Economic Regulation Authority

Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025

Final determination

31 May 2022

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Executive summary

The Wholesale Electricity Market (WEM) Rules and Gas Service Information (GSI) Rules require the Economic Regulation Authority to determine the allowable revenue and forecast capital expenditure for the Australian Energy Market Operator (AEMO) for the functions it performs, and the services it provides, to the electricity and gas markets in Western Australia. AEMO recovers the allowable revenue through fees charged to market participants, such as generators and retailers.

AEMO's initial proposal and the draft determination

On 17 December 2021, AEMO submitted its proposal for allowable revenue and forecast capital expenditure for the sixth review period, from 1 July 2022 to 30 June 2025 (AR6). AEMO initially proposed total allowable revenue of $156.2 million and forecast capital expenditure of $69.4 million for its WEM functions. For its GSI functions, AEMO proposed total allowable revenue of $5.3 million and forecast capital expenditure of $0.4 million.

The ERA reviewed this proposal and published its draft determination on 31 March 2022. The ERA's draft decision for AEMO's WEM functions was to approve allowable revenue of $135.9 million, 13 per cent lower than AEMO's proposal, and forecast capital expenditure of $52 million, 25 per cent lower than AEMO's proposal.

In the draft determination, the ERA approved most of the costs forecast for AEMO's two main capital programs: WEM reform and the Distributed Energy Resources (DER) Roadmap. The ERA did not approve some project contingency costs where project risks were unsubstantiated and poorly defined and did not approve some labour costs in capital projects that it considered were over-estimated. The ERA also did not approve the costs of most new staff positions, where AEMO had not demonstrated that its current staffing levels and processes were efficient before proposing additional staff. The ERA determined that AEMO had overestimated costs for supplies and services, Information Technology (IT) and telecommunications, and accounted for this in the approved allowable revenue.

The ERA's draft determination approved AEMO's allowable revenue and forecast capital expenditure for AEMO's wholesale gas market functions as proposed.

AEMO's revised proposal

On 26 April 2022, AEMO submitted a revised proposal with allowable revenue of $152.4 million and forecast capital expenditure of $72 million for its WEM functions. AEMO's revised proposal for allowable revenue was 2 per cent lower than its initial proposal and 12 per cent higher than the ERA's draft determination. For forecast capital expenditure, AEMO's revised proposal was 4 per cent higher than its initial proposal and 38 per cent higher than the ERA's draft determination. AEMO's revised proposed expenditure to deliver its gas functions was similar to its initial proposal.

AEMO's proposal includes allowable revenue and forecast capital expenditure for AEMO to deliver substantial WEM reform projects being implemented as part of the State Government's Energy Transformation Strategy. It is reasonable to expect an increase in AEMO's proposed costs given the scale and timing of the reform program. However, there has been a considerable increase in AEMO's cost to deliver WEM reform compared to AEMO's initial estimate. In 2019, AEMO estimated the overall cost of its WEM reform projects at $60.7 million. When AEMO submitted its initial AR6 proposal, this forecast capital cost had increased by 50 per cent to $91.2 million.

In its revised submission, AEMO moved $6.2 million of forecast capital expenditure into the AR6 period from the previous AR5 funding period. AEMO now forecasts that it will spend $50.8 million on WEM reforms in the AR6 period alone. Overall, the forecast capital expenditure for Distributed Energy Resources (DER) projects for AR6 has increased slightly in AEMO's revised submission, by $0.7 million. Reductions in other project costs did not quite offset a $1.6 million increase in the forecast capital costs to deliver Project Symphony – a test program to understand how DER such as rooftop solar can be aggregated and centrally controlled to better manage DER effects in the WEM.[1]

Considerations for the final determination

The successful transformation of the WEM requires the power system to be able to accommodate increasing numbers of small-scale variable energy resources into the electricity system without compromising the security and reliability of the power supply. AEMO is responsible for delivering a significant part of this transformation.

The ERA understands the risk of insufficiently funding AEMO to deliver its obligations and perform its functions, particularly in respect of the WEM and DER reforms. The ERA is fully aware of the challenges of developing new systems and processes to accommodate developing technologies. However, the ERA must also seek to ensure that AEMO performs its functions efficiently. In submissions to the draft determination, some market participants noted that market fees form a significant part of their operating costs and questioned whether the ongoing increases in fees continued to provide value for participants and consumers.

To make its final determination, the ERA thoroughly reviewed AEMO's revised proposal, financial data and additional information provided, including reports from AEMO's consultant. The ERA has engaged further with AEMO staff, reviewed all stakeholder submissions and considered advice from the ERA's technical consultant. The ERA also considered the benchmarking of AEMO's costs with costs of market and system operators in other jurisdictions. Benchmarking revealed that, while the WEM was rated as having a relatively simple system design, its costs were much higher than comparable markets. This indicates an underlying operational inefficiency.

WEM Reform and the Energy Transformation

AEMO is currently halfway through delivering the WEM reform and DER Roadmap programs. AEMO has argued that any substantial reduction in approved allowable revenue or forecast capital expenditure by the ERA could affect AEMO's ability to deliver the reforms as planned. AEMO claims that not delivering reforms on time risks the ongoing security and reliability of the operation of the WEM. The ERA is strongly of the view that the approved allowable revenue in the final determination will be more than sufficient to allow AEMO to deliver on its commitment to complete the WEM reforms on time and on budget by 2023.

The ERA will ensure that AEMO's expenditure will be carefully monitored and reported over the AR6 period. This will be achieved through regular reporting requirements established through the publication, by the ERA, of a regulatory reporting guideline.[2] This reporting will enable the ERA to track AEMO's actual expenditure against approved costs and identify any approved costs being diverted to projects that have not been subject to regulatory scrutiny.

[1] These DER forecast capital costs exclude two projects for which AEMO did not seek funding in its revised proposal.

[2] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.9(b), (online).

Following the final determination, the ERA will also revise its proposal guideline, which will tighten the information requirements for future proposals to improve the quality of the data AEMO provides to the ERA.[3]

The AR6 determination extends to 30 June 2025. Following delivery of the WEM and DER reform programs, the ERA will expect AEMO's next proposal to demonstrate efficiencies resulting from the delivery of new market systems, a reduction in contract staff hired to manage the transition to the new market design, and a downward trend in proposed allowable revenue and forecast capital expenditure toward pre-reform levels.

Final determination

The ERA approves WEM allowable revenue of $142.3 million for the AR6 period. This is $6.4 million or 5 per cent higher than the draft determination and $10.1 million or 6.6 per cent lower than AEMO's revised proposal of $152.4 million. The ERA's final determination differs in three main respects from the draft determination:

- Operating cost projects. In response to stakeholder feedback to the draft determination, the ERA has reconsidered proposed operating costs for AEMO to plan for the introduction of five-minute settlement periods in the WEM and has approved AEMO's proposed allowable revenue for this activity.
- New staff positions. Following the draft determination, AEMO provided additional information in support of its request for 30 additional Full Time Equivalent (FTE) positions and provided a consultant report on its proposed staffing The ERA has approved allowable revenue equivalent to the phased increase of 22 new FTE positions through the AR6 period. The additional information provided by AEMO, and its consultant, presented more robust justification for AEMO requiring additional staff to manage the transition to the new market design.
- Borrowing costs. AEMO's revised proposal included an increase in forecast borrowing costs. This is to be expected given the forecast for interest rates.[4] The ERA has reviewed the increase in AEMO's forecast borrowing costs against forecasts from the Western Australian Treasury Corporation.

The ERA has approved forecast WEM capital costs of $61.5 million for the AR6 period. This is $9.5 million or 18 per cent higher than the draft determination and $10.5 million or 15 per cent lower than AEMO's revised proposal of $72 million.

AEMO's revised proposal included moving $6.2 million in forecast capital expenditure forward into the AR6 period. This reflected delays in AEMO's ability to recruit staff needed to work on its capital program. In the final determination, the ERA approved this increase in forecast capital expenditure in AR6, given the tightening labour market in Western Australia.

In the final determination approved forecast capital expenditure to deliver WEM and DER reforms are relatively unchanged from the draft determination. The ERA has approved forecast capital costs ($2.2 million) for two WEM reform projects that were not approved in the draft determination. In its revised proposal AEMO provided additional and more robust information on how these projects contributed to its WEM reform program.

The ERA has not approved costs where there are identified errors in AEMO's data, overestimated labour capital costs, and contingency amounts for unsubstantiated project risks. For other capital expenditure, to support AEMO's ongoing IT development and

[3] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.9(a), (online)

[4] Reserve Bank of Australia, 2022, *Statement by Philip Lowe, Governor: Monetary Policy Decision*, Number 2022-12, (online).

maintenance program, the ERA has made a determination in accordance with the advice of its technical consultant.

Consequently, the ERA has approved forecast capital expenditure for each of the 22 WEM reform projects and for all but two DER projects. After the forecast costs of two DER projects were excluded from the ERA's draft determination, AEMO did not seek funding for these projects in its revised proposal. The main costs not approved in their entirety for AEMO's capital program are:

- Labour costs. The ERA has not reduced costs based on the number of staff that AEMO requires to deliver the reform program but instead has removed unnecessary cost increases by substituting estimated labour costs with actual staffing costs wherever possible and corrected errors found in AEMO's forecast labour capital calculations (a combined reduction of $4.6 million).
- Project contingency costs. Consistent with the approach taken in the draft determination, the ERA has substituted forecast project contingency costs (a reduction of $4.7 million) to remove allowances for unsubstantiated or poorly defined risks.

The ERA's final determination is to approve AEMO's proposed GSI allowable revenue as proposed. The ERA applied the same changes to labour costs and project contingency costs in approving AEMO's GSI forecast capital expenditure for the AR6 period.

Table 1: ERA's final determination on AEMO's AR6 proposal ($ million)

Expenditure category	AR6 revised proposed	Final determination	Variance
WEM			
Allowable revenue	152.4	142.3	(10.1)
Total forecast capital expenditure	72.0	61.5	(10.5)
– Facilitating Energy Transformation Strategy	57.3	48.9	(8.4)
– Other (business-as-usual) capital	14.7	12.6	(2.1)
GSI			
Allowable revenue	5.8	5.8	-
Total forecast capital expenditure	0.38	0.34	(0.04)
Total AEMO allowable revenue	158.2	148.1	**(10.1)**
Total AEMO forecast capital expenditure	**72.4**	**61.8**	**(10.6)**

Source: AEMO's AR6 proposal and ERA analysis

Governance and financial management

In the draft determination, the ERA expressed its ongoing concerns about AEMO's governance process for preparing proposals for submission to the ERA. Similar concerns were echoed by some stakeholders in their submissions and have also been raised in previous ERA determinations on AEMO's allowable revenue and forecast capital expenditure.

The ERA remains concerned about AEMO's governance around funding proposals. In particular, it is concerned that AEMO has not demonstrated that its staffing levels and operational processes are efficient now and will be efficient post reform. There is still a lack of justification in support of some investment decisions to bringing IT systems, solution development and maintenance in-house and why these decisions represented the most cost-efficient options. In its response to the draft determination, AEMO said it would seek to enhance its internal processes further during the AR6 period.

In AEMO's proposals, the ERA has observed continued inconsistencies and errors which have hindered the ERA's ability to undertake its assessment of AEMO's proposed costs. The ERA has raised this with AEMO's executive team and expects these concerns to be addressed satisfactorily and as a matter of priority.

Market fees

The ERA has compared estimated market fee levels at the end of the AR6 period to levels at the end of the AR5 period. Under AEMO's revised proposal, estimated WEM fees would have increased by 101 per cent. The estimated increase under the ERA's final determination is 85 per cent, which is still a very large increase. The pass-through of these increases will be particularly acute, given current cost of living pressures experienced by consumers.

1. Introduction

The ERA must determine the allowable revenue and forecast capital expenditure for AEMO for the functions and services AEMO provides to the Western Australian electricity and gas markets under the WEM Rules and GSI Rules. AEMO recovers its allowable revenue and forecast capital expenditure through fees charged to market participants.

This is the sixth allowable revenue period for the market operator in Western Australia. AEMO estimates its funding requirements every three years, with the current funding period ending on 30 June 2022, and the next period extending from 1 July 2022 to 30 June 2025. AEMO can make an in-period submission for additional funding for a project or activity fulfilling an obligation under the market rules, throughout the AR6 period.

1.1 AR6 review process and timeline

On 17 December 2021, the Minister for Energy gazetted changes to the WEM Rules and GSI Rules establishing a revised review process and timeline for AEMO's AR6 proposal.[5]

The new rules required the ERA to publish a proposal guideline to assist AEMO to prepare its proposal for the AR6 review period. The ERA published its proposal guideline on 29 October 2021, setting out the information to be provided in a proposal and the process the ERA will follow to make its determination.[6]

The ERA received a proposal from AEMO on 17 December 2021 seeking approval of its proposed allowable revenue and forecast capital expenditure for the AR6 period.[7] AEMO's proposal noted that it had reviewed and updated its proposal to meet the requirements of the proposal guideline where practicable.[8]

The ERA published AEMO's proposal as soon as it was received and an issues paper on 8 February 2022.[9] The ERA also published two supporting documents provided by AEMO, the AEMO Western Australian IT Roadmap 2022-2025 and the FTE Resources Estimate: WA Departments and WA Support Functions, on 25 February 2022.[10]

The ERA received six submissions in response to its issues paper from: Alinta Energy, the Australian Energy Council, Bluewaters Power, Collgar Wind Farm, Perth Energy and Synergy.[11] Feedback from these submissions is presented against relevant topics below and a summary of any remaining points is provided in Appendix 12.

On 31 March 2022, the ERA published a draft determination, which provided an indicative view of the level of funding to be approved for AR6. The ERA sought feedback from interested parties on the draft determination. On 26 April 2022, AEMO provided a revised proposal to the

5 Government of Western Australia, 2021, *Western Australian Government Gazette 212/2021 – 17 December 2021*, pp. 5589-5595, (online).

6 Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submissions under the WEM Rules and GSI Rules*, (online).

7 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, (online).

8 Ibid, p. 21.

9 Economic Regulation Authority, 2022, *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Issues paper*, (online).

10 These documents are published on the ERA's website (online).

11 The submissions are available on the ERA's website (online) and summarised in Appendix 12.

ERA. The ERA has considered AEMO's revised proposal and submissions received in response to both the issues paper and the draft determination to make its final determination.

All forecast capital numbers in the final determination include an allowance for project contingency, unless stated otherwise. All figures are nominal.

1.2 ERA's obligations under the market rules

The WEM Rules and GSI Rules set out the ERA's obligations and matters for consideration by the ERA when making its determination. The ERA's obligations under the WEM Rules, which are similar to the GSI Rules (see Appendix 5), are set out below.

The ERA must ensure that, when determining or undertaking a reassessment of the allowable revenue and forecast capital expenditure for AEMO:

- The allowable revenue is sufficient to cover the forward-looking costs of AEMO performing its functions in accordance with specified principles.[12]
- The allowable revenue and forecast capital expenditure include only those costs that would be incurred by a prudent provider of AEMO's services, acting efficiently, to achieve the lowest practicably sustainable cost of performing AEMO's functions while promoting the WEM or GSI objectives.[13]

The ERA is required, where possible, to benchmark the allowable revenue and forecast capital expenditure against the costs of providing similar functions and/or projects in other jurisdictions where possible. The ERA can consider any other matters it regards as relevant to its determination.

When making its determination, the ERA may do any, or all, of the following:[14]

- Approve the costs of any project or of AEMO performing its functions.
- Where the costs do not meet the relevant legal test, reject the costs fully or partially, or substitute those costs with costs the ERA considers meet the requirements.
- Recommend to AEMO that some of the costs be considered through an in-period application for additional funds or in a subsequent review period.

1.2.1 Application of legal test

To determine AEMO's allowable revenue and forecast capital expenditure, the WEM Rules and the GSI Rules require the ERA to only approve proposed costs that would be incurred by a prudent provider acting efficiently to achieve the lowest practicably sustainable cost of performing AEMO's functions, while effectively promoting the market objectives.[15] As a result, the ERA expects AEMO to demonstrate how its proposed expenditure will achieve the lowest practicably sustainable costs of delivering AEMO's functions.

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12 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(a), (online). Gas Service Information Rules, 17 December 2021, Rule 109(2), (online).

13 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(b), (online). Gas Service Information Rules, 17 December 2021, Rule 109(3), (online).

14 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.6(d), (online). Gas Service Information Rules, 17 December 2021, Rule 109(6), (online).

15 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(b), (online). Gas Services Information Rules, 17 December 2021, Rule 109(2)-(3), (online).

The ERA's proposal guideline outlines a two-pronged approach to assess the prudence and efficiency of AEMO's costs, as required by the WEM Rules and GSI Rules.[16] AEMO is required to ensure its proposal is in accordance with the proposal guideline.[17]

To assist the ERA in its assessment of the prudence of AEMO's proposed costs (prudency test), the proposal guideline requires AEMO to provide evidence that a project is necessary, that there is a clear connection between the proposed costs and AEMO's functions, and that the scope of the project aligns with, but does not exceed, the functions as described in the WEM Rules and/or GSI Rules.

To assist the ERA in its assessment of the efficiency of AEMO's proposed costs (efficiency test), the proposal guideline requires AEMO to ideally provide evidence that demonstrates:

- A consistent model/approach to estimating project costs.
- A competitive procurement process.
- A thorough governance process to challenge project cost estimates.
- How it has compared estimated project costs against the actual costs of similar projects.
- How resources will be optimised across the capital program.
- That proposed costs are consistent with current market costs for comparable labour resources, services and products.
- An options analysis was undertaken to evaluate whether the chosen solution is the lowest practicably sustainable cost approach.[18]

When reviewing AEMO's proposal, the ERA has applied the two-pronged test outlined in the procedure guideline, as required by the WEM Rules and GSI Rules. As part of the test, the ERA also considers how the proposed costs will effectively promote the market objectives and any other matters that the ERA considers relevant to its determination. Relevant excerpts of the WEM Rules and GSI Rules relating to the ERA's and AEMO's obligations are provided in Appendix 3, Appendix 4 and Appendix 5.

The ERA's final determination is based on the evidence that AEMO has provided to substantiate its proposal. The ERA has not approved costs where AEMO has not provided sufficient evidence to demonstrate the costs meet the legal test.

16 Economic Regulation Authority, 2021, *Guideline to inform funding submissions under the WEM Rules and GSI Rules*, Section 3.8.1, p. 8, (online).

17 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.2, (online).

18 Economic Regulation Authority, 2021, *Guideline to inform funding submissions under the WEM Rules and GSI Rules*, Section 3.8.1, p. 8, (online).

2. Overview of outcomes in AR5

AEMO performs system and market operations in the South West Interconnected System (SWIS). The WEM Rules place obligations on AEMO to administer the reserve capacity mechanism and operate and settle the short-term electricity market (STEM), the load following ancillary service market and the real-time balancing market (see clauses 2.1A.1A and 2.1A.2 in Appendix 3).

AEMO's system management team undertakes long-term system planning and manages the electricity system in the SWIS to ensure it operates in a secure and reliable manner. System management is responsible for procuring adequate ancillary services where Synergy is unable to meet the ancillary service requirements or where system restart and spinning reserve are available at a lower cost.

AEMO has information release and market administration functions, including proposing and changing market procedures. It is required to publish the Western Australian Electricity Statement of Opportunities and maintain and update a congestion information resource and a DER register. AEMO also plays a part in preparing for and facilitating the implementation of the WEM reform program, including constrained network access reforms.

AEMO provides advice to the Technical Rules Committee and Western Power, and support to the Minister for Energy, Coordinator of Energy, and the ERA.

AEMO's proposed allowable revenue must be sufficient to cover the forward costs of performing AEMO's functions in accordance with certain principles.[19] AEMO's proposal must only include costs that would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to achieve the lowest practicably sustainable cost, while effectively promoting the Wholesale Market Objectives (or GSI Objectives).[20]

The ERA has reviewed AEMO's revised forecast expenditure during the AR5 period (1 July 2019 to 30 June 2022). Based on AEMO's expectation of costs included in its proposal, AEMO will underspend on both allowable revenue and forecast capital costs for the AR5 period (Table 2). While the allowable revenue is forecast to be less than the AR5 determination, representing a cost saving to the market, the forecast reduction in capital costs does not. This reduction in costs is due to delays in AEMO's capital program, and AEMO has sought to move costs of $6.2 million from AR5 into the AR6 period.

[19] These principles are that (i) recurring expenditure requirements and payments are recovered in the year of the expenditure and (ii) capital expenditure is to be recovered through the depreciation and amortisation of the assets acquired by the capital expenditures in a manner that is consistent with generally accepted accounting principles. Refer to Wholesale Electricity Market Rules (WA), 1 March 2022, Rule 2.22A.5(a), (online). Gas Services Information Rules, 17 December 2021, Rule 109(2), (online).

[20] Refer to Appendices 3 and 4.

Table 2: ERA approved costs and AEMO's forecast costs to the end of AR5 ($ million)

	AR5 determination*			Revised AR5 forecast actual (April 2022)			Variance between total (%)
Expenditure category	**WEM**	**GSI**	**Total**	**WEM**	**GSI**	**Total**	
Allowable revenue	99.8	6.1	**105.9**	96.7	4.6	**101.3**	(4.3)
Forecast capital expenditure	80.4	0.5	**80.9**	77.1	0.4	**77.5**	(4.2)

**AR5 determination includes in-period submission.*
Source: ERA analysis

The revised allowable revenue forecast for the AR5 period is 4.3 per cent lower than the amount approved in the ERA's AR5 determination. However, this revised forecast (in April 2022) has increased by $2.2 million compared to AEMO's initial proposal in December 2021. The expense categories of IT and telecommunications, and supplies and services are now forecast to be $1 million less than the initial proposal, while labour costs have increased by nearly $3 million over the period December 2021 to April 2022.

For the AR5 period, the ERA approved forecast capital expenditure for 18 separate capital projects totalling $66.3 million, which included contingency costs of $11.4 million.[21] A further $14.6 million, with no contingency, was approved as an in-period submission for the DER Roadmap, making the total approved forecast capital expenditure for AR5 $80.9 million.[22]

The revised AEMO proposal has provided the ERA with significantly more information around projects and linked multiple project numbers to a single project approved in AR5. The new forecast for capital expenditure against the projects included in the $80.9 million of approved expenditure is $72.5 million (Appendix 6, Table 46). The balance of the forecast capital expenditure of around $5 million has been spent, or is forecast to be spent, against projects that were not specifically included in the AR5 proposal. Full details of these project costs can be found in Appendix 6, Table 47. A review of the actual expenditure on projects included in the AR5 determination showed that, of the 18 included projects, nine exceeded budgets (including contingency) to a total of $10 million and five smaller projects with a combined budget of $1.3 million were not started during AR5. Projects that were under budget for the period were largely ongoing projects, with DER Roadmap and WEM reform proposed costs were underspent by a combined total of $16.5 million. In its AR6 proposal AEMO has transferred $6.1 million of WEM reform costs from AR5 to AR6.

A detailed analysis on a project-by-project basis revealed that AEMO has substantially underspent on projects outlined in its AR5 proposal by around $8.4 million. However, in total for AR5 AEMO has only underspent by $3.3 million. The difference of $5 million was spent on projects that cannot be tracked back to projects specifically budgeted for or costs tested for prudency by the ERA.

