors affecting recovery period
  - Technical & economic life of BESS (warranties & degradation profiles)
  - Common contracted periods & terms of finance available

Propose annuity period of 15 years

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WEM Procedure: Clause 2.2.3

4. Rate of return (WACC)

- BESS investors must be confident they can recover equity and debt funding costs → rate of return compensates investors for risk.
- Weighted average cost of capital (WACC) historically used.
- Propose the Procedure specify use of **nominal pre-tax WACC**:
  - Nominal: compensate for inflation effect.
  - Pre-tax: various corporate structures that impact tax paid.
- Propose WACC components unchanged from existing Procedure, but values updated to account for risk of investing in BESS.
- WACC's 'Annual Components' reviewed in annual BRCP determinations and 'Fixed Components' fixed in Procedure.

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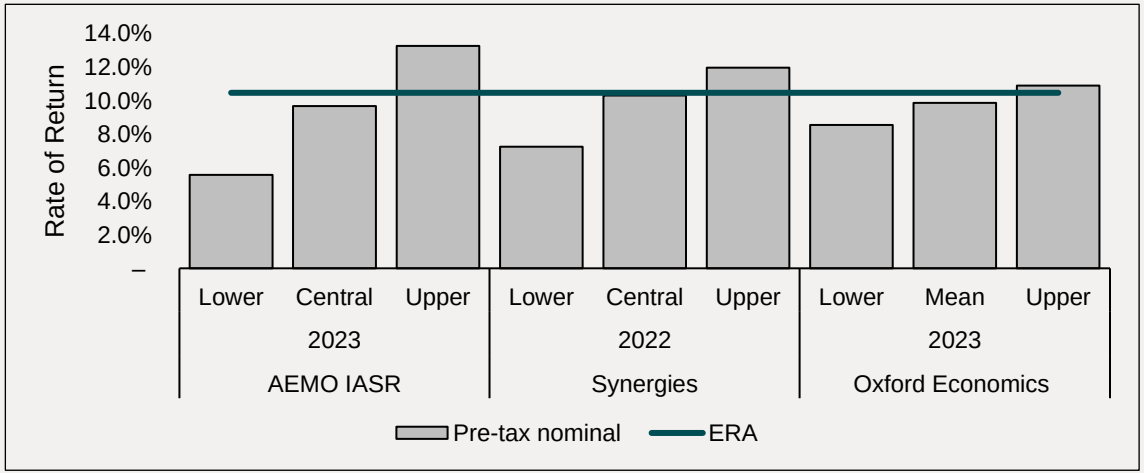
WEM Procedure: Clause 4.2

4. BRCP WACC comparison

Overall illustrative WACC of 10.5% is consistent with other regulatory reference points:

- Investor surveys indicate that BESS projects have higher expected returns than regulated, wind and solar projects and would align on the upper range of estimates.
- Discussions with financiers have confirmed reasonableness of parameters and overall WACC.

Pre-Tax Nominal WACC reference points



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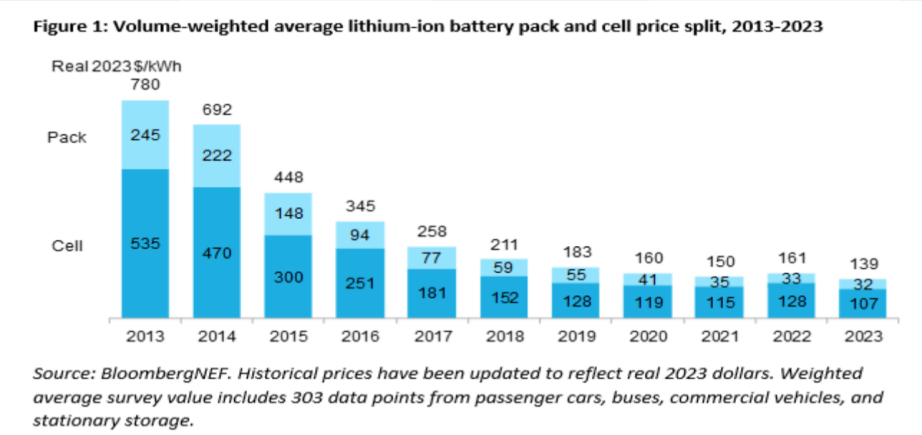
Notes: Lower, Central and Upper represent cases from low to high used by various sources for a rate of return estimate. Regulated infrastructure returns are in the lower cases.

4. BESS capital cost trends

- Unlike the traditional reference technology, the capital cost of batteries have been falling significantly



Compound Annual Growth Rate
2013-2023

Pack	-24.5%
Cell	-8.0%
Total	-15.8%

- ERA's procedure change proposal to include an annuity tilt was due to expected capital cost declines and the effect of BRCP annual resets.