[21] Economic Regulation Authority, 2019, *Australian Energy Market Operator Allowable Revenue and Forecast Capital Expenditure 2019/20 to 2021/2022 – Final determination*, (online).

[22] Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period funding submission for implementation of the Distributed Energy Resources Roadmap actions – Final determination*, (online).

Projects that exceed budget total $10.1 million and projects that were not budgeted for in AR5 total $5 million. To fund these projects and the projects that were not included as part of the AR5 proposal, AEMO has used $9.2 million from projects that were completed under budget or not commenced, and a further $5.9 million from contingency funding approved, but not required to complete projects. This activity is allowed under the WEM Rules and GSI Rules.

The flexibility AEMO has with approved funding can lead to a situation where AEMO expends funding on projects not considered by the ERA, or not approved by the ERA because they did not meet the requirements of the WEM Rules.

3. AEMO's AR6 proposal

AEMO submitted its initial proposal in December 2021. Following the release of the ERA's draft determination, AEMO provided a revised proposal in April 2022. A short comparison of the differences between AEMO's two proposals is provided below.

3.1 AEMO's initial proposal

Table 3 presents a summary of AEMO's AR6 proposal for WEM and GSI allowable revenue and forecast capital expenditure, and how it compares with the funding approved for AEMO in the AR5 period.

Table 3: AEMO's approved funding for AR5 and proposed funding for AR6 ($ million)

	AR5 1 July 2019 to 30 June 2022**			AR6 1 July 2023 to 30 June 2025*			Variance between total (%)
Expenditure category	**WEM**	**GSI**	**Total**	**WEM**	**GSI**	**Total**	
Allowable revenue	99.8	6.1	**105.9**	156.2	5.3	**161.5**	52.5
Forecast capital expenditure	80.4	0.5	**80.9**	69.4	0.4	**69.8**	(13.7)

*Source: *AEMO's AR6 proposal (online).*
***ERA's AR5 determination (online) including the 2020 in-period adjustment (online).*

It is not unreasonable to expect higher capital costs in the current environment of large transformational change.

However, AEMO's AR6 proposal for allowable revenue is a very large increase over the allowable revenue approved and expended in the previous review period.

AEMO's forecast capital costs for individual programs of work, such as WEM reform projects, have increased substantially from the levels AEMO forecast during the AR5 period.

Additionally, AEMO has flagged its intention to make an in-period funding submission for additional forecast capital expenditure, possibly ranging from $32 million to $64 million (see Section 6.1.5).[23]

The cost of AEMO meeting its gas market information service obligations has historically been much lower than AEMO's costs to meet its obligations in the WEM. In AR6, AEMO's forecast GSI costs remain small and there is little change from the GSI costs approved for the AR5 period.

[23] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure for 2022-23 to 2024-25*, p. 73, (online).

Based on its initial proposal, AEMO predicted an increase in average WEM market fees from $1.066 per MWh in the AR5 period to $1.826 per MWh in the AR6 period (64 per cent).[24] This is equivalent to an increase of between 2 per cent to 3.4 per cent of the average wholesale energy prices (based on balancing prices) over the last 12 months. Moreover, if the costs of additional flagged capital projects are incurred during the AR6 period, the average WEM fee will increase to between $2.403/MWh and $2.536/MWh by the end of the AR7 period.[25]

Excluding an in-period funding submission, AEMO estimated that if the 64 per cent increase in average WEM fees is passed through to residential customers, the market fee component of the average annual residential electricity bill will increase from $10.11 in the AR5 period to approximately $16.56 in the AR6 period, equating to an increase of $6.45 per year.[26]

3.2 AEMO's revised proposal

AEMO's response to the draft determination stated that it had taken feedback from the ERA and stakeholders on board and reviewed its "work program, expenditure forecasts and justifications."[27] Overall, compared to its initial proposal, AEMO's revised allowable revenue revised forecast capital expenditure increased as shown in Table 4.

Table 4: Comparison of forecast costs between AEMO's initial and revised proposals ($ million)

Expenditure	Initial proposal (Dec 2021)			Revised proposal (Apr 2022)			Variance between totals (%)
	WEM	GSI	Total	WEM	GSI	Total	
Allowable revenue	156.2	5.3	161.5	152.4[28]	5.4	157.8	(2.3)
Capital expenditure	69.4	0.4	69.8	72.0	0.4	72.4	3.7

Source: ERA analysis of AEMO data.

For allowable revenue, AEMO's revised proposal included an increase in its resourcing levels above the 9.3 FTEs for which the ERA included costs in the draft determination. AEMO provided additional information supporting the need for additional staff, including an assessment of the rationale for and level of proposed new positions by a consultant, Robinson Bowmaker Paul (RBP).[29]

AEMO accepted some proposed reductions to its WEM forecast capital expenditure from the draft determination.

[24] The calculation includes all fee components except the Coordinator's fee from the total for the average AR6 spend which was not incurred during the AR5 period. This reduces the cost to $1.745/MWh or a 64% increase from the AR5 average fee. Ibid, p 69

[25] Ibid, p. 74.

[26] AEMO calculated the AR5 average tariff as $1.066/MWh/1000 x (13 kWh per day) x 2, as the fee is charged to both generation and load. AEMO considered that its calculation was indicative only, as AEMO has no control or visibility of how market participants absorb or pass-through costs to end use customers.

[27] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 3, (online)

[28] AEMO's revised proposal contains two values $152.6m (page 5) and $152.4m (pages 9, 46, and 73). The ERA has used the $152.4m.

[29] Robinson Bowmaker Paul, 2022, *Review of AEMO Operational Staffing Estimates report,* (online).

> AEMO agrees with feedback on aspects of the DER Roadmap program and the IT sustaining capex program and has reduced the forecasts accordingly.[30]

AEMO also advised that it had moved $6 million of WEM reform forecast capital expenditure from the AR5 period into the AR6 period but that overall, the total forecast cost of WEM reform was unchanged at $91.2 million.[31] This is discussed further in section 6.1.2.2. AEMO provided additional information on the two WEM projects' costs that the ERA rejected in its draft determination. The new information more clearly explains how the projects contribute to delivery of the WEM reforms and will help train AEMO's controllers to manage the power system with higher levels of variable generation and lower levels of demand.

For contingency, AEMO stated that its approach is "a reasonable and repeatable method for estimating a prudent level of available funding."[32] AEMO resubmitted a new set of contingency calculators to the ERA. There were marked changes to the previous calculators. These changes are discussed in section 6.1.6.

Stakeholder views on market fees

Two stakeholders expressed concern about the forecast level of market fees in their response to the draft determination. The stakeholders suggested there was uncertainty around the value being delivered, given the costs to be incurred.

Bluewaters Power stated:

> Bluewaters acknowledges that the ERA's Draft Determination has led to an estimated reduction of 13% in market fee increase projections but Bluewaters still considers this upward trajectory of market fees a serious and unsustainable concern. Bluewaters reiterates its position that there does not appear to be any forecast or plan for these fees to plateau and then reduce. Instead there seems to be an understanding that future increases are still likely. Bluewaters requests that the ERA provide considered comment on whether the continued growth of market fees provides value-for-money to WEM participants and electricity customers.[33]

Alinta submitted:

> While Alinta Energy considers that the ERA has worked diligently to identify and remove aspects of the proposal that would impose net costs on customers, it remains concerned that despite these changes, customers will be exposed to a 70% increase in market fees for uncertain benefits.[34]

All stakeholders who provided submissions on AEMO's initial proposal and the ERA's issues paper expressed concern about the rise in AEMO's expenditure and the cost of market fees. These are summarised in Appendix 12.

For example, Alinta Energy objected to the proposal and expressed concern that AEMO had not substantiated why the significantly higher expenditure was necessary to perform its functions or how the proposed costs represented the lowest practicably sustainable cost of

30 Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 3, (online)

31 Ibid, p. 48. (online)

32 Ibid, p. 7. (online)

33 Bluewaters Power, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Draft Determination*, (online).

34 Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Draft Determination*, (online).

implementation.[35] Alinta considered that AEMO's proposal risked negating the benefits of WEM reform, locking in long-term cost increases for customers without providing commensurate benefits, setting a precedent that would allow AEMO to increase customer costs significantly without an appropriate rationale in future periods, and imposing unreasonable costs on generators that could not be recovered in offers.

Bluewaters encouraged the ERA to consider the impact of the proposed expenditure on future WEM fees, including in the next allowable revenue period, and to continue questioning the prudency, efficiency, and deliverability of the key programs of work.[36]

Collgar Wind Farm was concerned with the substantial increase in AEMO's proposed expenditure and the subsequent increase in market fees.[37] Collgar noted that market fees currently represented about 8 per cent of its total costs and would increase to over 12 per cent if AEMO's proposed allowable revenue and capital expenditure was approved, and 16 per cent if the $60 million in additional in-period capital costs were approved. Collgar considered that additional market fees would further constrain the resources available for market participants' own activities, including reform implementation, which could risk market participants being ill-prepared for the start of the new market design and other regulatory deadlines. Collgar also warned that the proposed expenditure for the AR6 period should not become the new baseline against which future allowable revenue and forecast capital expenditure proposals were compared and that any new reforms should be considered on their own merit to assist in mitigating expenditure creep.

The Australian Energy Council (AEC) considered that end customers had borne the cost of higher market fees over recent allowable revenue periods and would have to bear another incremental cost in the combined increase in allowable revenue and capital expenditure in AR6.[38] The AEC considered that any forecast costs should be reasonable and justifiable, keeping market fees to a minimum, and that AEMO should provide evidence the requested allowable revenue and capital expenditure was in the long-term interests of consumers in relation to the price, quality and reliability of goods and services provided.

Synergy acknowledged that a greater understanding of the scope of the WEM reform program had required AEMO to revise its cost estimates but considered the approximately $30 million increase to be a substantial leap that would significantly increase market fees over the next three allowable revenue periods.[39] Synergy suggested that being the largest participant in the market, it would pay most of these market fee increases, which would be passed onto electricity customers.[40] Synergy considered that the overall cost and fee impact of implementing the new market made it paramount to ensure that the market participants who will benefit from the new regime paid for it equitably. Synergy recommended the ERA considers the impact of each element of AEMO's proposal on the overall transition path for

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35 Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, p. 1. (online).

36 Bluewaters Power, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, p. 1. (online)

37 Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

38 Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

39 Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

40 Synergy does incur a large portion of the market fees, as it is the largest generator in the market, but the government has discretion over how much of the fees are passed through to the consumer.

WEM fees and future allowable revenue periods to ensure there was no inter-generational wealth transfer.

4. ERA final determination

After conducting a thorough review of AEMO's revised proposal and applying the legal test explained in section 1.2.1, the ERA partially rejects AEMO's revised proposed WEM allowable revenue for AR6 of $152.4 million and substitutes an allowable revenue of $142.3 million. This represents a reduction of $10.1 million or 6.66 per cent. The ERA's final determination on WEM allowable revenue is $6.4 million, or 5 per cent, higher than the draft determination.

Similarly, the ERA partially rejects AEMO's revised forecast WEM capital expenditure of $72.0 million and has approved forecast capital expenditure of $61.5 million, which represents a reduction of $10.5 million or 15 per cent. The ERA's final determination on WEM forecast capital expenditure is $9.5 million, or 18 per cent, higher than the draft determination.

The ERA's final determination partially rejects and substitutes AEMO's proposed WEM allowable revenue (Table 5) and forecast capital expenditure (Table 6) for AR6. The ERA's final determination corrects for errors in AEMO's calculations, removes expenditure that does not meet the funding approval criteria, and applies more consistent approaches to calculating labour costs and project contingencies.

Table 5: Variance in proposed and approved WEM allowable revenue, by reason, through the determination process

	$ million	Variance %
AEMO initial proposed WEM allowable revenue (Dec 2021)	156.2	
Eliminating overlap of capital and operating expenditure labour included in AEMO's proposal	(1.8)	(2.5)
Eliminating cost of new staff not approved	(7.4)	(10.1)
Adjusting operating cost categories	(5.1)	(14.7)
Eliminating labour costs in operating expenditure projects not approved	(3.1)	(94.0)
Reduction from recalculated depreciation and amortisation and borrowing costs resulting from changes to capital costs.	(2.9)	(5.7)
Draft determination WEM allowable revenue	**135.9**	**(13.0)**
AEMO revised proposed WEM allowable revenue (Apr 2022)	152.4	
Increase for inconsistency between different labour sources	3.6	5.1
Adjustment for operation cost categories (excluding labour)	(4.5)	(5.5)
Eliminating cost of new staff not approved	(5.5)	(43)
Backfilling adjustment	(3.7)	(5.3)
Final determination WEM allowable revenue	**142.3**	**(6.6)**

Source: ERA analysis

Table 6: Variance in proposed and approved WEM forecast capital expenditure, by reason, through the determination process

	$ million	Variance %
AEMO initial proposed WEM forecast capital expenditure (Dec 2021)	69.4	
Variance between AEMO financial tracking spreadsheets and proposal	0.3	0.4
Substitution of salary costs for AEMO's tier rates	(2.1)	(3.9)
Adjustment to project costs by IES – table 4 IES report	(2.2)	(14.3)
Borrowing cost adjustment	(0.1)	(0.6)
Reduction for projects not approved	(5.3)	(7.9)
Reduction for revised project contingency funding	(6.5)	(48.3)
Reduction for ARENA grant – Project Symphony	(1.5)	(100)
Draft determination WEM forecast capital expenditure	**52.0**	**(25.1)**
AEMO revised forecast WEM capital expenditure (Apr 2022)	72.0	
Substitution of salary costs for AEMO's tier rates	(3.2)	**(4.4)**
Reduction of capital labour costs to correct for double counted public holidays	(1.4)	**(1.9)**
Adjustment to capitalised cloud costs	(1.0)	**(1.4)**
Adjustment to capitalised borrowing costs	(0.1)	**(0.1)**
Adjustment to project contingency costs	(4.8)	(43.2)
Final determination WEM forecast capital expenditure	**61.5**	**(14.6)**

Source: ERA analysis

Below, the ERA has indicatively allocated the allowable revenue approved in the final determination over operating cost categories Table 7 and capital project workstreams Table 8.

Table 7: Variance in proposed and approved WEM allowable revenue ($ million) by cost category through the determination process

Cost category	AEMO initial proposal	Draft determination	AEMO revised proposal	Final determination	Variance (revised to final)
Labour costs	73.2	60.9	70.2[41]	64.6	(5.6)
Depreciation and amortisation	50.9	48.0	48.8	45.5	(3.3)

[41] AEMO's written revised proposal contains a value for the labour costs of $70.2. This is different from the value in its workforce plan of $73.1 including top-down adjustments and operational projects.

Cost category	AEMO initial proposal	Draft determination	AEMO revised proposal	Final determination	Variance (revised to final)
Supplies and services	13.0	10.7	10.8	10.7	(0.1)
IT and telecommunications	11.0	9.0	9.4	9.0	(0.4)
Accommodation	5.2	5.2	5.2	5.2	-
Borrowing	5.2	4.4	8.3	7.6	(0.7)
Adjustment*	(2.3)	(2.3)	(0.3)	(0.3)	-
Total WEM allowable revenue	**156.2**	**135.9**	**152.4**	**142.3**	**(10.1)**

Source: ERA analysis

Table 8: Variance in proposed and approved WEM forecast capital expenditure ($ million) by capital project workstream through the determination process

Capital project workstream	AEMO initial proposal	Draft determination	Variance	AEMO revised proposal	Final determination	Variance (revised to final)
WEM reform	44.6	37.2	(7.4)	50.8	44.0	(6.8)
DER roadmap	9.4	4.2	(5.2)	6.5	4.9	(1.6)
Sustaining capex	15.4	10.6	(4.8)	14.7	12.6	(2.2)
Total forecast WEM capital expenditure	**69.4**	**52.0**	**(17.4)**	**72.0**	**61.5**	**(10.5)**

Source: ERA analysis

The ERA's final determination on proposed GSI funding is provided separately in section 7.

To make this final determination, the ERA has thoroughly reviewed the initial and revised proposals and supporting information provided by AEMO and stakeholder submissions. The ERA has not approved some of the proposed costs because they do not meet the approval criteria required by the WEM Rules and GSI Rules.

The main changes between the draft determination and final determination are that in the final determination, the ERA has:

- Included additional WEM allowable revenue of $6.4 million to recognise the:
  - Staged introduction of 22 new positions to enable AEMO to manage the transition to the new market design. The draft determination only approved costs consistent with nine new positions.
  - Higher cost of borrowing over the AR6 period, given the anticipated increase in interest rates.

  - Estimated operating project costs for AEMO to undertake early planning for the introduction of more frequent settling (5-minute) of the wholesale market.
- Included additional WEM forecast capital expenditure of $9.5 million to recognise:
  - Capital costs for two WEM reform projects for which costs were not approved in the draft determination.
  - WEM reform expenditure AEMO moved from the AR5 period into the AR6 period in its revised proposal.

These changes are explained in more detail in sections 5 and 6.

WEM allowable revenue

The largest cost component the ERA partially rejects in AEMO's proposed allowable revenue funding is labour costs. The ERA does not approve costs identified for 8 of the new 30 staff positions in its revised proposal. This is because AEMO did not present a strong case to demonstrate that its current staffing levels were insufficient, nor that it had taken all steps to improve the efficiency of its processes and systems, before proposing staff increases. Refer to section 5.1.1.4 for more details.

Other proposed costs not approved and substituted by the ERA result in adjustments to existing costs. The reductions to individual allowable revenue cost categories, such as supplies and services, IT and telecommunications are the result of the ERA's review of all costs. A full explanation is provided in sections 5.1.3 to 5.1.5.

The reductions to the depreciation and amortisation expense and borrowing expense follows from changes made to forecast capital expenditure. See sections 5.1.2 and 5.1.6, respectively.

AEMO initially proposed three operating cost projects for AR6 totalling $3.9 million.[42] The costs estimated for these projects predominantly relate to early scoping of future obligations that AEMO expects to incur, such as a move to settling market transactions every five-minutes instead of every half hour. The ERA did not approve the costs for these projects in the draft determination as AEMO had not sufficiently justified the prudence or efficiency of the proposed costs for these three projects, as required by the WEM Rules.[43]

AEMO's revised proposal included costs for only one operating cost project, 5-minute settlement. Between AEMO's initial and revised proposals, the allowable revenue for this operating cost project increased from $0.9 million to $1.0 million. Further detail is provided in section 5.1.7.

WEM forecast capital expenditure

The ERA rejects costs proposed for one capital project in AEMO's sustaining capital workstream. This equates to a reduction of $0.2 million from AEMO's revised proposed $72.0 million forecast capital expenditure. The ERA considers that the project is not related to the delivery of AEMO's obligations in the Energy Transformation program. Further, the timing of the project is uncertain and dependent upon a trial that will be conducted by Western Power. AEMO can request additional forecast capital expenditure, if required once the timing of the project is known. Further details are provided in section 6.1.4.

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42 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority*, *Allowable Revenue and Forecast Capital Expenditure for 2022-23 to 2024-25,* pp. 65-68, (online).

43 The ERA did approve $0.2 million in forecast operating project costs for an action to support AEMO's obligations in the DER roadmap, refer to section 6.1.3.

The ERA has approved forecast capital expenditure costs for all the WEM reform and DER Roadmap projects represented in AEMO's revised proposal. This includes approving forecast costs for two WEM reform projects not approved in the draft determination. Further detail is provided in sections 6.1.2 and 6.1.3.

The ERA considers AEMO's method to estimate labour rates is inconsistent with the requirements of the WEM Rules and proposal guideline. The ERA has substituted AEMO's proposed labour costs with AEMO's actual staff costs to estimate the cost of staff seconded and hired to work on capital projects. As a result, labour costs approved by the ERA are $3.2 million lower that AEMO's proposed capital expenditure labour costs. The ERA has commented on the shortcomings of AEMO's estimated labour rates in previous determinations.[44] Despite the ERA's proposal guideline including the requirement to use actual staff costs in its AR6 proposal, AEMO continues to use estimated or tiered labour rates to determine its capital labour costs for seconded staff.[45] Details on the resulting reduction to capital staff costs are provided in section 6.1.1.

The ERA thoroughly reviewed AEMO's new method and calculation of project contingencies. The ERA maintains its view from the AR5 final determination that project contingency calculations should be risk-based.

AEMO's new contingency calculation method used to calculate contingency costs for the AR6 period is an improvement on previous methods. However, the ERA is concerned that unknown risks, risks that are described as having no impact, rare risks and risks that are considered unlikely to happen, are all assigned a contingency value in the AR6 proposal. Additionally, there is some overlap in identified risks, and some of the risks and associated cost assumptions lack validity, leading to concerns as to the prudence and efficiency of AEMO's proposed contingency costs. The ERA only partially approved AEMO's proposed contingency costs. This results in a reduction of $4.7 million from the contingency costs of $11.0 million proposed for projects comprising capital expenditure in AR6. Further details are provided in section 6.1.6.

Other observations through the determination process

In its initial proposal, AEMO attributed increasing complexity in the market as driving many of the forecast costs in the AR6 period. Despite the increasing costs, AEMO's proposal presented benchmarking information to suggest that although its costs were increasing, they were comparable to the cost of market and system operators in other jurisdictions.[46]

The WEM Rules and GSI Rules require the ERA to benchmark AEMO's costs where possible.[47] The ERA commissioned the Lantau Group to undertake this work and a summary of Lantau's findings are included in section 4.1.

As part of its determination, the ERA also reviewed AEMO's governance process in the development of the AR6 proposal. Over the last two determinations, the ERA has expressed concerns about the depth of AEMO's challenge sessions when reviewing estimated project

[44] Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period funding submission for implementation of the Distributed Energy Resources Roadmap actions – Determination report*, p. 14, (online).

[45] Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submissions under WEM and GSI Rules*, (online).

[46] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority*, *Allowable Revenue and Forecast Capital Expenditure for 2022-23 to 2024-25*, pp. 35-39, (online).

[47] Refer to the ERA's obligations in Appendix 5.

costs.[48] The ERA's observations on AEMO's data quality and governance process are provided in section 4.2.

4.1 Benchmarking

The ERA engaged the Lantau Group to undertake a benchmarking exercise and provide advice to the ERA on how AEMO's historic and proposed costs compared to those of market operators and system managers in other jurisdictions.

The jurisdictions selected and studied by the Lantau Group for the benchmarking exercise were selected based on similarities to Western Australia and the availability of public data. Costs for market and system operators were considered from jurisdictions including the National Electricity Market (NEM), Singapore, New Zealand, United Kingdom, Korea, and the United States. The United States included two combined market/system operators: Pennsylvania, New Jersey, and Maryland (PJM) and New England (ISO-NE). The similarities between the selected jurisdictions and the WEM included:

- Market size – the WEM is a comparatively small market in terms of volume, similar in size to New Zealand and Singapore.
- Market complexity – indicators of complexity differ for market operations and system management:
  - Market operations – level of commercial participation and trading, generation mix, and number of regulatory or planning jurisdictions.
  - System management – network constraints, rooftop solar penetration, share of renewable generation, number of generators, length of transmission network and frequency of extreme weather events.

As explained by the Lantau Group, all jurisdictions in the sample, except for New Zealand, have not-for-profit market operators that recover their costs through market fees, and all jurisdictions are regulated. In New Zealand, the regulator contracts out the various services required to run an electricity market. This is a competitive procurement process with contracts awarded for approximately five to eight-year terms that can be extended. The New Zealand Exchange has been the market operator since 2009, following the acquisition of M-co, which was the market operator since the market commenced in 1996.

Western Australia is not directly comparable to any other market, given its design, functions, size, and the ongoing reform process. However, the comparison to other jurisdictions is useful to demonstrate the costs of performing similar duties and to help understand the drivers of costs in these jurisdictions. The following information is based on the Lantau Group's analysis.

Benchmarking observations

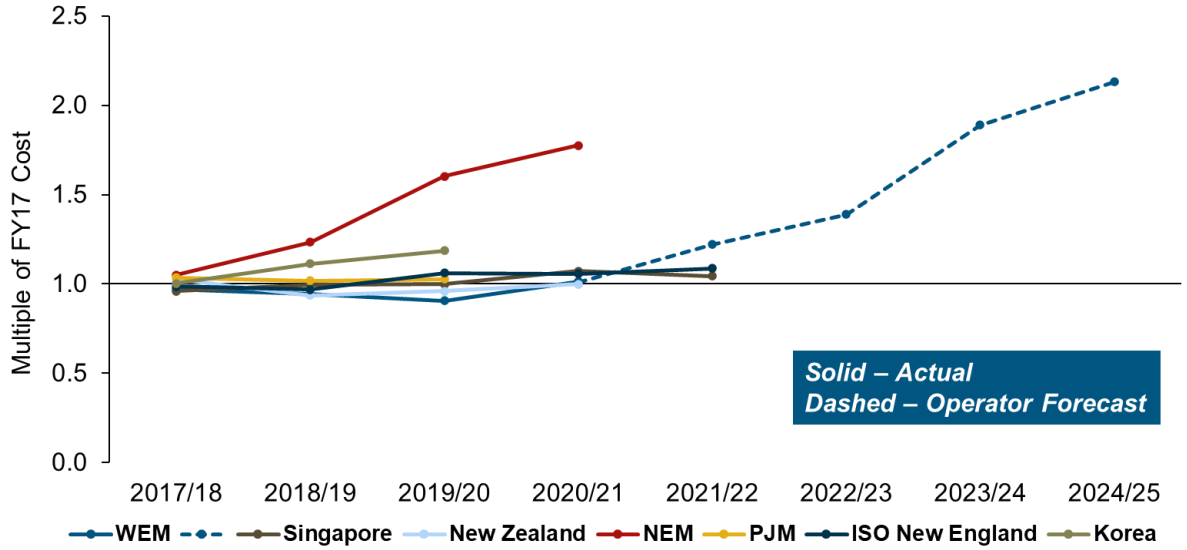
After declining between 2016/17 and 2019/20, AEMO's total operating costs for the WEM and GSI, based on the AR6 proposal, are expected to nearly double over the next four years. In 2019/20, the annual total operating cost spend was $28.6 million. This is expected to increase to $63.8 million in 2024/25.

Figure 1 presents a comparison of combined market and system operation costs over time for each jurisdiction, calculated by totalling the yearly annual market and system operation costs and dividing them by the yearly consumption for that jurisdiction. These costs are then

[48] Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period funding submission for implementation of the Distributed Energy Resources Roadmap actions – Final Determination*, p. 26, (online).

normalised to the earliest year in the data, 2016/17, which is set at a value of 1, to show the change in costs compared to 2016/17 over time.

Figure 1: Total cost of combined operations (market operations and system management) per MWh



Source: The Lantau Group's analysis for the ERA.

The Lantau Group noted that comparing market operation costs separately demonstrates that market operation costs per MWh have been increasing in all jurisdictions considered. In the WEM, AEMO's AR6 proposal demonstrates that the increase is driven by labour numbers and the market operation proportion of depreciation and amortisation expense. Market operation costs in the NEM have increased in response to the development and implementation of reforms such as five-minute settlement.

At several points in its proposal, AEMO noted that increasing complexity in the WEM was increasing costs:

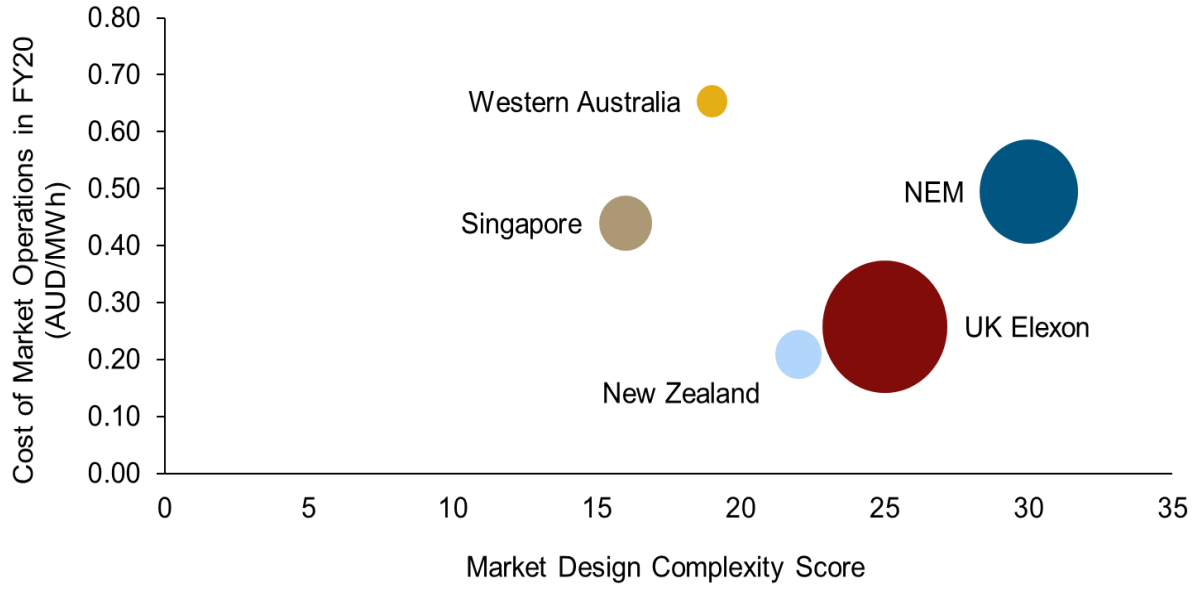
> The resourcing uplift is driven by the new market operating arrangements and increases to the volume and complexity of market settlements and prudential management.[49]

Accordingly, the Lantau Group considered the degree of complexity in market operations by rating each jurisdiction against a series of indicators of market complexity.[50] These included the number of products traded, variation in generation mix, length of trading interval, frequency of gate closure, number of shareholders and participants. The Lantau Group combined this information into Figure 2 below, which illustrates each jurisdiction's market design complexity score as a function of market operating costs in AUD/MWh, and network consumption (in MWh) in 2019/20.

[49] Australian Energy Market Operator, 2021, *FTE resource estimate, WA departments and WA support functions*, p. 8, (online).

[50] The ratings were between 1 – simple and 5 – very complex. Had a jurisdiction been rated very complex in all market complexity indicators, the highest market complexity score was 35.

Figure 2: Market design complexity, cost, and annual network consumption (MWh)[51]



Source: The Lantau Group's analysis for the ERA.

Figure 2 shows that the WEM has the highest market operation cost AUD/MWh, even though the Lantau Group rated the WEM as having the lowest annual network consumption, and as being a relatively less complex market compared to the other jurisdictions.

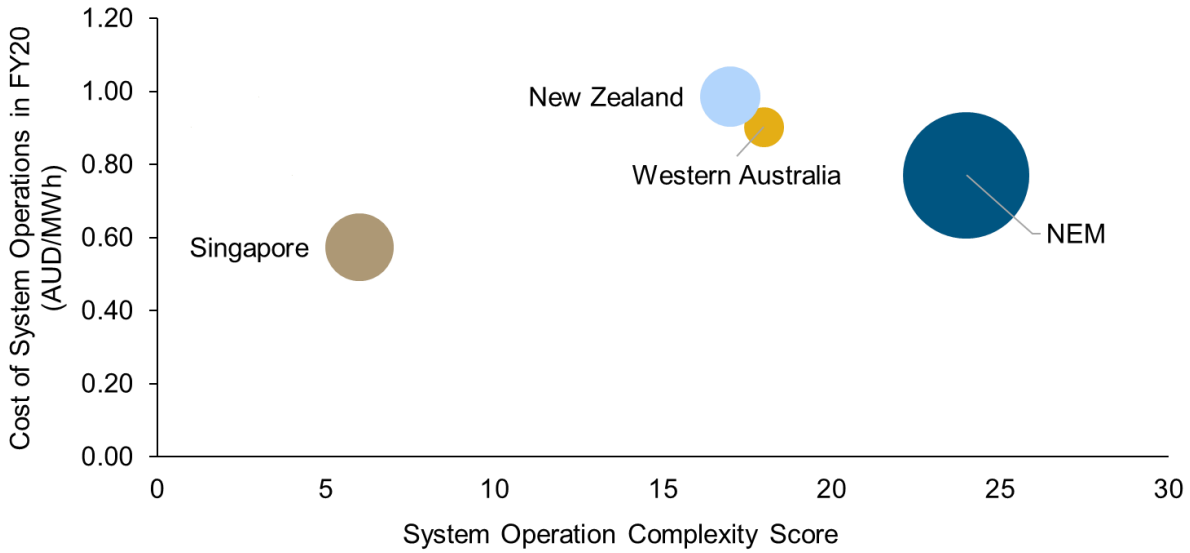
The Lantau Group also compared system operation costs between different jurisdictions, with a focus particularly on smaller jurisdictions: New Zealand (Transpower) the Singapore Power System Operator (PSO), and AEMO in the NEM. The degree of complexity in system operations was considered by rating each jurisdiction on a series of indicators of system complexity.[52] These included: network congestion, the penetration of rooftop solar, the share of renewables in the overall generation mix, the length of transmission lines and the number of extreme weather events.

The Lantau Group combined this information into Figure 3 below, which illustrates each jurisdiction's system operation complexity score as a function of system operating costs in AUD/MWh, and annual network consumption (MWh).

[51] Bubble size represents annual network consumption in FY20 (MWh).

[52] The ratings were between 1 – simple and 5 – very complex. Had a jurisdiction been rated very complex in all market complexity indicators, the highest market complexity score was 35.

Figure 3: System operation complexity, cost, and annual network consumption (MWh)[53]



Source: The Lantau Group's analysis for the ERA.

The Lantau data shows the WEM as having a comparatively low market design complexity and a relatively moderate level of operational complexity. However, the WEM's cost are relatively high compared to costs in other jurisdictions. This could indicate operational inefficiency.[54]

4.2 Governance

AEMO's Board approved the AR6 proposal for submission to the ERA. The Managing Director/Chief Executive Officer was accountable for the development of the allowable revenue and forecast capital expenditure proposal, with the executive leadership team providing support in terms of financial stewardship.[55]

Members of the executive sat on the AR6 steering committee, which was specifically appointed to ensure scrutiny and challenge of AEMO's forecast expenditure, with a particular focus on WEM reforms and DER.[56] Review, approval, and project delivery was governed by AEMO's project management framework, with funding approval granted through the project process and ongoing reporting on major projects such as WEM reform.[57]

AEMO's initial proposal noted that the AR6 forecast was subjected to top-down challenge by its Western Australian management team.[58] AEMO also required each project owner and management to consider a list of questions designed to ensure that AEMO met the

53 Bubble size represents annual network consumption in FY20 (MWh).

54 Though the analysis is qualitative and is based on a small sample of markets.

55 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 33, (online).

56 According to AEMO, its AR6 Steering Committee makes investment decisions, monitors investment benefit realisation, determines which initiatives will be submitted to the Board for further approval and sets the overall investment framework. It oversees project status, helps with issue resolution, endorses timing or budget changes and has the authority to release funds (including contingencies) or change scope (both of which may go to the Board for endorsement).

57 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 29, (online).

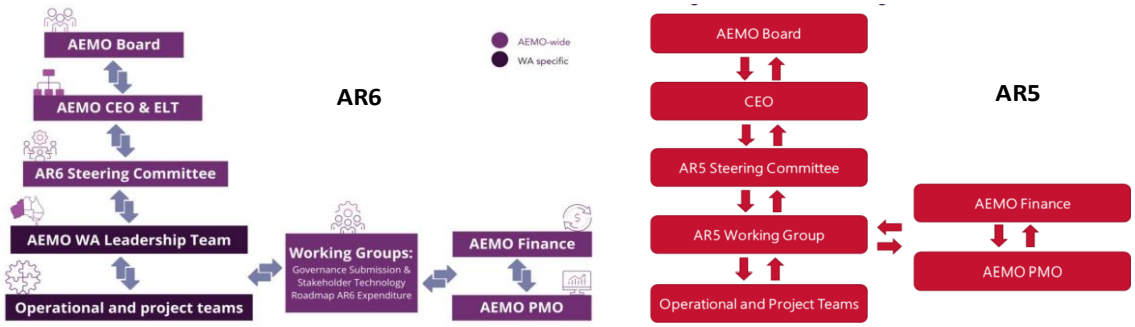
58 Ibid.

requirements of the WEM Rules and GSI Rules in terms of prudence – "is now the right time and is it the right solution?" – and efficiency – "is it the right cost and how much is it going to cost participants?"[59]

Given the materiality of the proposed costs to deliver AEMO's obligations and services under the Energy Transformation Strategy, AEMO noted that its proposal was founded on a "more exhaustive governance process than prior [allowable] revenue and capex [capital expenditure] reviews."[60]

Upon review, AEMO's governance structure has changed little between AR5 and AR6 as shown in Figure 4 below.

Figure 4: AEMO governance structure for the past two allowable revenue periods[61]



Source: AEMO's AR6 and AR5 proposal documents

The roles and responsibilities of the various groups is consistent between the two allowable revenue periods. In AR6, the Western Australian leadership team and working groups had the same responsibilities as the AR5 working group. The operational and project teams in AR6 had more responsibilities than their contemporaries in AR5, including responsibility for project contingency calculation and justification, engaging with stakeholders and responsibility for assessing resourcing requirements.

In its initial AR6 proposal, AEMO noted that:

> All opex and capex forecasts have for the AR6 period been subject to a series of top-down challenges by the WA Leadership Team, AR6 Steering Committee, ELT and Board, with information more granular at the lower management levels.[62]

AEMO's proposal explained that the purpose of its top-down challenge process was to:[63]

- Test the cost estimates and ensure a wider review is applied to the forecast to identify synergies and overlaps. Typically, this resulted in a reduction in the initial forecast.
- Consider the costs based on historical expenditure and future drivers such as changes in participation and activity volumes.

59 Ibid.

60 Ibid, p. 30.

61 Ibid. and Australian Energy Market Operator, 2019, *2019-2022 Allowable Revenue and Forecast Capital Expenditure Submission to the Economic Regulation Authority*, p. 29, (online).

62 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure for 2022-23 to 2024-25*, p. 45, (online).

63 Ibid, pp. 44-45.

- Identify opportunities to better manage the variable cost components of any expenditure (for example, the use of temporary or permanent staff).
- Include a cost-saving target or efficiency factor, designed to promote outperformance of the expenditure forecast where practicable.

The ERA asked AEMO to provide additional information on the timing and the nature of the top-down challenges to understand the level of rigour applied through the challenge process.

AEMO provided a governance timeline for the AR6 proposal and examples of the minutes from two steering committee sessions to the ERA as commercial-in-confidence information. The timeline showed 11 internal reviews of the proposal between July 2021 and December 2021: four of those by the board. Each review considered different elements of the proposal. The ERA's review confirms that AEMO's proposal underwent multiple top-down reviews.

The ERA then reviewed the minutes of two steering committee reviews: one on the forecast of allowable revenue and one on the forecast capital expenditure. This was to assess how robustly the AR6 proposal was challenged by the committee.

The questions asked, and points raised in the minutes, did not appear to challenge the costs. Instead, committee members discussed how the costs could be better explained or justified. An example discussion from the committee's review of forecast operating costs considered how AEMO should better highlight the benefits Western Australia receives from sharing AEMO-wide IT solutions. The discussion did not consider if the underlying IT solutions were efficiently costed, neither did the minutes indicate that the committee discussed the allocation of AEMO-wide costs to the WEM.

In the steering committee's review of forecast capital costs there was evidence of challenge to the calculated project contingency levels and AEMO's program management office had reconsidered the contingency calculator tool following that challenge. When the committee challenged whether the proposed costs were efficient, it appeared satisfied that the challenges that had taken place by other groups in the governance process were sufficient.

From the information reviewed, there was little evidence of the top-down challenge process being focussed on costs. The only reductions in costs from the top-down challenge were the 5 per cent efficiency saving applied to labour costs in the final year of AR6, and the 1 per cent vacancy rate applied each year. The 5 per cent efficiency saving in the final review period amounted to a saving of $6.8 million, while the 1 per cent vacancy rate savings were $0.8 million for 2022/23, $1.0 million for 2023/24 and $1.1 million for 2024/25 in AEMO's initial proposal.

AEMO revised proposal

AEMO's response to the draft determination noted several improvements to its governance process that were underway. These include an independent review of AEMO's project management framework and the establishment of a project delivery framework, introducing common approaches to investment governance, risk management, planning and scheduling. AEMO is also currently responding to a third-party review by the Boston Consulting Group of AEMO's organisational effort, costs and operating model.[64] AEMO committed to considering the ERA's advice on governance for future funding arrangements.

[64] AEMO website, Presentation to Finance Consultation Committee (online) accessed 24 May 2022

Stakeholder views on governance

Stakeholders expressed concerns with AEMO's governance of its AR6 proposal in their responses to both the issues paper and the draft determination.

In its response to the draft determination, Bluewaters Power stated:

> the governance structure of AEMO has developed haphazardly over time and is not well suited to forecast costs that are fit-for-purpose or represent best value.[65]

Collgar Wind Farm's response to the draft determination noted:

> In general, the ERA's findings around the governance processes and approach to top-down scrutiny does not provide confidence that AEMO can ensure that expenditure is prudent and efficient.[66]

Synergy's response to the draft determination stated that:

> There are significant issues in AEMO's investment planning and forecasting processes that need to be addressed. Increased stakeholder transparency and independent oversight are both required to ensure AEMO's proposed work program is prudent and efficient.[67]

In response to the ERA's issues paper, Perth Energy supported AEMO's approach of internally challenging its proposed cost by its senior management and board, as this focus should encourage good cost control.[68]

In contrast, Bluewaters considered that AEMO did not have appropriate governance structures in place.[69] Given the scant detail and lack of cost-benefit analyses in AEMO's proposal, Bluewaters observed there were unlikely to be many market participants that would be able to justify, via a board process, the level of additional expenditure AEMO was seeking. Bluewaters considered that an independent, bottom-up review of the appropriateness of AEMO's structure, resources, and governance of its WEM operations, was critical for maintaining AEMO's credibility.

Collgar suggested a potential governance reform whereby funding was approved in the initial proposal but could only be spent subject to a trigger being met (for example, notification from the Coordinator of Energy that a policy decision has been made).[70]

AEMO acknowledged that it prefers "to slightly overestimate capex than underestimate" it.[71] Although it does not agree with AEMO's approach, the ERA understands the risk to AEMO,

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65 Bluewaters Power, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Draft determination*, (online).

66 Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Draft determination*, (online).

67 Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Draft determination*, (online).

68 Perth Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

69 Bluewaters Power, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

70 Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

71 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure for 2022-23 to 2024-25*, p. 24. (online).

its customers and the market of AEMO being insufficiently funded to perform its functions under the market rules.

After reviewing the information AEMO provided in support of its governance process for the AR6 proposal and stakeholder submissions, the ERA considers that opportunities exist for AEMO to improve its governance. These opportunities cover three main areas discussed below.

4.2.1 Options analysis

The ERA has reviewed samples of AEMO's investment request documentation. Project managers use these documents to initiate a project and request project funding. The investment request document requires project managers to list any alternative options they have considered before proposing the project in question. The information on alternative options provided in this document is short, often with just a few words for description, and there is no qualitative or quantitative analysis of why other options were rejected in favour of the preferred option.

The shortfall in options analysis is particularly acute when NEM systems or practices are recommended and then adopted for the WEM. Market participants in the WEM expect economies of scale and scope from having AEMO operate across both the WEM and NEM. For example, Synergy considered there was greater opportunity to achieve the economies of scale and scope that were envisaged when the decision was made to adopt systems and processes from the NEM. AEMO has advised the ERA that the WEM benefits from systems and practices adopted from the NEM.[72] However, these benefits are rarely quantified or adequately demonstrated in or form part of AEMO's regulatory funding proposals.

In the draft determination, the ERA recommended that for future proposals AEMO extends its exploration of options early in the project evolution process and provides more qualitative and quantitative explanation of why the proposed project is preferable to alternative solutions. For NEM solutions adopted in the WEM, the ERA would expect to see the NEM options qualitatively and quantitively compared to a WEM standalone solution.

In its revised proposal, AEMO acknowledged "that the investment briefs provided to the ERA as part of the AR6 proposal provide limited information on the various options available to meet a capital expenditure requirement and will seek to address this recommendation ahead of the next allowable revenue forecasting process."[73]

4.2.2 Critical decisions

AEMO's AR6 proposal identified multiple systems that are being developed in-house, rather than by purchasing a third-party solution, such as a settlement system. Third-party systems usually enable a degree of customisation and can be maintained and updated through a service level or maintenance agreement with the third-party supplier or licenced support contractors.

The decision to bring system development in-house is pivotal to the costs and maintenance associated with projects. This is particularly true when there are subsequent dependencies and costs associated with this decision, such as where a system is developed in-house, and the development and cost of development of subsequent systems and software is also

[72] Ibid.

[73] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 16. (online)

internalised. Similarly, the decision to internalise key functions, such as forecasting and engineering advice, is also significant.

Depending on the stage of project development, the decision to bring system development or a main process in-house may not be clear in AEMO's three-yearly proposal. Consequently, in the draft determination the ERA noted that it cannot assess whether the decision to internalise system development or an important function is prudent or efficient. Once funding is approved, the ERA has no visibility of the economic efficiency of these critical decisions.[74]

In the draft determination the ERA recommended that these critical decisions, and their associated cost implications are shared with industry. Transparency, outside a regulatory determination, will help market participants better understand the implications on market fees of the cost decisions AEMO is making compared to the expected benefits from internalising a system and/or function.

In its response to the draft determination, AEMO stated:

> AEMO has sought to provide this transparency (and sought stakeholder feedback) via its Western Australian Electricity and Gas Consultative Forums (WAECF and WAGCF), and as a key contributor and presenter to industry on WEM Reform delivery via the Transformation Design and Operation Working Group (TDOWG) and WEM Reform Implementation Group (WRIG).[75]

In their responses to the draft determination, stakeholders suggested that AEMO could go further in providing transparency around its decision-making.