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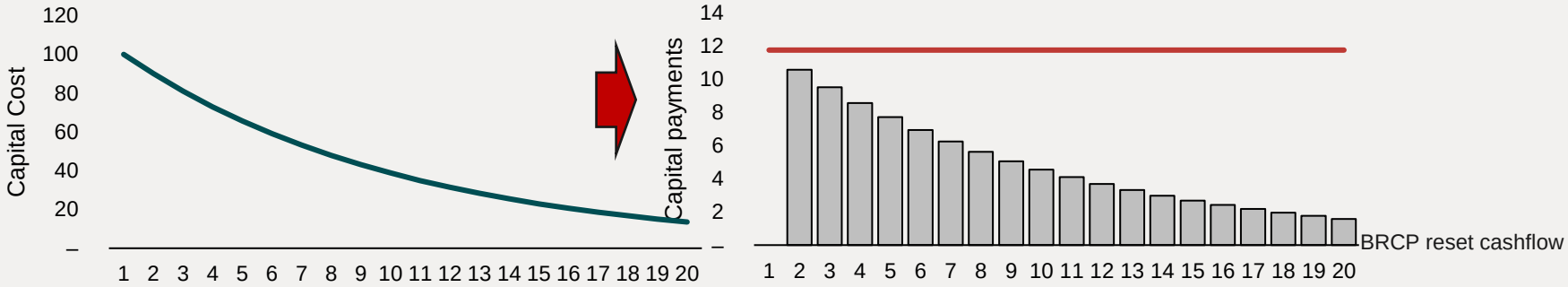
4. Effect of capital cost trends

- The move to a BESS reference technology creates a new problem of cashflow recovery under the current constant annuity approach as annual resets distort intertemporal cashflow profiles.
- As illustrated below, using a constant annuity approach that is updated annually to reflect current (expected lower) costs means that investors do not recover their required return of (depreciation) and return on (rate of return) over the life of the project.



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Source: ERA analysis
Notes: Illustrative example using capital of $100 that declines at 10% per period; rate of return of 10%; asset life of 20 years

4. Annuity tilt

- Investors expect to receive the return of (depreciation) and return on (rate of return) capital invested in a project over its life.
- Propose a tilted annuity approach that provides more cashflow upfront in an NPV-neutral manner.
- Propose a **tilt factor of 1.24** in the Procedure.
  - Based on assumption of ~4.4% annual decline in BESS capex
  - Increases BRCP by 24%
- Targets keeping investors ‘whole’ and improves opportunity to recover capital and earn ROI early.
- Under expected declining capital costs, a tilted annuity could be used until costs stabilise, whereupon a constant annuity method can be adopted again.

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WEM Procedure: Clause 4.1

4. Process flow in determining and implementing tilt

Form estimate of expected capital cost changes → **Estimate the adjusted tilt** → **Convert adjusted tilt into a multiple of the standard annuity**

4.4% expected cost decline

- (A): Take the mean of future cost forecasts (from BNEF, Rocky Mountain etc) = -8.0%.
- (B): Determine the component of the BESS exposed to capital cost reductions (from GHD) = 55%.
- Expected capital cost reduction is (A)x(B) = -4.4%.

-0.7% adj tilt for depreciation

- Normally an estimated capital cost decline of 4.4% would require a tilt <5% without resets.
- However, annual BRCP resets can result in –ve NPV outcomes unless the tilt factor is adjusted.
- This can be determined via financial modelling.
- Therefore, an expected capital cost decline of 4.4% results requires an adjusted tilt of -0.7%.
- This is equal to the straight-line depreciation method in gas and electricity networks.

1.24x multiple of constant annuity

- A -0.7% adjusted tilt is equal to multiplying the constant annuity by 1.24x.
- This approach maintains a connection with past methodology and allows for more straight-forward interpretation.
  - The premium required over and above the standard annuity to incentivise investment and improve the opportunity of investors to recover their capital.
  - As cost stabilises, the multiple will tend towards 1.

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4. Worked example to determine tilt

	Units	Value
Capital cost	#	100
WACC	per cent	10.5%
Annuity period	years	15
Capital cost decline rate	per cent	(4.4%)
Multiple required	x	1.24x

	Total	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Capital Cost			100.0	95.6	91.4	87.4	83.5	79.9	76.3	73.0	69.8	66.7	63.8	61.0	58.3	55.7	53.3
Apply multiple to constant annuity	187.6		16.8	16.1	15.4	14.7	14.0	13.4	12.8	12.3	11.7	11.2	10.7	10.3	9.8	9.4	9.0
NPV	100																
Target NPV	100																
Difference	–																

Solve for multiple

[Excel model underlying annualisation analysis (Appendix 7)]

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5. Procedural & administrative drafting

- **Appendix 1** includes timeline of amendments to WEM Procedure
- **Sections 1 and 2** outline requirements from WEM Rules
- General drafting changes to improve readability

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Q&A

4 Out of session feedback on draft WEM Procedure (March 2024)

5 Next steps

6 General business

thank you

Ask any questions

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