The Australian Energy Council stated:

> The AEC supports the ERA's recommendation that these critical decisions and cost implications should be shared with industry. The AEC further recommends that the mechanisms for requiring and sharing this information should be the financial reporting and guidelines as required by sections 2.22A.8 and 9 of the WEM Rules. The AEC advocates the ERA publishing its guidelines for public comment and concluding them prior to the publication of AEMO's financial report on 31 October 2022.[76]

Collgar Wind Farm stated:

> Collgar supports the ERA's recommendation that AEMO provides more transparency around its critical decision-making, including decisions to build custom IT systems inhouse.[77]

4.2.3 Project scoping

AEMO's initial proposal provided summary descriptions of projects but did not detail how project scoping ensures the operating or capital project delivers outcomes consistent with

[74] For instance, the ERA had approved $4.5 million for the digital roadmap project in AR5 instead of $12.7 million proposed by AEMO, as the ERA considered the benefits of the common centralised platform had not been fully justified. In August 2021, AEMO reported to industry that it was expecting to spend $7.6 million on digital roadmap activities, which was $3.1 million higher than the amount approved by the ERA. See section 2 for further information.

[75] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 16. (online)

[76] Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft Determination,* (online)

[77] Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft Determination,* (online)

AEMO's obligations under the WEM Rules and GSI Rules. so that projects deliver an appropriate level of functionality for AEMO. Project scoping should not be too little that AEMO cannot deliver on its obligations under the market rules, and not too great that the systems being developed are gold-plated and provide functionality that is over and above what AEMO is required to deliver.

AEMO does consider project scope at the point the project manager develops an investment request to initiate a project and project funding. Project scopes are also reviewed as the project passes through project gates, and funding for the next stage of the project is approved by AEMO's internal investment committee.

The ERA considers a better way for AEMO to demonstrate that project scopes are reasonable when requesting funding approval from the ERA would be to:

- Provide documented evidence, such as meeting minutes, to demonstrate that project scopes have been assessed at the program level, and to ensure projects are delivering AEMO's obligations under the market rules and not over or under-delivering.
- Record how and why project scopes change or are reassessed over the allowable revenue period. These changes in scope should be endorsed, with reasons by the appropriate oversight committee.
- Record how the project remains focussed on scope through the project development and implementation process to avoid project scope creep.

In response to the draft determination, AEMO noted "the ERA's request for additional information to better understand the alignment of project scope with AEMO's functions and will aim to provide further evidence as part of its future submissions."[78]

4.2.4 Reviewing the proposal guideline

Through its detailed analysis, the ERA has found multiple errors and inconsistencies in AEMO's data and has raised this with AEMO's executive team. The degree of error and inconsistency between alternative data sources has undermined the ERA's confidence in the data provided and this has confounded the ERA's ability to adequately analyse and test AEMO's proposed costs.

Following the determination process, the ERA will review its proposal guideline. The ERA will work with AEMO to update the guideline to give more direction on the type of information the ERA requires to be able to assess AEMO's proposed expenditure, consistent with the WEM Rules and GSI Rules. The guideline will cover the issues identified in sections 4.2.1 to 4.2.3. The ERA will consult with stakeholders on the revised proposal guideline to ensure the changes take into account stakeholder concerns identified through the funding determination process.

[78] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 17. (online)

5. Detailed assessment of AEMO's WEM allowable revenue

Given that AEMO's allowable revenue for AR6 represents a significant increase compared to previous review periods, the ERA has undertaken a forensic approach to reviewing both AEMO's initial and revised proposals to make its final determination.

The sections below outline each cost item in AEMO's proposal. For each cost category there are two sub-sections that explain:

- AEMO's proposal, stakeholder feedback on the issues paper and the ERA's draft determination for AR6.
- AEMO's revised proposal, stakeholder feedback in response to the draft determination and the ERA's final determination.

Further detail on the ERA's analysis and determination is included in the appendices.[79]

The ERA's draft determination for WEM allowable revenue was $135.9 million, 13 per cent less than AEMO's initial proposal of $156.2 million.

AEMO's revised proposed WEM allowable revenue is $152.4 million, a reduction of $3.8 million, or 2.4 per cent on its initial proposal and an increase of $16.5 million or 12.1 per cent on the ERA's draft determination.

The ERA's final determination for WEM allowable revenue is $142.3 million, which is 6.6 per cent less than AEMO's revised proposal of $152.4 million and $6.4 million or 4.7 per cent higher than the draft determination.

This section considers each of the allowable revenue expenditure items forecast by AEMO in its initial and revised proposals and provides an overview of the ERA's approach to analysis and justification for its final determination.

5.1 ERA's final determination on WEM allowable revenue

The ERA has undertaken a thorough review of each category of allowable revenue included in AEMO's revised proposal. The ERA's final determination approves a higher level of WEM allowable revenue than the draft determination. However, the ERA's final determination does not approve some of AEMO's proposed costs where AEMO has not adequately demonstrated that these costs meet the requirement for approval outlined in the WEM Rules.

The ERA has not approved all costs associated with AEMO's proposed new staff positions. AEMO did not present a strong case to demonstrate that its current staffing levels were efficient, nor that it had taken all steps to improve the efficiency of its processes and systems, before proposing permanent staff increases. Further information is presented in section 5.1.1.4.

Details of the partial approval of individual allowable revenue cost categories, such as supplies and services, IT, and telecommunications, is provided in sections 5.1.3 to 5.1.5.

[79] The WEM reform is detailed in Appendix 8. The DER program is detailed in Appendix 9. The sustaining capital expenditure program is detailed in Appendix 10. Contingencies are presented in Appendix 11.

The partial approval of the depreciation and amortisation cost and borrowing cost results from a recalculation of these expenses following changes made to forecast capital expenditure in the final determination. The ERA has partially approved costs for both categories. This reduction in costs is based on the ERA's approved capital expenditure being lower than AEMO's proposal. See sections 5.1.2 and 5.1.6, respectively.

AEMO reduced its forecast operating project costs to $1.2 million, down from $3.9 million in its initial proposal. AEMO agreed that there is uncertainty about the timing of the decommissioning project and so did not include forecast costs ($1 million) for this project in its revised proposal. AEMO also accepted the ERA's draft determination on forecast costs for the DER Network Services Marketplace Trial and Design project ($0.2 million).

AEMO's revised proposal includes forecast operating costs for two projects for AR6 totalling $1.2 million. The costs estimated for these projects relate to the development of the initial design framework for distribution services, the development of a business case ($0.2 million) and the commencement of early planning for five-minute settlement ($1.0 million). The ERA's final determination on these projects is explained in section 5.1.7.

Table 9: AEMO proposed and ERA final determination on WEM operating expenditure

Operating cost category	AR6 revised proposed ($ million)	Final determination ($ million)	Variance ($ million)	Variance (%)
Labour costs	73.2	64.6	(5.6)	(8.0)
Depreciation and amortisation	48.8	45.5	(3.3)	(6.8)
Supplies and services	10.8	10.7	(0.1)	(0.9)
IT and telecommunications	9.4	9.0	(0.4)	(4.2)
Accommodation	5.2	5.2	-	-
Borrowing	8.3	7.6	(0.7)	(8.4)
Adjustment for over/under recovery	(0.3)	(0.3)	-	-
Total allowable revenue	**152.4**	**142.3**	**(10.1)**	**(6.6)**
Operating projects (included in costs above)	1.2	0.90	(0.3)	(25)

Source: AEMO's AR6 proposal and ERA's analysis

5.1.1 Operating expenditure labour costs

Initially, AEMO sought funding for approximately $73.1 million in labour costs for its operating expenditure over the AR6 period. This included funding to employ 33.7 new FTE staff by the end of the AR6 period, over and above its existing estimated 104 FTEs.[80]

[80] AEMO did not provide a clear indication of how many staff work on Western Australian operations at the commencement of the AR6 period. The staff manifest contained details on 238 positions, many of which are contractors or NEM staff working on capital expenditure projects. The workforce plan for operating expenditure comprised 266 discrete rows for staff not identified as working on projects, split across different Western

AEMO's revised proposal reduces forecast labour operating costs to $70.2 million. This was mainly due to marginally lower staffing numbers in the final workforce plan offsetting the higher staff costs.

Labour costs are a high proportion of both the operating expenditure costs and the proposed capital expenditure costs, largely due to AEMO's decision to conduct work in-house rather than outsourcing work to consultants or using "off the shelf" IT systems. Information on capital expenditure labour costs is in section 6.1.1.

5.1.1.1 ERA's review, findings and draft determination on proposed labour costs

AEMO's initial proposal

AEMO provided the ERA with additional information on its labour cost estimates for both its initial proposal and revised proposal. These documents included:

- A staff manifest showing a breakdown of labour costs for all AEMO Western Australian staff.
- A consolidated workforce plan (an Excel workbook), which provided an overview of the labour allocation across all capital and operating expenditure projects.

A large proportion of the labour applied to capital projects is drawn from internal operating labour staff. The extent to which these staff are replaced after they transfer to a capital project affects forecast labour operating costs.

The ERA's proposal guideline requires AEMO to provide detailed information on how it determined labour allocation to capital projects through information such as individual position titles and actual salaries or contractor costs.[81] This allows the ERA to evaluate if labour has been allocated to projects and internal operations correctly and to ensure there is no double counting of operating labour costs on capital projects.

AEMO's proposed and revised labour costs as part of its forecast operating expenditure for the AR6 period are summarised in Table 10. The negative adjustments shown in the table represent:

- Vacancy allowances (applied over the whole of AR6).
- Backfilling, the replacement of staff seconded to capital projects (applied over the whole of AR6).
- AEMO's operating cost savings target (only applied in the final year of AR6).

Australian cost centres. Presentations were provided on current staffing levels but only covered 83 positions in the different cost centres in Western Australia and excluded information where no new staff were proposed to be employed (such as for GSI). The existing staff numbers have been calculated based on the sum of operating expenditure FTE staff in the workforce plan, without the negative adjustments and the allocation of new staff.

81 Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submissions under the WEM Rules and GSI Rules*, pp. 5-6. (online).

Table 10: AEMO proposed operating expenditure labour costs ($ million)[82]

Activity (initial and revised)	Labour costs			
	2022/23	2023/24	2024/25	**AR6**
INITIAL – DRAFT DETERMINATION				
Market operations	8.0	9.2	9.8	**27.0**
System management	14.1	16.6	17.7	**48.4**
GSI	1.0	1.0	1.1	**3.1**
Operating expenditure[83]	**23.1**	**26.9**	**28.5**	**78.5**
AEMO negative adjustments	(0.7)	(0.7)	(1.3)	(2.7)
Initial workforce plan (December 2021) – proposed operating expenditure	**22.4**	**26.2**	**27.2**	**75.8**
REVISED FOR FINAL DETERMINATION				
Market operations	7.5	8.8	8.9	25.2
System management	13.9	16.5	17.2	47.6
GSI	1.0	1.1	1.1	3.2
Operating expenditure	22.5	26.3	27.2	76.0
AEMO negative adjustments	(0.7)	(0.7)	(1.44)	(2.83)
Revised workforce plan (April 2022) – proposed operating expenditure	**21.8**	**25.6**	**25.8**	**73.1**

Source: ERA analysis of AEMO workforce plan

ERA's review, findings and draft determination

AEMO's initial workforce plan did not provide clear information on the exact size of AEMO's standing workforce, the movement of staff from operational roles to capital project roles, and where new roles would sit. There were inconsistencies between the workforce plan, the staff manifest, the individual project financial tracking workbooks, and with staffing information provided in AEMO's proposal.[84]

The labour force costings also contained multiple errors that lowered the ERA's confidence in the cost estimates. For example:

82 Some fields in Table 10 may not sum due to rounding.

83 These values are derived from those contained in the workforce plan accompanying the proposal. They do not reconcile exactly with those in the proposal.

84 For example, many projects have inconsistent position numbers and titles between the workforce planning workbook, the staff manifest and project financial workbooks. Some positions are simultaneously listed as vacant and occupied. Some positions were noted in the staff manifest but not in the workforce planning workbook, while some position numbers were noted with more than one position title. The financial tracking sheets did not contain position numbers, rather contained names and titles. The operating expenditure labour costs do not tally exactly with the AEMO proposal.

- Payroll tax in AEMO's costings ranged from 5.3 per cent to 9.3 per cent, while the base payroll tax rate in Western Australia is based on a sliding scale between 5.5 per cent and 6 per cent. [85] This indicates that payroll tax has been overestimated in AEMO's initial costings.
- Long service leave allowance was included in AEMO's labour costing at a rate of 2 per cent, while AEMO's Enterprise Agreement (EA) stipulated a rate of 2.5 per cent.[86]
- AEMO assumed a worker's compensation premium of 1 per cent, which exceeded the industry standard rate of 0.7 per cent for office-based businesses.[87] AEMO also incorrectly applied the premium to the base salary and superannuation, rather than the base salary plus the performance incentive.

AEMO was asked to rectify these errors in its revised operational expenditure costings and workforce plan.

Many of the methods and assumptions underlying AEMO's labour costs were not clearly documented, and calculations were not provided. The ERA considers the proposal documents did not undergo a thorough quality assurance process.

AEMO's initial proposal included a reduction of $1.2 million to represent a reduction in costs for instances where backfilling would not occur, for example, if an employee is only seconded to a capital project for short periods and so would not be replaced. AEMO included a line item in its workforce plan on the overlap between operating and capital expenditure to account for positions it considered unlikely to be backfilled. However, AEMO was unable to provide its calculation of this value and the assumptions it used.

The ERA used its own estimates of the effect of backfilling on proposed labour operating costs in a manner consistent with that applied to the DER Roadmap in-period submission during AR5.[88] This has resulted in a $1.7 million net reduction in these costs. In undertaking this calculation, the ERA applied the following assumptions.[89]

- Consistent with AEMO's higher duties practices, periods of equal to or less than 10 consecutive days per month are not backfilled. [90]
- Contract labour will only be brought in for a minimum period of three months.
- Senior project staff will not be backfilled for periods of less than six months FTE.[91]

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85 Western Australia has the most complex payroll tax of all jurisdictions, with a base rate of 5.5 per cent up to a salary of $100 million and 6 per cent above this up to $1.5 billion. Most jurisdictions in the National Energy Market have payroll tax values of less than 5 per cent. In Queensland and South Australia, the payroll tax rates are 4.95 per cent, in New South Wales and Victoria it is 4.85 per cent, and in Tasmania it is 6.1 per cent.

86 Fair Work Commission, *AEMO Enterprise Agreement 2018*, p.32. (online).

87 A rate of 1 per cent is comparable to the workers compensation premium attracted by electronic equipment manufacturing and substantially higher than nominally expected for energy sector entities and office-based activities. See Workcover WA, 2021, Government Gazette, No. 63, online.

88 Prior to calculating the effect of reduced backfilling on OPEX, the ERA corrected the errors in payroll tax, long service leave and workers compensation found in AEMO's calculation of staff costs.

89 This is consistent with the ERA's decision on backfilling made on AEMO's previous AR5 in-period submission. See ERA, 2020, *AEMO in-period funding submission for implementation of the Distributed Energy Resources Roadmap actions – Determination report*, pp. 14-20. (online).

90 Fair Work Commission, *AEMO Enterprise Agreement 2018*, Clause 26, p. 18. (online).

91 In this analysis, senior project staff refers to staff salaried at tier three or higher. Staff were allocated to different costing tiers based on their role within projects and the organisation. There are four functional tiers with some distinction for staff with fewer entitlements (such as contractors). The ERA's evaluation of the tiers as a costing method is included in Appendix 7.

- Fractions of the cumulative FTEs less than the 10-day backfilling threshold are not backfilled.

AEMO's initial workforce plan listed unspecified positions to work on capital projects, to be drawn from the existing workforce. As many of the projects using these unspecified staff were underway at the time of the AR6 submission, AEMO should be aware of which staff are working on current projects.

There were FTEs identified with generic position titles such as Senior Analyst, Project Lead or Subject Matter Expert. This lack of details was problematic when calculating backfilling costs as there was no indication whether these employees would be drawn from AEMO's NEM or WEM workforces. In the absence of data, the ERA assumed staff would be drawn from the WEM and approved forecast labour costs to align with backfilling requirements in AEMO's enterprise agreement. In these circumstances the ERA substituted indicative labour cost values based on job titles of AEMO's existing staff.

5.1.1.2 ERA's review, findings and final determination on AEMO's revised proposed labour operating costs

AEMO's revised proposal

AEMO submitted a revised workforce plan to support its revised proposal. The workforce plan estimated operational labour costs totalling $73.1 million. This value comprised a series of adjustments applied to an operating labour cost of $75.4 million, including $1 million of operational projects.[92] The top-down adjustments comprised:

- Capital and operating expenditure overlap, which reflected backfilling for staff drawn from operational activities into capital projects. This amounted to a reduction in operational costs of $1.2 million.
- A vacancy allowance reflecting time taken to fill vacant positions. This amounted to a reduction in operational costs of around $0.6 million over AR6.
- Overtime, which was added to the workforce plan following the draft determination and reflects overtime accrued to shift workers across AEMO. This was an increase in operational expenses of around $0.6 million over AR6.
- A savings target to reflect an efficiency drive for operational areas of AEMO in the final year of AR6 amounting to $1 million.

AEMO rectified some of the errors identified in the draft determination and revised its forecast costs to reflect its updated EA.

In reviewing the revised workforce plan, the ERA continued to identify errors in the workforce plan and staff manifest. The types of errors included the double-counting of salaries and the application of unique identifiers to multiple positions.

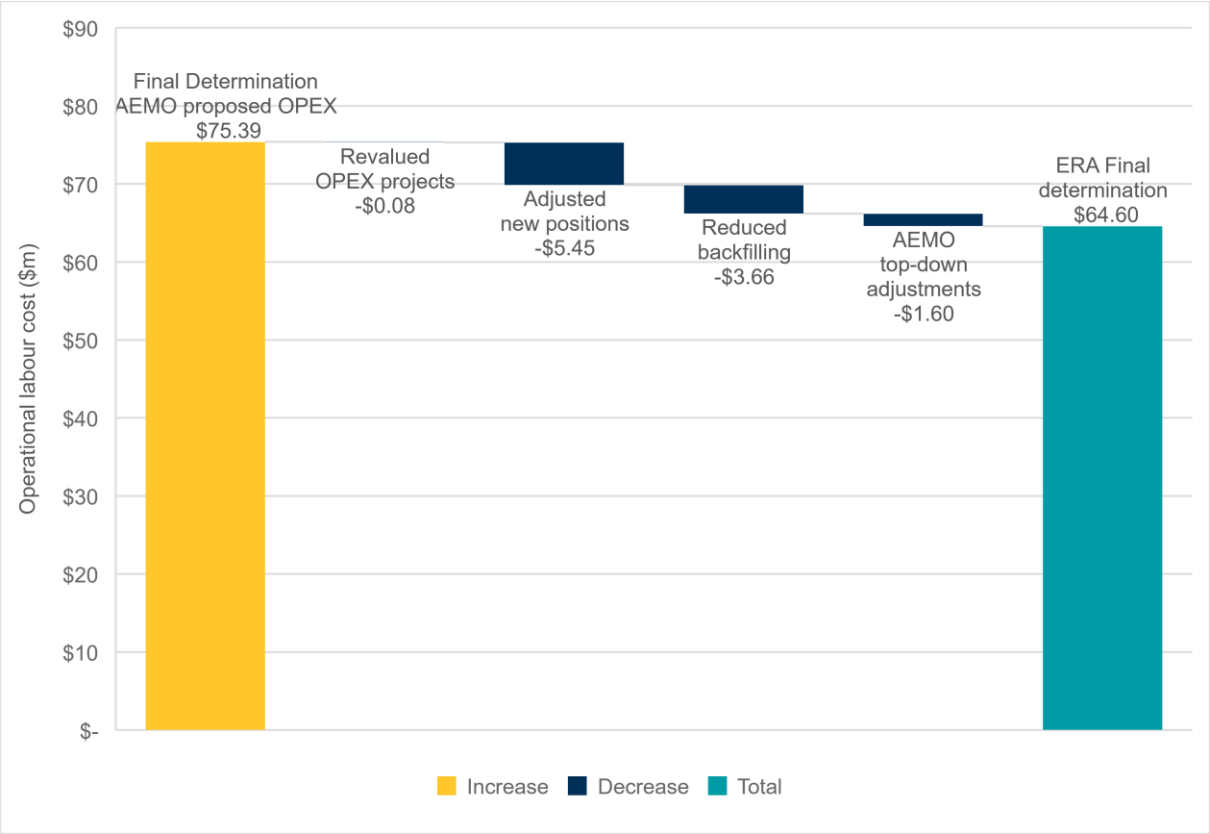
ERA's review, findings and final determination

After the adjustments outlined above, the ERA has partially approved $64.6 million in allowable revenue, for labour operating costs, for the AR6 period. This is $9.6 million less than AEMO's revised proposal for labour costs of $75 million.

[92] The estimated labour cost ($70.2 million) was not consistent with the value in AEMO's workforce plan ($73.1 million)

The ERA calculated similar values for the recurrent staff costs to those submitted by AEMO in its workforce plan – notwithstanding the problems caused by low data integrity.[93] Figure 5 shows the changes to the operational cost by category.

Figure 5: Final determination changes to revised operational cost by category



Source: ERA analysis of AEMO workforce plan.

In determining the operating labour costs to be included in the final determination, the ERA did not approve costs that were unlikely to be incurred. These included backfilling positions for staff seconded onto capitalised projects where the time contribution did not warrant backfilling. To substitute quantifiable backfilling costs, the ERA assumed that:

- Consistent with AEMO's revised EA and past ERA funding determinations, acting arrangements are only instigated for periods exceeding ten days.[94]
- Consistent with AEMO's vacancy assumptions used in the determination, empty positions remain vacant for a period of three months before contract labour replacements backfill positions.
- Senior positions would not be backfilled for periods of less than six months.

The ERA substituted capitalised project costs (that used tier rates) with actual salary costs where staff were identified by AEMO and from industry standard costs and AEMO benchmark

[93] The ERA recalculated the costs in the workforce plan based on values contained in the staff manifest and for positions as yet unfilled using values based on AEMO's indicative employment costs for comparable positions or industry standard rates where a sample of comparable positions from AEMO's workforce was not available.

[94] Australian Energy Market Operator, 2022, Enterprise Agreement, Clause 26.1.

costs for similar positions. A downward adjustment was also applied to correct for public holidays that AEMO double counted in its capitalised project costs.

In its revised workforce plan, AEMO added a new 'top down' adjustment titled 'overtime,' in part to reconcile the differences between data sources and also to account for overtime payments to control room operators. This adjustment was not approved because penalty rates applied to shift staff in the control room were already accounted for in other allowances. Further, the quantity of overtime AEMO is likely to incur during AR6 will reduce with increased staffing in the control room, for which the ERA has approved the forecast costs as proposed.

The ERA also made an adjustment to approved allowable revenue for the new positions AEMO justified with supplementary information provided following the draft determination. The uptake of the new positions has been reprofiled following the supplementary information to better reflect the indicated uptake over the AR6 period. The approved allowable revenue included AEMO's savings target and vacancy allowance.

5.1.1.3 ERA's review, findings and draft determination on proposed new FTE staff

AEMO's initial proposal

AEMO initially proposed 33.7 new FTE positions because "an uplift in human resources is still required to ensure WA's market and power system can continue to operate efficiently, compliantly and within acceptable risk tolerances."[95]

AEMO undertook a review of staffing across each of its Western Australian departments to calculate the number of additional staff required to fulfil its obligations under the WEM Rules. AEMO provided an additional document for publication that set out its process and reasoning behind the proposed staff increase. AEMO argued that higher staff requirements were "driven by the new market operating arrangements and increases to the volume and complexity of market settlements and prudential management."[96]

Stakeholder views in response to the ERA issues paper

Alinta questioned how AEMO determined its need for $24.5 million in additional spending on labour for 31 new FTEs, and whether AEMO benchmarked these costs.[97] Alinta considered managers may have an incentive to overstate their requirements and grow their teams, and limited incentive to minimise their costs. Noting that AEMO's responsibilities have not changed since the last period, Alinta concluded that AEMO's proposal to increase its FTE count to support market development may be unnecessary.

Bluewaters noted the proportionately large value of additional labour expenditure compared to the number of new FTEs and recommended the ERA examine costs set aside for these positions.[98] Bluewaters suggested AEMO should be required to articulate each new forecasted FTE role and the cost of staffing these roles.

Collgar considered it is essential that AEMO is adequately resourced for reform implementation but noted that AEMO should be subject to the same fiscal constraints faced

[95] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, FTE resources estimate – WA departments and WA support functions*, p. 3. (online).

[96] Ibid, p. 8. (online).

[97] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

[98] Bluewaters Power, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

by market participants.[99] Collgar stated the ERA should be satisfied that AEMO's resourcing was proposed at an efficient level and was fit for purpose. Collgar suggested benchmarking should include comparisons with the private sector as well as broader AEMO and government entities, and that AEMO must demonstrate its chosen implementation methods were "the best value, fit for purpose, and not unduly conservative."[100]

Synergy considered that AEMO's approach to developing its labour cost forecasts using a bottom-up build of resource requirements was reasonable, but it must be balanced by a robust top-down challenge, ideally with rigorous efficiency targets applied to it.[101] Synergy considered the 5 per cent reduction to the bottom-up labour forecast was too conservative. Synergy suggested there was further scope for stronger efficiency targets, given the degree of uncertainty on how much effort the new market will require, coupled with the flexibility available to AEMO in terms of resourcing options and expenditure overrun allowances.

Synergy also considered the ERA cannot better understand the impact of reforms on AEMO's operations than AEMO. Synergy recommended the ERA avoid a granular challenge of AEMO's labour bottom-up build and instead looks at alternative options, such as applying a top-down efficiency mechanism that sets a target operating cost benchmark.

ERA's review, findings and draft determination

The ERA reviewed the reasons AEMO provided for the new permanent staff members and stakeholder comments on the proposed labour uplift in its draft determination. The ERA assessed the suitability of the proposal including AEMO's bottom-up evaluations and its internal challenge processes.

AEMO sought substantial new staff that would increase its operational workforce by around a third. To support its argument on the staff requirements AEMO provided a supporting document on the FTE assessments.[102] AEMO divisional managers also presented on the staff requirements to the ERA in a workshop on 14 February 2022.

In the draft determination, the ERA indicated it would approve allowable revenue equivalent to 9.3 new FTEs for AR6, which it found to be prudent and efficient. Overall, the ERA considered AEMO had not provided sufficient justification to demonstrate that the current level of staffing in some teams, such as the market operations team, and the operations, governance and integration team, were efficient for their existing activities before they requested new permanent positions.[103] For example, the market operations team did not use timesheets to document its existing activities and its functional review assumed the high degree of manual data cleaning and invoice checking would continue despite the higher degree of automation. The team has also been operating adequately without backfilled staff and staff vacancies without a reported degradation in services. Substantial staff were also deployed in the reserve capacity mechanism team to clean data from a small number of third parties, with limited demonstrable effort to resolve problems at the source.

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99 Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

100 Ibid.

101 Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

102 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, FTE resources estimate – WA departments and WA support functions,* (online).

103 There are 6 broad teams in AEMO's WA function (WA Market Operations; Reserve Capacity; WA Reform and Market Development; Power Systems Operation; Power System & Market Planning; Operations Governance and Integration) and support functions.

Rather than applying a consistent, robust, evidence-based process, each divisional manager conducted their own needs assessments and so consequently the approach and results were quite varied. One common element across all divisions was the assumption that existing processes and resourcing were efficient. Rather than demonstrating need through a bottom-up assessment of workplace needs for the new market, AEMO opted for a lighter review focused on incremental changes to market functions.

AEMO placed substantial emphasis on how complex the new market would be and that it would need additional staff to manage this complexity. However, AEMO did not explain why additional staff were needed when the substantial IT platform improvements implemented though the reform process were expected to deliver process efficiencies and hence lower staff requirements. For example, in-built input rules established in the new market systems should prevent input error and free up staff currently employed to address input errors to be deployed elsewhere.

It was apparent from material provided that two areas within AEMO were understaffed. In the draft determination, the ERA approved allowable revenue for additional FTEs to recognise this. The reserve capacity team is currently operating with 10 FTEs, which is two more than its expected total at the end of the AR5 period.

The ERA also approved allowable revenue consistent with 2.8 FTEs to correct for existing understaffing in the power system operations team. The ERA considered that, given it takes approximately two years to train an individual to the required standard for a power system operator, AEMO should not enter AR6 without a trainee position available in the team. Consequently, the ERA approved forecast costs relating to an additional FTE for the power system operations team in the draft determination.

Most of the permanent staff in the reform and market development team are on secondment to the market and regulatory design capital project. When the new market goes live in October 2023, the market design project closes and the seconded staff will return to their former positions. The ERA did not approve the forecast cost for an additional 1.9 FTEs to this team as the ongoing requirements of WEM reform are uncertain. Further detail on the second stage of the energy transformation program will emerge through 2022 and 2023. AEMO can make an additional application for staff supported by a robust business case once more information becomes available through AR6.

The ERA did not approve costs for the 9.9 FTEs AEMO proposed for the Western Australian support team. In its initial proposal, AEMO requested an additional 9.9 FTEs, most of which were IT staff (8.1 FTEs) to support the increased number of Western Australian systems. AEMO's supporting information on its labour numbers acknowledged that:

> Technology resource requirements increased from ~12FTE to ~23FTE over the AR5 period, as more systems and IT solutions (e.g., settlement system changes (RoPE and SMST)) increased the scope of the WA Solutions team's responsibilities. This trend will continue into the AR6 period, as the breadth of systems and scope of work for the team increases.[104]

The ERA approved forecast capital expenditure in AR5 for AEMO to develop and refresh its IT systems to ensure they were suitable for the new market design. However, AEMO did not identify the need for additional IT staff in operating costs at the time, instead the staff were costed to the system management budget. In the draft determination, the ERA suggested AEMO demonstrate that the increase in IT staff over AR5 was efficient before requesting additional staff for the IT team over AR6. In addition, AEMO needed to make clear what any

[104] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, FTE resources estimate – WA departments and WA support functions*, p. 26. (online).

new staff would be doing and the steps AEMO had taken to minimise any additional IT effort through automation and staff reallocation before requesting new staff.

The ERA recognised that additional engineering effort would be required in the power system planning team. This is driven by changing power system conditions that require new models to be developed and more complex system analysis to be conducted in greater volumes. Initially, AEMO proposed an increase of 8.8 FTEs to undertake a variety of tasks in the team, including power system modelling, investigating power system events, and improving forecasting. AEMO's initial proposal was unclear on the extent to which engineering staff could be deployed to meet multiple needs. For example, a single individual may not be investigating power system events all the time, so outside of an investigation they could be engaged in other activities. AEMO's proposal referred to an AEMO-wide engineering framework but did not provide sufficient evidence of the benefits of including Western Australia in the framework to justify its additional staffing.

5.1.1.4 ERA's review, findings and final determination on proposed new FTE staff

AEMO's revised proposal

AEMO provided additional information on new FTE staff in response to the draft determination and a third party review of its proposed new staffing requirements. AEMO advised that the new staffing proposed in the draft determination, 9.3 FTE above the approximately 105 existing staff employed by AEMO WA permanently or on contract, would be insufficient for AEMO to fulfil its obligations under the WEM Rules over the AR6 period.

> AEMO considers that the ERA's draft determination – if accepted – would place AEMO's ability to adequately resource market and system operations over the next three years at unacceptable risk. In particular, the cuts to Market Operations and Power System Planning would introduce heightened risk to market and power system operation during a period of particular vulnerability for the WEM. The potential consequences of this heightened risk are severe. Material breaches, settlement errors, and dispatch errors are all likely if AEMO's resources are stretched too thinly.[105]

The ERA's draft determination did not affect the number of existing staff employed by AEMO in the areas of market operations and Power System Planning. The draft determination did not allow for growth in staff where inadequate information had been provided in support of the staff increases.

AEMO's consultant, Robinson, Bowmaker, Paul (RBP), provided a review of the proposed new staffing.[106] The consultant considered current staffing levels in AEMO's various teams and the basis and justification for the proposed increases. In some cases, RBP agreed with AEMO's proposal, and in some cases it did not and suggested an alternative staffing requirement.[107]

[105] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 18. (online)

[106] Robinson Bowmaker Paul, 2022, *Review of AEMO Operational Staffing Estimates,* (online)

[107] Ibid.

The RBP report agreed with some of AEMO's suggested staff increases:

- In digital – the increase of 3 FTE to support market applications during the transition period is reasonable.
- In system planning – existing resourcing levels, as well as requested uplift are largely reasonable.
- In market operations – current resourcing in the daily operations area is reasonable. Increase in this area is largely reasonable with some opportunity to decrease the effort in the areas of pricing analysis (but adding additional effort to contribute to the congestion rental information resource publication) and pricing outcomes.

RBP did not support other staffing suggestions:

- In system planning – increasing staff to plan for the transition to asynchronous power was important. However, the resourcing requirements are uncertain and may be subject to future changes.
- In digital – unable to comment on whether existing staffing in this area is efficient as that would require detailed analysis of the types of issues handled by the team.

In AEMO's revised proposal, the number of new FTE positions reduces to 29.3, down from 33.7 in its initial proposal. These positions were identified as being mostly contract positions[108]:

> AEMO stresses that the vast majority, of new FTE roles proposed for AR6 are fixed-term contractors (FTCs), not permanent employees. No party can foresee the precise level of resourcing and effort that will be required to operate the new market until it commences. Therefore, rather than appointing permanent employees and 'hard coding' ongoing operating costs into future forecasts, AEMO is taking the prudent step of using contractors and flexible staffing arrangements to manage the energy transition. This will allow AEMO to scale back (or scale up) resources as required, until such time that the new market is bedded in and staffing levels can be normalised.

AEMO agreed with the ERA's draft determination on proposed new staff in two areas:

- Approval of forecast costs equivalent to two FTE positions in the reserve capacity mechanism team.
- No increase in the FTE costs for the operations, governance and integration team.

The differences in AEMO's initial and revised proposed new FTE positions are shown in Table 11 below, compared to the ERA's draft determination. Only half of the new positions in AEMO's revised proposal were fixed term contracts. AEMO had identified the remaining positions as new permanent positions.

[108] When AEMO identified the unique staff numbers, multiple people occupied the position numbers. On resolution of this error, only around half of the staff were identified as fixed term contractors.

Table 11: Changes in AEMO's proposed FTE increases compared to the ERA's draft determination

Department or function (FTE at end of AR5)	AEMO initial proposal	ERA draft determination	AEMO revised proposal
Market operations (10)	+6.0	-	+5.1
Reserve capacity mechanism (8)	+4.0	+2.0	+2.0
Reform and development (1.7)	+1.9	-	+2.8*
Power system operations (15)	+2.3	+3.8	+2.8
Power system planning (15.5)	+8.8	+3.5	+8.3
Operations, governance and integration (8)	+1.1	-	-
WA support (37.3)	+9.9	-	+9.9
WA management (6)	-0.8**	-	-
Total increase	33.7	9.3	30.9

Source: ERA analysis of AEMO data.

Notes:

** AEMO's initial proposal suggested at the end of AR5 the reform and development team would be 1.7 FTE. In its revised proposal this reduced to 1.2 FTE with no explanation. The reduction in anticipated FTE at the end of AR5 increases the additional FTE requirement to bring the overall team up to 4.0 FTE at the end of AR6.*

***The reduction of (0.8) was applied by AEMO to reflect a 5 per cent efficiency target and 1 per cent vacancy rate in the last year of AR6. This efficiency target was not applied to AEMO's revised proposal.*

Stakeholder views in response to ERA draft determination

Only two stakeholders commented specifically on AEMO's proposed new FTE positions in their responses to the draft determination. The AEC supported the ERA's position in the draft determination to approve only a small proportion of the new FTE positions.[109]

Collgar Wind Farm stated:

> Collgar supports the ERA's conclusion that a substantial portion of AEMO's labour costs have not been justified. It is concerning that AEMO has not provided complete information on its standing workforce and reallocations for reform.
>
> Further, it is not clear that AEMO has rationalised staff that may no longer be required due to the reforms and/or increased automation, supported by the ERA's example of AEMO's market operation team. Collgar's general observation is that AEMO is well staffed compared to most other organisations in the sector.[110]

[109] Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft Determination*, p. 2. (online)

[110] Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft Determination*, p. 2. (online)

ERA's review, findings and final determination

When approving forecast operating costs for new FTE positions it is important for the ERA to ensure the labour cost increases stem from an underlying efficient base labour cost. Otherwise, the ERA risks approving inefficient forecast labour operating costs for the AR6 period. The ERA's draft determination expressed concern that AEMO had not assessed the efficiency of its current staffing numbers before undertaking work to identify incremental FTE positions.

In its submission to the draft determination, AEMO stated:

> Current resourcing levels at AEMO are consistent with the AR5 determination. During the AR5 review process, the ERA assessed AEMO's forecast labour costs and staffing levels, and determined an opex forecast it felt satisfied the prudence and efficiency tests under the Rules. AEMO is currently operating within this opex forecast, and staffing levels across the functions are not substantially different from those anticipated in the AR5 determination and subsequent in-period adjustment for DER Roadmap actions. The forecast AR5 resourcing levels were deemed efficient in the relatively recent AR5 determinations; it is not unreasonable to assume these resourcing levels are efficient today.[111]

The ERA approves forecast operating costs, including labour, at a point in time, based on information provided to it by AEMO. After the determination has been made, AEMO can vary how it expends those approved costs.

The ERA's determination on forecast labour costs is also dependent on the quality of the data provided as outlined in section 5.1.1.2.

AEMO's response to the draft determination advised that the approach it had taken to estimating new staff positions was consistent with common regulatory practice and that in an earlier funding determination the ERA had focussed on incremental costs only.

> This approach of focusing on the incremental increase in costs is consistent with that taken by AEMO and the ERA in past allowable revenue reviews. In both the AR5 process and in the in-period adjustment to fund DER Roadmap actions, AEMO's starting point for forecasting opex was to take the existing recurrent costs and use them as a base estimate, applying step and trend changes as appropriate. This base-step-trend approach is accepted common practice in regulatory revenue processes.
>
> Further, during the AR5 in-period DER adjustment, the ERA's review was primarily concerned with identifying additional or incremental costs associated with the new obligation. AEMO therefore submits that in this context, the approach of focusing on incremental or additional costs AEMO will incur in executing its obligations under the new market arrangements is reasonable and is a suitable method of estimating revenue requirements for the next three years

The base, trend and step approach to develop an operating cost forecast is commonly used in regulatory determinations as summarised in the box below.

[111] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 19. (online)

Explanation of base, step trend forecasting in regulatory determinations

Base – The organisation's actual operating costs in a given year are used as a starting point. A regulatory review will assess whether the actual operating costs are efficient, often through a benchmarking exercise. If the regulator finds the actuals are inefficient, then the regulator may make an adjustment.

Trend – The efficient base is then forecast forward by applying a rate of change to account for growth in input prices, output and productivity.

Step – Finally, any step changes in forecast operating costs are included to reflect costs not compensated by the base operating costs and rate of change. Often step changes in forecasts are linked with changes in regulatory obligations.

The base, trend and step approach is a relevant regulatory approach where the actual costs of a service provider are assumed to be efficient. Under the WEM Rules and GSI Rules there are no, or at best, very weak incentives for AEMO to be cost efficient.

The WEM Rules do not require the ERA to assess AEMO's base operating costs, which in this case, is AEMO's actual expenditure in the AR5 period. Neither do the WEM Rules require the ERA to adjust the base year expenditure to an efficient level if AEMO's actual operating expenditure is considered an inefficient base from which to forecast forward. However, the efficiency of base year expenditure is relevant in determining forecast costs. Therefore, in the draft determination, the ERA was interested in understanding how or if AEMO had assessed the efficiency of its resourcing levels before considering incremental additions or subtractions from this level.

As the AR5 determination was only a point in time assessment before any costs were expended, the ERA does not assume this is an efficient starting point to forecast forward. AEMO's consultant RBP provided opinion that the current resourcing in some teams was reasonable, such as in the power system planning and market operation teams. However, RBP could not confirm that current levels were efficient for the digital team, as to do this, RBP would have to undertake additional work, including benchmarking against other market and system operators.

In answer to AEMO's second point, in its determination on proposed costs for the Distributed Energy Resources (DER) Roadmap, the ERA did focus on the incremental cost for AEMO to fulfil its new obligations under the DER Roadmap. Specific and transitional WEM Rules were introduced to identify the DER Roadmap as a new obligation for AEMO and to guide the ERA's determination of the allowable revenue and forecast capital expenditure to deliver this obligation. The transitional WEM Rule:

- Limited the time available to the ERA to review the proposed costs and make its determination.
- Limited the amount of additional information the ERA could request from AEMO to enable its determination.
- Did not require the ERA to determine if the proposed projects and forecast costs were prudent.
- Restricted the ERA from considering any costs already approved for AR5.[112]

[112] Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period funding submission for implementation of Distributed Energy Resources Roadmap – Draft findings report*, pp. 9-11. (online)

The ERA focussed on incremental costs for the DER Roadmap determination because it was required to by the WEM Rules. These transitional rules have since been removed. The ERA is no longer restricted to only focus on incremental costs and can consider the prudence and efficiency of all costs proposed for the AR6 period when making its determination as outlined in section 1.2.

In summary, while is it not the ERA's role to consider the efficiency of AEMO's staffing in AR5, it is an important consideration when forecasting staffing costs that would be incurred by a prudent provider. AEMO did not provide an assessment of the efficiency of its current staffing levels before considering the addition of new positions. Moreover, AEMO's consultant, RBP acknowledged that it had "not performed a detailed efficiency review to determine the efficient resourcing level for various functions."[113]. Without this information, the ERA is unable to consider whether AEMO's staffing in AR5 is an efficient base from which to assess the addition of new positions. The ERA is aware of market participants' concerns around AEMO's staffing levels, as expressed in submissions to the issues paper and draft determination. Consequently, the ERA will consider including additional information in its proposal guideline to inform any staffing requests that may for part of future proposals.

In its draft determination, the ERA provided information on proposed new FTEs at a team level to help identify where the case for additional staff was supported and where further information was required before the proposed operating costs met the requirements in the WEM Rules. AEMO's revised proposal in response to the draft determination stated:

> AEMO considers that the ERA's draft determination – if accepted – would place AEMO's ability to adequately resource market and system operations over the next three years at unacceptable risk. In particular, the cuts to Market Operations and Power System Planning would introduce heightened risk to market and power system operation during a period of particular vulnerability for the WEM.
>
> The potential consequences of this heightened risk are severe. Material breaches, settlement errors, and dispatch errors are all likely if AEMO's resources are stretched too thinly.[114]

In response to the draft determination, AEMO and its consultant RBP focussed on the proposed staffing increases in three main teams: the market operations team, the power system planning team and the WA support team. This focus and additional information have informed the ERA's final determination.

The ERA has approved forecast costs equivalent to a higher number of new FTE positions for the AR6 period. The additional staff positions costed into the final determination are shown below.

- Market operations (+4 FTEs) – The ERA has accepted RBP's review and conclusion that AEMO's request for additional staff in this area was reasonable but there was scope to reduce activity and resourcing in some areas such as settlement processing. Given the analysis from RBP, the ERA has approved forecast costs consistent with four new FTEs. The four new staff will be occupied primarily for daily operations and investigating pricing events. The staff will undertake support services as the market operations team responds to an expected higher level of queries over the new market go-live period. AEMO's revised submission illustrates that AEMO expects to spend $8.7 million on enhancing and reforming its settlement system over AR5 and AR6. Despite this, both AEMO and RBP support the need for additional settlement staff to validate settlement calculations and correct errors.

[113] Robinson Bowmaker Paul, 2022, Review of AEMO operational staffing estimates, p 2, (online)

[114] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 18. (online)

- Power system planning (+7 FTEs) – The ERA has accepted RBP's review and conclusion that AEMO's request for additional staff in this area for power system modelling, operations forecasting and incident investigation is reasonable. The ERA has approved forecast costs consistent with seven new FTEs. This recognises RBP's opinion that there is potential for AEMO to reduce activity and resources in some areas, such as managing the network constraint library and that staff estimates around planning the transition to asynchronous power were uncertain.
- WA support (+8 FTE) – The ERA has accepted RBPs review and conclusion that the need for additional staff to support the ongoing development and testing of market operation and system management applications through the transition period was reasonable and to manage WA's share of cyber support activities.

Additional FTEs for the other teams are consistent with the draft determination (Table 11).

In identifying costs consistent with these new positions, the ERA has applied the profiling – when the new positions are active – consistent with the profiling of positions provided by AEMO in supplementary commercial in confidence information. This means each new FTE is not costed in full for the whole AR6 period.

The ERA considers this staffing increase is temporary to enable AEMO to manage the transition to the new market design. The ERA expects these additional staffing costs will not automatically roll into the next funding period, AR7 and supports AEMO seeking efficiencies in its staffing expenditure once the new market has settled. As such, AEMO will need to fully justify any proposed increase in staffing for future funding periods.

The ERA does not approve costs for individual staff positions. The ERA does approve project costs or AEMO's costs of performing functions, which when totalled make up the determination on total forecast operating costs for the AR6 period. This determination includes funding for approximately 22 new FTEs. Once approved, the ERA has no influence on how AEMO expends these costs over the next three years.

5.1.2 Depreciation and amortisation

5.1.2.1 Initial proposal and draft determination on forecast depreciation and amortisation

AEMO's initial proposal

Depreciation and amortisation expense is the second largest of the operating expense categories in AR6. AEMO's initial proposed depreciation expense in AR6 was $50.9 million. This was 146 per cent higher than that forecast for the AR5 period. The significant increase in depreciation and amortisation was in line with expectations, given that $26.8 million of capital projects were completed and transferred into service during AR5 and a further $126 million expected to be completed in AR6.

Stakeholder views in response to the issues paper

Alinta considered it was difficult to determine whether AEMO was recovering its capital expenditure via depreciation consistently, using "acceptable accounting principles" because the proposal does not outline what assets will be depreciated, over what useful life, and only provides the total depreciation per annum.[115]

[115] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

Alinta noted, however, that based on the shape of depreciation over the AR5 period and the proposed depreciation over the AR6 period, AEMO appeared to be depreciating most of the value of its assets over an unreasonably short period, which undermined the case for investment, as this implied a very short useful life of the asset. Alinta considered that this was inconsistent with 'acceptable accounting principles,' as per 2.22A.5 of the WEM Rules.[116]

Synergy commented that the systems put in place by AEMO will likely operate for over a decade and accordingly, consideration should be given to recovering costs over the operational life of the assets, rather than the notional economic life.[117] Synergy recommended the ERA seek opportunities to soften the price impact for market participants and consumers by considering whether the depreciation schedule for the new market systems was appropriate.

Similarly, the AEC suggested that costs may be higher if AEMO calculated depreciation on a straight-line basis using the capital expenditure on an asset with a short economic life.[118] Both Synergy and the AEC encouraged the ERA to explore other depreciation methods, such as the real annuity method.

Australian Accounting Standards require intangible assets with a finite useful life to be amortised systematically over the useful life of the asset.[119] The amortisation method used needs to reflect the pattern in which the assets future economic benefits will provide benefit to the organisation. If the pattern of benefit is unable to be reliably determined, then the straight-line method is used. Amortisation commences when the asset is available for use.

Under accounting standards, the amortisation period and the amortisation method for an intangible asset must be reviewed at least at each financial year end. This review is generally undertaken by the organisation and checked and signed off by the external auditors of the company. If the expected life of an asset is different from previous estimates, then the amortisation period and therefore the amortisation charged to the income and expenditure statement is changed, accordingly.

In its AR6 proposal, AEMO has followed Australian Accounting standards for both capitalising assets and the depreciation/amortisation of these assets.

ERA review, findings and draft determination

A review of proposed depreciation and amortisation for the AR6 period revealed that AEMO is calculating depreciation on a straight-line basis over the useful life of the asset. The ERA considered if alternative methods, such as the declining balance and the sum of the years' digits method plus the real annuity method, were more appropriate to determine these annual costs. Both the declining balance and the sum of the years' digits method result in higher depreciation costs in the earlier years of an assets life. These methods are generally used if the value of an asset is more likely to decline quicker in the early years of its life. The ERA does not consider this is the case with AEMO's assets.

The use of the real annuity method of depreciation is linked to the future cash flows of an asset. As none of the assets of AEMO generate cash flows (AEMO's cash flows are generated

116 Ibid, p. 2.

117 Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

118 Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

119 Australian Accounting Standards Board, Compiled Accounting Standard AASB 138 – Intangible Assets, (online).

by the recovery of costs), the ERA does not consider this method to be appropriate for the calculation of depreciation.

The ERA has reviewed the effective life of the assets that AEMO has capitalised over the AR6 period. The effective life of the assets varies between three to five years for software and tools, five years for hardware, and 10 years for systems or new platforms. The effective life allocated to the various classes of assets is considered appropriate by the ERA with the two exceptions noted below.

AEMO had applied short operational lives to two systems developed as part of the WEM reform program. AEMO's rationale for expensing the costs over only three years is that both systems will need to be replaced or significantly modified with the introduction of five-minute settlement (see section 6.1.5) and the new market settlement system. Costs for these assets total $11.7 million and the shorter effective life affects the amortisation expense in the AR6 and AR7 periods.

For the draft determination, the ERA completed a detailed review of the type of capitalised costs forming the asset base and the amortisation of these assets. The ERA is satisfied that both are in accordance with Australian Accounting Standards for intangible assets and concur with AEMO's initial assessments for effective life. AEMO's proposed depreciation and amortisation for AR6 compared to values in the AR5 period and the ERA's draft determination are shown in Table 12.

Table 12: AEMO proposed and ERA draft determination on depreciation and amortisation costs in AR6 ($ million)

AR5 determination	AR5 actual forecast	AR6 proposed	**Draft determination**
23.6	20.7	50.9	**48.0**

Source: AEMO AR6 proposal and ERA analysis

With many of the capital projects being completed and entered into service mid-way through the AR6 period, the full effect of amortisation for these projects is not seen until AR7. Table 13 shows the periods assets are entered into service. Table 14 shows the projected depreciation of the assets built into the AR5 period and those proposed in the AR6 period over their effective lives. Table 15 shows the effect the ERA's proposed reduction in capital expenditure for AR6 will have on the depreciation expense over the AR6 to AR9 periods.

Table 13: Capital assets entered into service ($ million)

Existing assets 2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	Total
28.1	24.9	91.3	10.4	5.1	4.1	4.1	**168.0**

Source: AEMO AR6 proposal and supporting documents

Table 14: Amortisation of capital assets in service ($ million) as per AEMO's proposal

AR6	AR7	AR8	AR9
50.9	62.2	37.0	14.0

Source: AEMO AR6 proposal and supporting documents

Table 15: Amortisation of capital assets in service ($ million) after ERA adjustments

AR6	AR7	AR8	AR9
48.0	56.3	33.6	10.2

Source: ERA analysis

Final approved depreciation and amortisation operating expenditure will depend on the ERA's approval of capital expenditure for the AR6 period.

5.1.2.2 Revised proposal and final determination on forecast depreciation and amortisation

AEMO's revised proposal

The ERA reviewed AEMO's methodology for capitalising assets and the effective life of those assets for the draft determination and concluded both were in accordance with Australian Accounting Standards. AEMO has advised it has maintained the same methodology and effective life for its capital assets in preparing the revised proposal.

The depreciation and amortisation expense included in the revised proposal differs from the ERA's draft determination for several reasons including:

- increased costs for several projects
- delays in completion dates
- the inclusion of capital projects that the ERA did not approve in its draft determination.

The depreciation and amortisation expense in AEMO's revised proposal reflects AEMO's changes to its capital expenditure forecast for the AR6 period. Table 16 shows the amounts and periods assets are entered into service in AEMO's proposal.

Table 16: WEM capital assets entered into service ($ million)

Existing assets June '22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28	Total
27.6	26.7	79.4	3.6	5.0	3.9	3.9	150.1

Source: AEMO AR6 revised proposal and supporting documents.

Based on the revised capital expenditure and dates of assets being entered into service, AEMO has recalculated the depreciation expense for the AR6 period. The table below summarises changes in the depreciation expense from the draft determination to AEMO's revised proposal.

Table 17: ERA draft determination and AEMO revised depreciation proposal ($ million)

AR6 revised proposal	Draft determination	Variance
48.8	48.0	0.8

Source: AEMO revised AR6 proposal and ERA draft determination.

ERA review findings and final determination

The ERA has reviewed both the methodology and effective life of the assets in AEMO's revised proposal and concluded both are consistent with those used in the initial proposal. The ERA has conducted a thorough review of AEMO's proposed capital expenditure of $72.0 million over AR6 and in its final determination approved $61.5 million of this expenditure. Details of the approved forecast capital expenditure are discussed in section 6. The changes to the capital base of projects and the delay of some expenditure on WEM projects from AR5 to AR6 influences the depreciation expense across the effective life of each asset. These changes will result in assets being built as part of the energy reform program having a bigger effect on allowable revenue in both the AR8 and AR9 allowable revenue periods.

The ERA found inconsistencies between the various worksheets provided in support of AEMO's revised proposal. In some instances, asset values were understated in the depreciation and amortisation schedule while others were overstated, and in one instance an asset was duplicated and consequently the depreciation expense on this asset was duplicated. Depreciation has been recalculated for the final determination and forward periods after making the following adjustments:

- Duplicate assets removed.
- Cost base of assets reduced to reflect grants received.
- Cost base of assets reduced to reflect capital expenditure approved by the ERA in its final determination.
- Asset values corrected for inconsistencies between the depreciation schedule and the individual financial tracking worksheets.

The revised depreciation across AR6 to AR9 is detailed in Table 18 below.

Table 18: Comparison of AEMO proposed amortisation of capital assets in service and ERA final determination (FD) calculations after adjustments ($ million)

AR6		AR7		AR8		AR9	
AEMO Proposal	ERA FD	AEMO Proposal	ERA FD	AEMO Proposal	ERA FD	AEMO Proposal	ERA FD
48.8	45.5	58.1	53.4	35.4	33.6	13.6	11.0

Source: AEMO revised AR6 proposal and ERA analysis

Table 19 below compares the AEMO's proposed depreciation and amortisation for AR6, the ERA's draft determination and the ERA's final determination.

Table 19: Forecast depreciation and amortisation values through the determination process ($ million)

AR6 initial proposed	Draft determination	AEMO revised proposed	Final determination	Variance from Proposed (%)
50.9	48.0	48.8	45.5	**(6.8)**

Source: AEMO AR6 proposal, ERA draft determination, AEMO revised AR6 proposal and ERA analysis

5.1.3 Accommodation

5.1.3.1 Initial proposal and draft determination on forecast accommodation costs

AEMO's initial proposal

In Western Australia, AEMO leases offices in the Perth CBD and data warehouse space for its servers in Malaga.

AEMO has not proposed an increase in its accommodation footprint during the AR6 period. While employee numbers are forecast to increase considerably, AEMO has shifted to more flexible working arrangements, with employees now adopting a mix of working from home and in the office. The proposed operational expenditure on accommodation includes utilities and outgoings, such as water, electricity and building management costs, leased assets and occupancy lease interest.

In AEMO's initial proposal forecast accommodation costs were 34 per cent higher than the estimated actual costs from AR5, mainly due to changes in accounting practices, rather than actual increased expenditure.

Prior to 1 July 2021, AEMO partially capitalised accommodation costs based on a fixed rate per hour on FTE hours worked on capital projects. This policy ceased with the introduction of accounting standard AASB 16 and, as a result, all occupancy costs are either expensed at the time they are incurred or are accounted for as prescribed by AASB 16. Under this accounting standard, lessees are required to recognise assets and liabilities for all leases with a term of more than 12 months, unless the underlying asset is of low value. The lessee is required to recognise a right of use asset representing its right to use the underlying leased asset and a lease liability representing its obligation to make lease payments.

Prior to the introduction of this accounting standard, operating expenditure for operating leases, such as accommodation, was the actual payment made under the lease arrangement. Costs remained flat throughout the period of the lease. Under AASB 16, operating expenditure now consists of the amortisation of the capitalised right of use asset over the period of the lease and an interest component for the lease liability. Operating expenditure for leased assets is higher in the earlier years of a lease when the lease liability and therefore the interest is higher.

Review, findings and draft determination

The proposed operating expenditure in the AR6 period for accommodation reflects the lease terms of AEMO's current accommodation leases and the accounting requirements of AASB 16, except for the Malaga data centre. The current lease on this property is due to expire in June 2024. AEMO stated that systems hosted in this data centre require real time applications and are therefore not suitable candidates for AEMO's public cloud environment. Consequently, AEMO's intention is to renew the contract with the existing data centre, as

reflected in the AR6 proposal. AEMO's proposed accommodation costs for the AR6 period compared to values in AR5 and the ERA's draft determination are shown in Table 20.

Table 20: AEMO proposed and ERA draft determination on accommodation costs in AR6 ($ million)

AR5 determination	AR5 actual forecast	AR6 proposed	Draft determination
1.6	3.8	5.2	**5.2**

Source: AEMO AR6 proposal and ERA analysis

5.1.3.2 Revised proposal and final determination on forecast accommodation costs

AEMO's forecast costs for accommodation for AR6 are unchanged from its initial proposal. The ERA approved these forecast costs in its draft determination and has approved the equivalent forecast costs for the final determination. Table 21 below summarises these costs.

Table 21: Forecast accommodation costs through the determination process ($ million)

AR6 proposed	Draft determination	Final determination	Variance from proposed (%)
5.2	5.2	5.2	**-**

Source: AEMO AR6 proposal, ERA draft determination and AEMO revised AR6 proposal

5.1.4 Supplies and services

5.1.4.1 Initial proposal and draft determination on forecast supplies and services

AEMO's initial proposal

Supplies and services include costs for consultants, licences, training, travel, subscriptions, and corporate services. AEMO's initial proposed expenditure of $13 million for supplies and services in AR6 is 8 per cent higher than its forecast of actual expenditure in AR5.

Review, findings and draft determination on supplies and services costs

During the AR5 period, AEMO completed a project to bring system management services in-house. Prior to this, system management services had been provided by Western Power to AEMO, with Western Power paid through a service level agreement, captured as consulting costs. The AR5 period included approximately $4.5 million of consulting costs for the Western Power services agreement.

Once the system management services were transferred to AEMO, its consultancy costs were expected to reduce.[120] However, the anticipated saving has been offset by significant proposed increases in:

[120] In its submission, Perth Energy questioned whether there is a similar reduction in Western Power expenditure because Western Power would have been responsible for system life extension prior to the move of the system to AEMO.

- Legal consultant costs up from $0.3 million to $0.9 million in AR6.
- The allocation of corporate costs (finance, legal, human resources) to Western Australia (termed enterprise recoveries by AEMO) up from $2.3 million to $2.9 million.
- Subscriptions and research data costs up from $0.5 million to 1.6 million.
- Training costs up from $0.7 million to $1.6 million.
- Other costs, supplies and services, increasing from $0.2 million to $0.7 million.

AEMO has advised that the increase in legal consultants is based on the increased risk of disputes as the new market goes live. The ERA considered this increase to be excessive, given that AEMO has in-house legal counsel who could assist with any disputes that arise and that the number of any disputes likely to occur cannot be substantiated. In the draft determination the ERA proposed partially rejecting forecast legal consulting costs of $0.4 million.

Enterprise recoveries are costs charged to Western Australia under AEMO's corporate allocation policy. These costs are based on Western Australia's portion of total FTEs. The proposed increase is largely driven by the proposed increase in Western Australian FTEs. In the draft determination, the ERA included forecast costs for 9.3 of the 33.7 FTEs requested. Consequently, the ERA reduced the enterprise recovery costs consistent with this level of additional staff.

The other supplies and services category included around $0.4 million of costs associated with the DER network services marketplace trial and design project. This is an operational project comprising two actions identified within the DER Roadmap. The second of the two action points requires AEMO to commence the development of trials for a distribution services market for network support by July 2024. This action is dependent on the completion of Project Symphony and other DER projects. Given the uncertainty, the ERA considered it was not prudent to approve costs pertaining to this operational project in the draft determination and so also did not approve associated supplies and services costs. Any forecast costs related to this operational project should be included in an in-period submission.

Training costs can be broken into two categories, those provided by employees and those provided by external consultants. In its initial proposal, AEMO advised that the costs for training provided by employees totalled $0.54 million and assumed that operational staff involved in this training will be backfilled during the training period. The ERA disagreed with the backfilling assumption, given in-house training only runs for a matter of hours at a time. Consequently, the ERA did not approve this forecast cost in the draft determination. Included in the training provided by external consultants is an allowance per FTE. This allowance is based on 145 FTEs. As all additional FTEs are not expected to be approved for AR6, the ERA did not approve $0.2 million in proposed training expenditure.

The ERA rejected $0.5 million in forecast expenditure on subscriptions and research data costs. While some uplift of costs in this category is expected due to the changes to the market, the ERA has not been given sufficient information to justify the full increase from $0.5 million to $1.6 million as initially proposed by AEMO.

AEMO's proposed supplies and services costs for the AR6 period compared to values in AR5 and the ERA's draft determination are shown in Table 22.

Table 22: AEMO proposed and ERA draft determination on supplies and services costs in AR6 ($ million)

AR5 determination	AR5 actual forecast	AR6 proposed	Draft determination
17.3	12.4	13.0	**10.7**

Source: AEMO AR6 proposal and ERA analysis.

5.1.4.2 Revised proposal and final determination on supplies and services

AEMO's revised proposal

AEMO partially accepted the ERA's draft determination costs for supplies and service forecast. AEMO's revised proposal accepted reductions to legal costs, subscriptions, and the DER network services marketplace trial in full but included increases to training and enterprise recovery costs. These increases in costs were based on AEMO's revised FTE forecast. Table 23 below details movements in supplies and services costs from the draft determination to AEMO's revised proposal.

Table 23: ERA draft determination and AEMO revised proposed supplies and services for the AR6 period ($ million)

Expense	Draft determination	Revised AR6 proposal	Variance
Contractors	0.2	0.2	-
Consulting IT	0.6	0.6	-
Consulting Legal	0.5	0.5	-
Consulting Other	3.5	3.5	-
Enterprise Recoveries	2.4	2.6	0.2
Professional membership	0.1	0.1	-
Subscriptions and research data	0.8	0.9	0.1
Repairs and maintenance	0.1	0.1	-
Other	0.5	0.5	-
Training	0.9	0.9	-
Travel and Accommodation	0.5	0.5	-
Market Audit	0.6	0.6	-
Unreconciled discrepancy in revised proposal	-	(0.2)	(0.2)
Total Costs	10.7	10.8	0.1

Source: AEMO AR6 revised proposal and ERA analysis.

ERA review, findings and final determination

The ERA has reviewed AEMO's proposed changes to costs for supplies and services in its revised proposal. The increase to enterprise recoveries is driven by the proposed increase in FTE positions. AEMO has proposed an increase from the 9.3 FTE the ERA approved in its draft determination to 30.8 FTE. The ERA has reviewed these numbers and approved a staged increase of up to 21.7 full-time contractors in FY25 in its final determination. Based on this increase in FTE positions, forecast enterprise recovery costs increased to $2.5 million for the final determination.

AEMO's revised proposal did not justify an increase in subscriptions and research data costs. The ERA therefore maintains its draft determination position on this forecast expense.

Table 24 below summaries the ERA final determination on costs for supplies and services.

Table 24: Forecast supplies and services costs through the determination process ($ million)

Draft determination	AR6 revised proposal	Final determination	Variance to draft (%)
10.7	10.8	10.7	-

Source: AEMO AR6 revised proposal and ERA analysis.

5.1.5 IT and telecommunications

5.1.5.1 Initial proposal and draft determination on forecast IT and telecommunications

AEMO's initial proposal

IT and telecommunications costs include IT support, software support contracts, telecommunications, IT leased assets and cloud costs.

AEMO's initial proposed expenditure for IT and telecommunications in AR6 was $11 million, against a forecast actual expenditure of $4.8 million for AR5. Proposed AR6 expenditure sees increases in costs from forecast actual AR5 expenditure across many of the expense lines in this category, with the biggest increases being in:

- cloud costs, up from $0.1 million in AR5 to $3.4 million in AR6,
- software support, up from $3.3 million to $5 million, and
- other IT, up from zero to 0.8 million.

Other IT costs consist of $228,000 for laptops, computer screens, a new screen for the upgrades to the Perth Control room, and $520,000 for software for the Network Services Market Trial in 2024/25.

Review, findings and draft determination on IT and telecommunications costs

In the draft determination, the ERA approved costs for the upgrades to the control room as proposed by AEMO.

However, consistent with the ERA's approach to determine the supplies and services expense (section 5.1.4), the ERA rejected costs for the second of two actions in the DER Roadmap, summarised under the DER network services marketplace trial and design project. The ERA

considered it was not prudent to approve costs pertaining to this operational project at this point in time and rejected the associated IT and telecommunications cost accordingly. Any costs related to this operational project should be included in an in-period submission.

The increase in cloud costs was expected as AEMO transitions its IT infrastructure away from the traditional hardware and data centre solution to a cloud solution. As an offset to this cost increase, the ERA expected to see a decrease in hardware and software maintenance, software support, accommodation and depreciation relating to hardware and software in the existing environment. In its initial proposal, AEMO stated that the use of a cloud environment provided a more secure, sophisticated, and scalable suite of IT solutions, and reduces AEMO's on-site server and infrastructure costs.[121] It is unclear whether AEMO included these expected savings in its AR6 operating cost forecasts.

To determine cloud costs in the AR6 period, AEMO used a model to trend and then track cloud costs direct from major cloud suppliers like Microsoft. From this information, AEMO derived the costs of cloud environments as the projects go through their lifecycle. This method does not consider best practices in cloud workload and configuration and refresh processes. Research shows that without employing optimisation tools, cloud costs for businesses are often up to 50 per cent higher than they need to be. In the draft determination, the ERA partially rejected cloud costs of $1 million in AR6 to account for savings AEMO could obtain from employing tools to optimise cloud usage and therefore costs.

Software support was largely driven by the requirement for additional Oracle and Plexos licences to support the new market platforms.

AEMO's proposed IT and telecommunications costs for AR6 compared to values in AR5 and the ERA's draft determination are shown in Table 25.

Table 25: AEMO proposed and ERA draft determination on IT and telecommunications costs in AR6 ($ million)

AR5 determination	AR5 actual forecast	AR6 proposed	Draft determination
8.2	4.8	11.0	**9.0**

Source: AEMO AR6 proposal and ERA analysis

5.1.5.2 Revised proposal and final determination on IT and telecommunications

AEMO's revised proposal

AEMO accepted the ERA's draft determination findings on proposed cloud costs and the IT costs associated with the DER Network Services Marketplace Trial and design project. However, AEMO revised software support costs from the amount approved in the draft determination as shown in Table 26 below.

[121] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 62. (online)

Table 26: Forecast IT and telecommunications cost in the draft determination and AEMO's revised proposal ($ million)

Expense	Draft determination	AR6 revised proposal	Variance
Cloud Costs	2.4	2.4	**-**
Software Support	6.6	7.0	**0.4**
Other IT (includes DER Network Service Marketplace Trial and Design project)	-	-	**-**
Total	**9.0**	**9.4**	**0.4**

Source: AEMO AR6 revised proposal and ERA draft determination.

ERA review, findings and final determination

AEMO's revised proposal forecast software support costs to increase by $400,000 above the costs it proposed ahead of the draft determination. AEMO's detailed expenditure in its revised proposal shows that the costs included in the AR6 proposal for telecommunications, hardware maintenance, minor purchases and leased IT assets are significantly higher than the AR5 actual and forecast costs for these expenses. No justification is given for the proposed increases and therefore the ERA maintains its approval of $9 million in forecast costs for this expense category in its final determination.

Table 27: Forecast IT and telecommunications costs through the determination process ($ million)

Draft determination	AR6 revised proposal	Final determination	Variance to draft (%)
9.0	9.4	9.0	**-**

Source: AEMO AR6 revised proposal and ERA draft determination.

5.1.6 Borrowing expenses

5.1.6.1 Initial proposal and draft determination on borrowing expenses

AEMO's initial proposal

AEMO's borrowing facilities increased from $238 million in 2020 to $358 million in 2021. This increase reflects the significant expenditure on capital projects in both the WEM and NEM. AEMO's accounting policy is to capitalise interest on projects that are in progress then, once the asset is in service, to expense the ongoing borrowing cost as operating expenditure. This approach is in line with Australian Accounting Standards (AASB 123).

In its response to the issues paper, Alinta considered AEMO's proposal did not provide adequate information on its borrowing costs, and so it could not evaluate whether AEMO was borrowing at reasonable costs, managing its debt levels prudently, planned to increase borrowings in the future, or had over-recovered its borrowing costs in the past.[122] Alinta considered that the absence of previous borrowing costs indicated that AEMO had sufficient

[122] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

cash to cover its previous capital expenditure and would not require further depreciation of AR5 capital expenditure in the current period.

Review, findings and draft determination on borrowing expenses

Total interest expensed in the AR5 period was negligible, as assets relating to the Western Australian operation were mostly written off. The significant amount spent on capital assets and the transfer of these assets into service during the AR6 period will result in interest being allocated to operating expenditure in Western Australia consistent with the AEMO accounting policy and generally accepted accounting principles.

The interest rate applied to AEMO borrowings is the Bank Bill Swap Rate (BBSW) plus the average credit margin on existing term borrowing facilities. The interest rate being applied to the average borrowings over the AR6 period is in line with the one-year and three-year BBSW rates as they currently stand. While the current BBSW rate is low the one-year and three-year rates increase materially, as expected, due to the uncertainty time creates. Consequently, the interest being applied to the high debt levels in 2023/24 and 2024/25 affects both proposed borrowing costs and the ability to determine these costs with any degree of accuracy.

With no distinct debt facility applicable to the WEM, the only borrowings AEMO has calculated are borrowing expenses based on the average level of borrowings for the period. AEMO determined average borrowings using the opening balance plus the value of any assets transferred into service for the year, taking into account depreciation expensed. The ERA was not satisfied by the accuracy of AEMO's proposed borrowing costs. The ERA requested cash flow information for the Western Australian operations only, but AEMO was unable to provide this information.

To inform the draft determination, the ERA constructed a cash flow based on an opening asset base of $28.1 million, with equal monthly revenues and recurring expenditure for each year and with capital projects included in the month those projects are expected to become operational. The ERA calculated interest based on these monthly cash flows. AEMO's proposed borrowing costs for AR6 compared to values in AR5 and the ERA's draft determination are shown in Table 28.

Table 28: AEMO proposed and ERA draft determination on borrowing expenses in AR6 ($ million)

AR5 determination	AR5 actual forecast	AR6 initial proposed	Draft determination
-	-	5.2	**4.4**

Source: AEMO AR6 proposal and ERA analysis

The final borrowing costs approved in AR6 will be dependent on the total capital expenditure approved and the expected changes to timing for capital projects going into service during this period.

5.1.6.2 Revised proposal and final determination on forecast borrowing costs

AEMO's revised proposal

Borrowing expenses in AEMO's revised proposal have increased significantly on those proposed in its initial proposal. The Reserve Bank increased interest rates by 0.25% in its May meeting. With economists forecasting bank borrowing rates to continue to rise throughout the 2023 and 2024 financial years, AEMO revised its interest rate calculations to reflect the latest

advice on bank bill swap rates. Table 29 details the ERA's draft determination and AEMO's revised proposal for borrowing costs in AR6.

Table 29: ERA draft determination and AEMO's revised proposal for borrowing costs ($ million)

Draft determination	AR6 revised proposal	Variance to draft (%)
4.4	8.3	88.6

Source: AEMO AR6 revised proposal and ERA draft determination

ERA review, findings and final determination

The borrowing costs in AEMO's revised proposal increased 59.6 per cent from AEMO's initial proposal. With lower capital expenditure now included in AEMO's proposal this increase can be attributed solely to the increase in interest rates from December 2021 to April 2022. At the time of preparing the proposal the market was expecting the Reserve Bank to increase the short-term cash rate. The market's expectation of this increase on forward rate was significant. AEMO sought advice from their bank on the one, two and three years forward interest rates and applied these rates with their lending margin on capital borrowings over the period. This resulted in estimated borrowing costs for AR6 of $8.3 million. In completing its due diligence of the borrowing costs, the ERA assessed the forecast interest rates against alternative sources and determined that the rates used by AEMO were appropriate.

Borrowing expenses are calculated by applying the appropriate interest rate for the period to the outstanding capital borrowings after any reductions from the collection of market fees. The changes to approved borrowing expenses the ERA has made in its final determination reflect the reduction in approved capital expenditure over the AR6 period. Final approved operating borrowing costs for AR6 are $7.6 million. Table 30 below shows the variance between the proposed and final determination costs.

Table 30: Forecast borrowing costs through the determination process ($ million)

AR6 revised proposal	Final determination	Variance	Variance (%)
8.3	7.6	0.7	8.4

Source: AEMO AR6 revised proposal and ERA analysis

5.1.7 Operating expenditure projects

5.1.7.1 Initial proposal and draft determination on forecast operating expenditure projects

AEMO's initial proposal

AEMO included $3.9 million for projects in the proposed operating expenditure for the AR6 period. The inclusion of projects in operating expenditure was a departure from the policy adopted in previous proposals where all costs relating to a project were capitalised. Operating expenditure included forecast costs of:

- $2.0 million for DER network services marketplace trial and design – this project is driven by one of AEMO's obligations under the DER Roadmap.
- $0.9 million for five-minute settlement project planning - this project aligns the frequency of settlement of market transactions with the frequency of dispatch in the WEM, by

increasing the frequency at which market transactions are settled from every 30 minutes to every five minutes.

- $1 million for WEM reform decommissioning – this is the forecast cost for taking existing WEM systems out of service once the new market design, and underlying new system, is operational.

Review, findings and draft determination on operating project costs

The ERA reviewed these costs and confirmed that they are operating costs for early planning or research activities and do not result in the creation of a separately identifiable asset with a future benefit to AEMO. For costs of internally generated assets to be capitalised under the relevant accounting standards (AASB 138), both conditions must be met.

The ERA reviewed the proposed operating projects, the costs for which almost all fall in the final year of the AR6 period. The one exception is the development of the initial design for the framework for a distribution services market, with fit-for-purpose arrangements for dispatch and settlement, which is being driven by the DER Roadmap, published in 2019.

The ERA approved only the $0.2 million required for work on the development of the initial design for the framework for a distribution services market, as this project was the most certain and most advanced of the operating projects. AEMO can seek funding for the balance of the operational projects in an in-period submission when there is more certainty around the timing and requirements for the projects and a stronger case for cost estimates.

As a result, the ERA's draft determination on the corresponding forecast labour cost and the IT and telecommunication cost categories are $3.1 million and $0.5 million lower than AEMO's initial proposal, respectively.

5.1.7.2 Revised proposal and final determination on forecast operating expenditure projects

AEMO's revised proposal

In its revised proposal for operating expenditure projects, AEMO accepts the ERA's draft determination to exclude funding of $1 million from the operating cost forecast for the decommissioning of WEM legacy systems and applications. While AEMO agreed that some WEM legacy market systems will need to be decommissioned following reforms, it agreed that there is sufficient uncertainty around the timing of this work. Decommissioning of redundant systems and applications will depend on what happens during and after the new market starts (October 2023) and the volume and nature of any issues that may arise. In its revised proposal, AEMO proposed any decommissioning work required during the AR6 period will be funded from within its AR6 approved operating expenditure limits. AEMO further proposed that, should a funding shortfall become evident, an in-period adjustment will be sought.

In its revised proposal, AEMO also accepts the ERA's decision to exclude all but $0.2 million of forecast costs for the initial design and framework for a distribution services market under the DER network services marketplace trial and design project. After seeking further clarity around the timing, AEMO agreed with the ERA's view and did not include these costs in its revised proposal. Should more certainty become evident during the AR6 period and once the scope is better defined, AEMO will submit an in-period submission to fund this work.

In its revised proposal, AEMO proposed that planning costs for 5-minute settlement need to be included in the AR6 operating cost forecast. While there is still much uncertainty around the scope and costs for this project, the actual project itself remains a crucial part of the State Government's Energy Transformation Strategy. Therefore, there is a need to develop the

business case and commence planning early in the AR6 period. This point was supported by EPWA in its response to the draft determination. AEMO's revised proposal included forecast costs of $1 million for the 5-minute settlement project. AEMO's revised proposal on operating cost projects in response to the ERA's draft determination are shown in Table 31 below.

Table 31: ERA's draft determination and AEMO's revised proposal on forecast costs for operating projects ($ million)

Operating expenditure project	Draft determination $ millions	AR6 revised proposal $ millions	Variance to draft determination $ millions
DER network services marketplace trial and design	0.2	0.2	-
WEM reform decommissioning	-	-	-
WA 5-minute settlement planning	-	1.0	1.0
Total	**0.2**	**1.2**	**1.0**

Source: AEMO AR6 revised proposal and ERA draft determination

Stakeholder feedback in response to the ERA draft determination

Two stakeholders, in addition to AEMO, commented directly on the 5-minute settlement operating cost project in their submissions in response to the draft determination.

Collgar Wind Farm stated:

> Collgar agrees with the ERA's conclusion that it isn't appropriate to approve costs for AEMO to develop a trial for the distribution services market.
>
> Collgar considers that AEMO ought to have scoped the design of its systems so that functionality for five-minute settlement can be added at least cost, rather than needing substantial rework. While the WEM Rules have not yet been amended to include this requirement, there is a clear, documented policy decision that five-minute settlement will commence on 1 October 2025. Further, amendments to the Electricity Industry (Metering) Code have been made to require Western Power to commence works, including metering and IT upgrades, to implement five-minute settlement. Given this, there is a clear mandate for five-minute settlement and hence AEMO ought to be designing its systems with these future requirements in mind.[123]

EPWA stated:

> The planned updates to market settlement arrangements to introduce five-minute settlements (5MS) into the WEM by October 2025 is also included in Stage 2 of the Western Australian Government's ETS, announced in July 2021. We will require significant input from AEMO to support the planning and design of this complex reform, and early input from AEMO and industry stakeholders will be critical to ensure a fit-for-purpose implementation of 5MS in the WEM.[124]

[123] Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination,* (online)

[124] Energy Policy WA, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination,* (online)

ERA review, findings and final determination

The ERA has reviewed AEMO's reasoning behind including the business case and planning costs for the 5-minute settlement project in the operating costs of AR6. The ERA concludes that there is sufficient evidence that this work is essential in the short term to ensure the delivery of the Government's Energy Transformation Strategy. Stakeholder feedback from Energy Policy WA and Collgar Wind Farm supports this conclusion.

However, a review of the costs included in the proposal shows inconsistencies between the revised proposal for all operating cost projects and the costs calculated in the workforce plan and included in the operating expenditure total costs. Table 32 shows labour costs for operating cost projects included in the workforce plan.

Table 32: Forecast labour costs included in operating project estimates in the AR6 period ($ million)

Operating cost project	AR6 revised proposal $ millions	AMEO workforce plan costings $ millions	Variance $ millions
DER network services marketplace trial and design	0.2	0.2	-
WA 5-minute settlement planning	1.0	0.8	(0.2)
Total	1.2	1.0	(0.2)

Source: AEMO AR6 revised proposal and AEMO workforce plan costings

There are inconsistencies in labour costs between the workforce plan and AEMO's revised proposal. Labour costs for the DER network services marketplace trial and design are consistent with AEMO's proposal but costs for 5-minute settlement planning are 20 per cent higher in the proposal than in the workforce plan. The ERA has adjusted these forecast costs in its final determination to reflect the lower labour value shown in AEMO's workforce plan. The adjustments to forecast labour operating costs described in section 5.1.1.2 have been applied to the labour element of operating projects for the ERA's final determination.

Table 33: Forecast costs for operating cost projects through the determination process ($ million)

Operating cost project	Draft determination $ millions	AR6 revised proposal $ millions	Final determination $ millions	Variance to revised proposal $ millions
DER network services marketplace trial and design	0.2	0.2	0.2	-
WEM reform decommissioning	-	-	-	-
WA 5-minute settlement planning	-	1.0	0.7	0.3
Total	0.2	1.2	0.9	0.3

Source: ERA draft determination and AEMO AR6 revised proposal.

6. Detailed assessment of AEMO's WEM forecast capital expenditure

The ERA's final determination is to approve WEM forecast capital expenditure of $61.5 million for the AR6 period. This is $10.5 million or 14.6 per cent lower than AEMO's revised proposed forecast capital expenditure of $72.0 million for the WEM. The final determination is $9.5 million or 18 per cent higher than the ERA's draft determination. See Appendix 13.

The variance between AEMO's revised proposed costs and the ERA's final determined costs for each of the capital work programs and total project contingencies are summarised in Table 34.

Table 34: AEMO revised proposed and ERA final determination on WEM forecast capital expenditure ($ million)

Forecast capital expenditure	AR6 revised proposed	Final determination	Variance	Variance (%)
Facilitating the Energy Transformation Strategy	48.2	**44.0**	(4.2)	(8.7)
WEM sustaining capital expenditure	12.8	**11.2**	(1.6)	(12.5)
Contingencies	11.0	**6.3**	(4.7)	(42.7)
Total forecast capital expenditure	72.0	**61.5**	(10.5)	(14.6)

Source: AEMO AR6 proposal and ERA analysis.

Labour costs remain the largest component of AEMO's capital program (around 90 per cent[125]). The ERA has reviewed AEMO's approach to determining labour quantities and costs across the capital projects program in section 6.1.1. The ERA's final determination on AEMO's two capital expenditure workstreams – facilitating the Energy Transformation Strategy (WEM reform and DER Roadmap projects) and WEM sustaining capital expenditure – are presented in sections 6.1.2, 6.1.3 and 6.1.4, respectively. Project contingency costs are discussed in section 6.1.6.

In each section there are two sub-sections that explain:

- AEMO's proposal, stakeholder feedback on the issues paper and the ERA's determination for AR6.
- AEMO's revised proposal, stakeholder feedback in response to the draft determination and the ERA's final determination.

[125] This includes internal and external labour.

6.1.1 Capital expenditure labour costs

6.1.1.1 ERA's review findings and draft determination

AEMO's initial proposal

The labour element of AEMO's forecast capital expenditure for the WEM (excluding project contingency) is summarised in Table 35.

Table 35: AEMO proposed forecast capital labour costs ($ million) for the AR6 period

Capital expenditure projects	Labour costs			
	2022/23	2023/24	2024/25	AR6
Initial labour costs, at December 2021	29.1	19.4	9.7	**58.2**
Revised labour costs, at April 2022	30.6	18.7	9.3	**58.6**
Variance	1.5	(0.8)	(0.4)	**0.4**

Source: AEMO proposal workforce plan

As explained in section 5.1.1, AEMO provided three sources of data to support its proposal for forecast labour costs: a workforce plan that allocated staff to capital projects, a financial tracking sheet for each project showing all the costs for that project, and a staff manifest (a list of staff positions with corresponding breakdown in labour cost information for each position).

AEMO's proposed labour costs for capital projects were calculated using a tier (or unit) rate multiplied by the number of FTE days the individual was expected to work on the capital project. Some staff were allocated to multiple projects.

Labour tier rates

To calculate the tier rates, AEMO reviewed a subset of the costs of AEMO staff and contractors who had worked on capital projects in 2020/21. Staff costs were grouped, based on seniority and skill set, into five groups for permanent staff and five groups for contract staff. AEMO then calculated an average unit rate for each tier. The five tier rates for contract staff were lower, reflecting a more modest remuneration package, without performance incentives and long service leave entitlements, due to the relatively brief tenure of contract staff. AEMO used each individual's tier rate, multiplied by their estimated FTE days, to build up labour costs for each project.

Labour quantity

AEMO estimated the quantity of FTE days allocated to each capital project based on actual staffing levels for projects already in progress. For new projects AEMO applied its standard approach to project management and costing – explained as its "T-shirt sizing approach". This approach populates the projects with a core team and draws in other expertise as required.[126]

[126] Where a project is entirely new and without precedent, AEMO will adopt a T-shirt sizing approach (i.e. small, medium, large, extra-large) to estimate the effort and resources required to deliver the project. From there, AEMO will estimate each element from a zero base, using prevailing market conditions and unit rates to determine costs where possible. Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 44. (online).

Stakeholder views in response to the ERA issues paper

Perth Energy noted that it had been seeking greater understanding of AEMO's growing expenditure on new IT systems and at the same time increasing staff base.[127] Regarding AEMO's reference to a peak in activities and resourcing effort during the real-time and essential services market launch, and a bedding down period of 12 to 18 months following this, Perth Energy stated that it was important that any temporary staff needs were not embedded into AEMO's ongoing staffing levels. Perth Energy expected that initially it may be better to over-staff a little, but as AEMO developed experience with the new markets and new tools over the first year or so, the numbers could be optimised.

Alinta also considered that increased investment in systems should allay or reduce the need for FTEs rather than lead to the need for additional capital expenditure to replace systems, and additional FTEs to "support functions associated with growth in systems."[128] Alinta questioned whether AEMO's investment in systems was efficient if it required significant increases in personnel and considered that these functions could be performed by staff no longer involved in market development as this phase of the WEM Reform project concluded.

Similarly, the AEC noted that AEMO's proposal of 31 new FTEs was a significant increase and came when more processes were being automated.[129] The AEC encouraged the ERA to thoroughly review the labour cost estimates and satisfy itself that these positions were justified and could not be performed more economically in another way (for example, through short-term contracting or reallocating existing teams).

Synergy also requested that the ERA consider the prudence of establishing permanent resources in the early, uncertain, stages of the new market, as compared to using flexible resourcing arrangements.[130] Synergy recommended the ERA consider the temporary nature of these positions and whether outsourcing was a cost-effective and viable alternative to in-sourcing, as it avoids establishing long-term recurrent costs and annual adjustments associated with permanent staff.

Synergy questioned whether AEMO had considered a similar sized shift back from capital to operating expenditure but could not see this occurring within the AR6 period. Synergy recommended the ERA consider whether capitalised resources should continue beyond the commissioning of the various systems, or if the staff can be redeployed back into the business, offsetting the labour uplift in the later years of AR6 and into AR7.

ERA's review, findings and draft determination

Initially, the ERA reviewed the three sources of data for consistency: the workforce plan, financial tracking sheet and staff manifest. The information in the three sources could not be reconciled.[131] After discussion with AEMO, the ERA focussed on the workforce plan and staff manifest to review AEMO's capitalised labour cost estimates.

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127 Perth Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

128 Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

129 Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

130 Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

131 The financial tracking sheets contained position names and titles but not position numbers. The staff manifest contained position titles and numbers but not names. The workforce planning sheet contained position titles and numbers but not names.

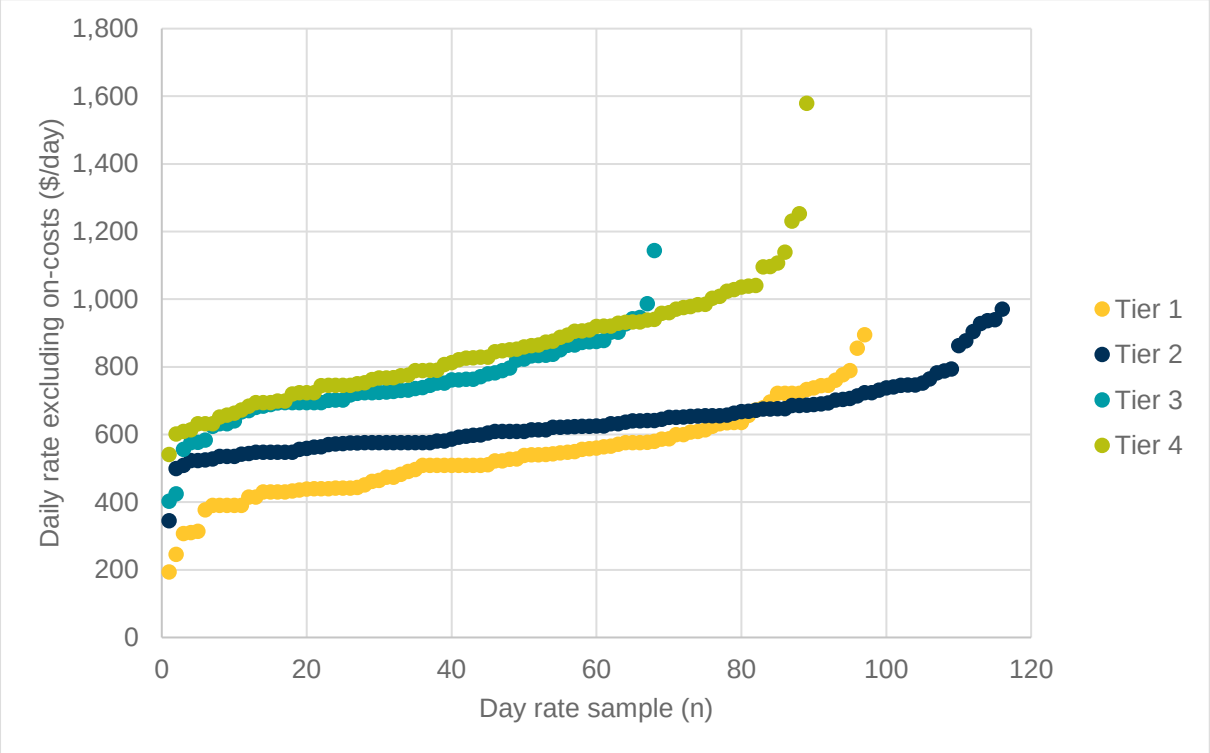
In a previous determination, the ERA expressed the following concerns with AEMO's calculation of tier rates:

> The overlap between tiers in the sample analysed by the ERA indicates the tiers do not clearly represent clusters of roles with similar competencies, responsibilities and pay rates.[132]

In its previous determination, the ERA chose to substitute actual costs for existing staff and estimated costs, based on market rates for new staff. Despite this, AEMO still used tier rates for capital costing purposes in AR6.

The ERA has reviewed AEMO's revised approach to calculating tier rates. Although AEMO had used a different sample of costs to estimate tier rates, the ERA found that there was still no discrete grouping of salary costs as demonstrated in Figure 6. A review of the top 10 per cent of the total salary sample contained representatives from all four of the employee cost tiers.

Figure 6: AEMO labour cost sample by tier[133]



Source: ERA analysis of AEMO data

The ERA recognises that it may be more convenient for AEMO to use 10 unit rates, rather than numerous individual staff costs as a guide when in the early stages of project costing. However, the WEM Rules require the ERA to approve the lowest practicably sustainable costs when determining AEMO's funding.[134] Using AEMO's tier rates overestimates capital labour

[132] Economic Regulation Authority, 2021, *AEMO in-period funding submission for the implementation of the DER Roadmap actions – Determination report*, p. 16. (online).

[133] The top employee tier only included one employee and so was not included in the ERA's analysis of staff tier rates.

[134] This approval is subject to additional considerations listed in WEM clause 2.22A.5(b).

costs and the use of these rates is inconsistent with the requirements in the ERA's proposal guideline.[135]

Consequently, to ensure a determination consistent with the WEM Rules, the ERA has used projected salary costs based on current actual AEMO salaries. For projects where AEMO has indicated the position will be drawn from internal staff, tier rates were substituted with actual average staff costs for comparable positions. For positions for which no AEMO data was available, tier rates have been substituted with industry values derived from salary guides adjusted to account for AEMO's employment practices.[136]

The ERA reviewed and used AEMO's estimated FTE days from the workforce plan. There are multiple individuals working on each capital project. However, the majority of projects began in AR5 and are underway as they enter the AR6 period. Consequently, the FTE day contribution expected from individuals working on projects are known or can be estimated by AEMO with some certainty.

For the reasons outlined above, in the draft determination the ERA considered that some of the costs proposed by AEMO did not meet the requirements of the WEM Rules. Following clause 2.22A.6(c) of the WEM Rules, the ERA substituted the labour costs in capital expenditure proposed by AEMO with actual salary information for named staff, average AEMO rates for staff identified as coming from internal resource and market rates for external contractors on capital projects and AEMO internal staff where the ERA had no other salary data. This resulted in a partial rejection of $2.1 million in labour costs as part of forecast capital expenditure in AR6.

There appeared to be differences between the labour costs in the workforce plan from which the costs were calculated for the draft determination and the financial tracking sheets, resulting in differences in the calculated values and the summation of costs from the individual projects. The draft determination noted that these inconsistencies should be rectified by AEMO prior to the final determination.

6.1.1.2 Revised proposal and final determination on forecast capital labour costs

In its revised proposal, AEMO resubmitted the workforce plan based on revised tier rates and corrected some of the errors in its initial labour costs, including:

- removing double counted positions
- correcting on-costs such as payroll tax
- revising and correcting workers compensation rates.

In section 5.1.1.1, the ERA outlined its concerns with AEMO using the tier method to estimating capital labour costs. In the final determinations, the ERA has not approved AEMO's forecast labour costs in the final determination and has substituted AEMO's tier rates with actual salary rates for occupied positions. Where there are unoccupied positions, with job titles similar to those for existing AEMO staff, the ERA has used comparable AEMO salary data to cost the unoccupied positions. Where comparable positions existed, the ERA used industry-expected rates to estimate costs for unoccupied positions.

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135 Economic Regulation Authority, 2021, Guideline to inform AEMO funding submissions under the WEM Rules ad GSI Rules, (online)

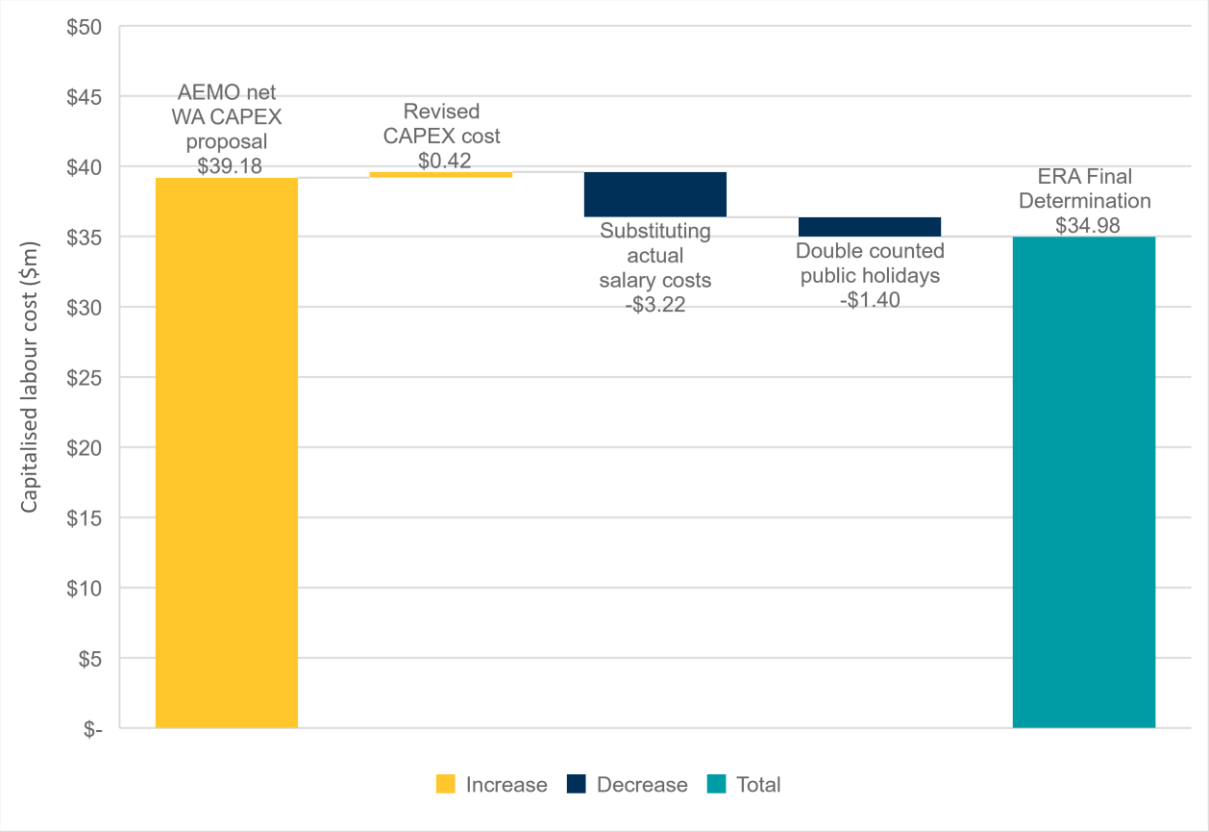
136 AEMO indexes salaries to the 75th percentile of the relevant industry. To emulate this practice, the mid-point between the average and maximum values for the relevant position based in Western Australia were used.

AEMO's revised proposal

The ERA's approach of using AEMO's actual employment costs where available results in a lower forecast cost of labour for capital projects.

Substituting actual salaries for tier rates reduced forecast capital labour costs by 8 per cent. In estimating labour costs for the AR6 period, AEMO had double-counted public holidays. Correcting this error reduced the capital costs by a further 4 per cent.[137]

Figure 7: Waterfall chart amendments to capital expenditure costs over AR6



Source: ERA analysis of AEMO workforce plan

ERA's review, findings and final determination

To enable AEMO to have sufficient capacity to deliver its obligations and services under the WEM rules, including WEM reform projects, the ERA has accepted the number and positions identified in AEMO's capital program. The ERA has only corrected errors in the labour cost calculations and substituted actual labour costs where possible. This approach has included $35 million in the ERA's final determination of forecast capital costs.

AEMO's proposal did not meet the requirements of the ERA's proposal guidelines by quantifying the resources that would be used or justifying the skillsets needed for delivery. However, the reform program has been underway for some time and drastically reducing

[137] AEMO in an effort not to capitalise public holidays and annual leave calculated broke out the annual leave entitlement from the base salary. To ensure AEMO adequately covered its staffing costs in the workforce plan, it grossed up the FTE allowance for project labour by dividing the FTE's by the fraction of worked days (around 260 days per year less 20 days of annual leave and ten days of public holidays) from the number of working days per year (260 weekdays per year). Because no separate allowance for public holidays had been made, this process double counted public holidays and erroneously grossed-up the labour component of capital costs by approximately 4 per cent.

AEMO's staffing funding part-way would be disruptive. Consequently, the ERA has only substituted demonstrably inflated costs and corrected calculation errors.

6.1.2 WEM reform program

6.1.2.1 Initial proposal and draft determination on forecast WEM reform expenditure

AEMO's initial proposal

AEMO had planned the WEM reform program of work to span both the AR5 and AR6 funding periods. At the time the ERA made its AR5 determination, AEMO's total forecast capital expenditure for the WEM reform program was $60.7 million. Of this amount, $2.3 million had been incurred in 2018/19, $51.8 million was proposed for the AR5 period, and $6.6 million was forecast for the AR6 period.[138]

AEMO's proposed capital expenditure for the total WEM reform project has increased to $91.2 million, a 50 per cent increase in funding compared to the estimate in AR5. By the end of 2021/22, AEMO expected to have incurred capital expenditure of $46.6 million, with a further $44.6 million to be incurred in the first two years of AR6. During the AR5 period, AEMO undertook a substantial rescoping and reforecasting of the WEM reform program.

AEMO's AR6 proposal acknowledged that, for the WEM reform program, "the original scope and complexity of the program was underestimated."[139] On reflection, AEMO suggested that in AR5 it had produced "an overly optimistic total forecast for WEM reform given the limited detail on policy and implementation requirements at the time."[140]

In its response to the ERA's issues paper, Alinta questioned how AEMO underestimated the initial costs of the WEM reforms so dramatically.[141] Alinta noted most of the information papers summarising the new market's design had been released prior to AEMO's AR5 proposal in June 2019. Earlier versions of the proposed reforms were available for about two years prior via the consultation process in which AEMO was closely involved.

In its AR6 proposal, AEMO noted the points at which new WEM Rule changes had been gazetted through the energy transformation program. AEMO's proposal described how this information had prompted a review and reforecast of the WEM reform program:

> Since the original forecast was developed in early 2019, the scope has crystallised and AEMO now has a much greater understanding of the scale of changes to the WEM Rules and therefore the technical requirements of the new systems. This in turn informs what WEM Procedures and other key documentation needs to be developed, and the business and process change necessary to give effect to the reforms.[142]

AEMO's main reforecasting process took place over May to July 2021. The process included consideration of 14 separate work packets, conducted over 50 internal workshops, with 70

[138] Australian Energy Market Operator, 2019, *2019-22 allowable revenue and forecast capital expenditure submission to the Economic Regulation Authority*, p. 79. (online).

[139] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 92. (online).

[140] Ibid.

[141] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

[142] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 87. (online).

employees and contractors. In AR6, AEMO has identified 25 individual projects at a cost of $44.6 million: a base cost of $33.2 million plus $11.4 million in contingency (34 per cent).

Alinta considered that AEMO's earlier estimates would have been factored into decisions to pursue WEM reform and suggested that the reforms would have been significantly re-shaped or deferred, had AEMO appraised its costs at approximately $90 million from the outset.[143]

The last forecast underwent an internal top-down challenge. This review increased the overall forecast costs after drawing on lessons learned from implementing 5-minute settlement in the NEM. Although AEMO acknowledges that costs can rise, the outcome of this challenge runs counter to AEMO's assertion that:

> The purpose of the top-down challenge is to test the cost estimates (opex or capex) and ensure a portfolio-wide or enterprise-wide view is applied to the forecast. This allows synergies or potential overlaps to be identified, typically resulting in a reduction in the initial forecast.[144]

A summary of the allocation of WEM reform project costs (excluding contingency) over AR4, AR5 and AR6 is shown in Table 36 below. A list of all the WEM reform projects and their individual cost allocations over the periods is provided in Appendix 8.

Table 36: AEMO's initial proposed WEM reform program costs by allowable revenue period

	AR4	AR5	AR6	Total
WEM reform program costs ($ million)[145]	1.5	45.1	44.6	**91.2**
Allocation by allowable revenue period (%)	1.6	49.5	48.9	**100**

Source: ERA analysis of AEMO information.

Stakeholder views in response to the ERA issue paper

Alinta suggested that the increase in WEM reform costs indicated that AEMO was commissioning new systems and hiring new personnel, rather than leveraging expertise and systems from its NEM operations.[146] Alinta considered that such investments appeared disproportionate to the size of the markets that the WEM reforms would create, for example, the essential system services market for Contingency Reserve Raise and Lower, which would cost many times the current cost of the services and would therefore outweigh the benefits of WEM reform.

Alinta highlighted that AEMO's proposed expenditure on WEM reform would be significantly higher than the major reforms of the past, such as the Independent Market Operator's

[143] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

[144] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 44. (online).

[145] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 87. (online).

[146] Alinta Energy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

$10.55 million spend to implement the Market Evolution Program and $13.352 million spend to establish system management's IT system.

Synergy noted that it is keen to see the new market established by 1 October 2023, with investment in the WEM reform program prioritised ahead of AEMO's other programs of work to ensure timely delivery of a functioning market.[147] Synergy considered that the revised WEM reform capital expenditure forecast suggested AEMO would spend a similar amount in the next 18 months as it did over the AR5 period and recommended the ERA scrutinise whether this was deliverable, given the other projects proposed for the AR6 period.

ERA's review, findings and draft determination

Analysis of the allocation of WEM reform project costs over AR4 to AR6 for the draft determination demonstrates that the WEM reform program is just over halfway through as AEMO enters AR6. To assess the proposed WEM reform costs for the draft determination, the ERA has considered the implications of a possible reduction in the funding proposed for AR6 on the overall delivery of the WEM reform program.

There are six projects that will be either completely or substantially (over 90 per cent) complete by the end of AR5. The WEM Rules do not provide for the ERA to retrospectively consider whether the expenditure on these projects was efficient. The remaining funding proposed for AR6 for these six projects is $0.4 million, which the ERA approved in the draft determination.

There are eight WEM reform projects in progress at the start of AR6 and another eight projects that are due to begin within the AR6 period.

The eight projects in progress at the beginning of AR6 include development of the digital platform to support new WEM systems and development of the new dispatch model and its user interface. Development of support systems and processes, such as the reserve capacity mechanism and settlement process to support the new market design, are also underway. Overall, the initial proposed capital cost of projects that are at least halfway through as they enter AR6 amounts to $26 million.

Internal and external labour comprise the majority of costs for WEM reform projects that are underway. The number of FTEs working on a project varies from seven to 24, with an average of 16 FTEs per project. These staff are a combination of existing AEMO staff seconded to capital projects and contract staff. Given the projects have been running since AR5, these internal staff will have already been seconded or hired. Similarly, consultants will have signed agreements and, along with other staff, will be engaged in hardware and software development.

The ERA is concerned that if the costs of these projects were to change substantially, this could affect delivery of the WEM reform program. Therefore, in the draft determination, the ERA approved the capital costs of these eight projects as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6.2). In the draft determination, the ERA approved forecast capital expenditure on the eight in progress WEM reform projects as $23.7 million, which is $3.7 million or 9 per cent lower than AEMO's proposed cost, as shown in Table 37.

[147] Synergy, 2022, Submission to *Australian Energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

Table 37: AEMO's initial proposed and ERA's draft determination on ongoing WEM reform projects ($ million)

	Base project cost	Contingency	Total project cost
AEMO initial proposal	19.7	6.3	26.0
ERA draft determination	**20.0**	**3.6**	**23.7**
Variance (%)	2	(43)	(9)

Source: AEMO proposal and ERA's analysis.

The forecast capital expenditure for the eight projects that begin and end within the AR6 period is $16.8 million. This is equivalent to 38 per cent of the WEM reform capital expenditure in AR6 in AEMO's initial proposal. Except for one small consultant cost, all proposed costs were for internal labour. The number of FTEs working on the projects varied from 5 to 32, with the average being around 12 individuals.

Three of these projects sit on AEMO's critical path to deliver the WEM reforms. These are:

- The integration and market trial project – to test and trial the new WEM systems and processes before the new market design commences.
- Commissioning test reform – to ensure market participants can operate in the new market.
- Short-term Projected Assessment of System Adequacy (ST PASA) project – so AEMO can improve its forecasting, given the volatility of intermittent renewable generation and network congestion, to support market participants' bidding into the new market.

Three other projects – hypercare and support, compliance reporting, and STEM reform – are also tied to the commencement of the new market in October 2023. Hypercare and support is to have AEMO staff available to help market participants through the first six months of the new market and for AEMO to be able to respond quickly to issues, through changes to system or processes, as and if they arise.

The compliance reporting project will create the ability to gather and report on AEMO's compliance with multiple aspects of the operation of security constrained economic dispatch. Consequently, the compliance reporting capability will be needed as the new market goes live.

The STEM reform project will be completed in advance of the new market start date. This is to ensure market participants can continue to buy and sell electricity in a day-ahead forward market to manage their contracted position. The STEM reform project includes changes to STEM systems and processes related to the new market arrangements.

Collectively, these six projects are estimated to cost $13.9 million. In the draft determination, the ERA was concerned that if the costs of these six projects were to change substantially, this could affect delivery of the WEM reform program. Therefore, in the draft determination, the ERA approved the capital costs of these six projects as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6.2). The ERA determined forecast capital expenditure on these six, in-progress, WEM reform projects as $13.2 million, which is $0.7 million or 5 per cent lower than AEMO's proposed cost, as shown in Table 38.

Table 38: AEMO's initial proposed and ERA's draft determination, new WEM reform projects ($ million)

	Base project cost	Contingency	Total project cost
AEMO initial proposal	10.0	3.9	13.9
ERA draft determination	**10.0**	**3.2**	**13.2**
Variance (%)	(0)	(18)	(5)

Source: AEMO proposal and ERA's analysis.

The two remaining projects are the 'system operation planning tool project' and the 'dispatcher training simulator integration and security constrained and economic dispatch offline tools project.' The combined proposed capital costs of these projects were $2.9 million in AEMO's initial proposal. AEMO considered both projects would deliver operational efficiencies but did not quantify those likely benefits.

The system operations planning tool project proposed costs ($0.9 million) were for:

- Delivering WEM Procedures and supporting processes required to support new obligations under the reformed market (new system restart obligations). It will also develop minor tools to extract data from new market systems in a format capable of being imported into existing power system security assessment and modelling tools such as E-terra and DIgSILENT.

The dispatcher training simulator integration and security constrained and economic dispatch offline tool project's proposed costs ($2.1 million) were for:

- Extensions to the new market dispatch model "WEMDE" and market participants access to the dispatch model "WEMDE-UI" into a simulation environment and combined with the dispatcher training simulator component of the power system tool E-terra. This capability is to assist in the training of new system operators.

The ERA was concerned that neither of these projects met the funding requirements of the WEM Rules. AEMO's system management function is not in question and training of power system operators is an important part of AEMO's competency in system management. However, AEMO did not provide any explanation as to how the improvements to system operator training or the addition of minor tools would improve AEMO's performance in managing the system.

For example, there was no assessment of how or if the current power system operator training will be sufficient for the new market or if the tools proposed by the two projects will address any gaps. There was insufficient information provided by AEMO for the ERA to determine how these projects directly contribute to AEMO performing its system management function under the WEM Rules, nor whether the proposed funding was the 'least sustainable practicable cost' of providing those functions.

For the reasons outlined above, the ERA considered the costs proposed by AEMO did not meet the requirements of the WEM Rules. Following clause 2.22A.6(c) and (d), the ERA rejected the costs for these projects in the draft determination. The ERA recommended that AEMO consider these costs in future review periods or provide further evidence to quantify the benefits prior to the ERA's final determination on AR6.

To reconsider this funding in the final determination, the ERA would need to see quantification of the expected benefits from the two projects offset the proposed costs of the projects, as these projects do not meet the requirements in the WEM Rules, and the projects do not appear to be closely tied to the WEM reform program.

In the draft determination, the ERA rejected costs for two projects in the WEM reform program and partially rejected costs in the labour cost and contingency calculation components. As a result, the ERA's draft determination on the WEM reform program was $37.2 million (including contingency), which is $7.4 million or 16.6 per cent lower than the $44.6 million initially proposed by AEMO.

6.1.2.2 Revised proposal and final determination on forecast WEM reform expenditure

AEMO's revised proposal

AEMO advised that it has moved approximately $6 million in WEM reform forecast capital expenditure from AR5 to AR6. This change reflects AEMO's "latest view of resourcing availability, labour market costs and the time and effort required to deliver each of the workstreams."[148] AEMO notes that, overall, the forecast total capital cost for the WEM reform program, $91.2 million, was unchanged.

Most of the change in expenditure between allowable revenue periods was in two workstreams: settlement and legacy markets. In both workstreams, forecast capital expenditure in AR6 has increased by $1.1 million and $2.7 million, respectively.[149]

AEMO explains that its initial forecast capital estimate for the settlement reform project, within the settlements workstream, was high level and had underestimated the level of effort required. AEMO has subsequently undertaken more detailed planning and analysis to determine the resourcing level required and decided to move from internal to external staff to deliver the project.[150]

For the reserve capacity mechanism reform project, within the legacy workstream, AEMO's more detailed planning and analysis has identified a required increase in forecast capital costs, from $3.4 million to $6.2 million in AR6 due to:

- A greater understanding of the Network Access Quantity framework.[151]
- A reconsideration of the application of reserve capacity constraints when approving capacity credits.
- Additional scope that had not been identified previously.

For the second project, STEM reform, in the legacy workstream, AEMO explains that it had included nearly half of the cost of the project $0.5 million as contingency in its initial proposal. This was to park forecasts costs so that AEMO had flexibility to commence the project either before or after implementation of the new market. The ERA's draft determination had subsequently removed the contingency estimate for this project. In response, AEMO has revised the allocation of forecast costs between its base estimate and contingency for this project by moving more costs into its base forecast.

148 Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 51. (online)

149 Ibid, p. 52.

150 Ibid.

151 Network Access Quantity will be the capacity credits assigned to each capacity provider under constrained network access.

In its response to the ERA's draft determination, AEMO provides additional information on the 'system operation planning tools' project and the 'dispatch simulator training and security constrained economic dispatch offline tools' project. The ERA excluded the costs for these two projects from the draft determination because AEMO had not yet provided sufficient information to explain how these projects contributed to managing the electricity system.

Stakeholder views in response to the ERA draft determination

Not all the submissions received in response to the ERA draft determination commented on the forecast cost of the WEM reform program directly. Most market fee-paying stakeholders expressed concern about the overall level of AEMO's forecast costs and these comments have been included and addressed in other areas of this report.

AEMO's project partners in many of the WEM reform projects expressed support for the effective delivery of the WEM program.

EPWA stated:

> We support the sentiment expressed by the ERA, AEMO and several market participants through the AR6 process so far, regarding the importance of effective delivery of the existing WEM Reform program. This includes the introduction of security constrained economic dispatch, new essential system services and revised frameworks for power system operation.
>
> These reforms deliver the 'Foundation Regulatory Frameworks' work stream of Stage 1 of the ETS, and have been developed with significant input and effort from many parties, including AEMO. It is essential that they are successfully implemented by 1 October 2023 to deliver benefits for consumers and to establish the foundational market and system frameworks which we will need to build on as the power system transition continues.[152]

Western Power's response identified its dependency on AEMO delivering many of the reform programs on time:

> Whilst Western Power acknowledges that the ERA will apply appropriate rigour in evaluating the AEMO AR6 proposal, in Western Power's view the successful and timely delivery of AEMOs reform program is critical for Western Power and its customers to realise the broader benefits of the market reform.[153]

Synergy's and Collgar Wind Farm's separate responses were measured and recognised the balance the ERA was trying to strike to ensure forecast costs were approved consistent with the approval criteria in the WEM Rules and that AEMO was adequately funded to deliver the WEM reform program:

> Synergy welcomes and supports the ERA's draft determination on AEMO's proposal and considers it reflects an appropriate balance between the establishment of the new market arrangements and continued evolution of the WEM, and the cost implications for Market Participants. Nevertheless, Synergy remains concerned about the significantly high level of investment proposed for the AR6 period and associated contingency, and considers the level of independent investment scrutiny needs to be enhanced.[154]

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[152] Energy Policy WA, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination*, p. 1. (online)

[153] Western Power, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination*, p. 2. (online)

[154] Synergy, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination*, p. 2. (online)

Collgar's response stated:

> It is concerning that AEMO substantially underestimated WEM reform costs in its AR5 submission. This has put the ERA in a challenging position because, as it notes, it has approved the capital cost for the eight WEM reform projects because not doing so risks delivery of the WEM reform program. This approach undermines the regulatory process as the ERA is no longer considering whether the investment is prudent and efficient, but rather that it is needed to continue with the previously selected delivery path.[155]

ERA's review, findings and final determination

The ERA has considered the additional information AEMO provided for the draft determination, AEMO's revised proposal and other stakeholder comments on the WEM reform program.

The total forecast capital cost of the WEM reform, at $91.2 million, is consistent across AEMO's December 2021 and April 2022 estimates. Overall, 2 per cent to the total expenditure occurred in AR4 with the anticipated expenditure broadly comparable across the AR5 and AR6 allowable revenue periods:

- In AEMO's initial proposal, the remaining forecast WEM expenditure was evenly divided across AR5 and AR6.
- In AEMO's revised proposal, expenditure at the end of AR5 is expected to be slightly lower at 43 per cent of the total, leaving 56 per cent to be expended in AR6.

AEMO's proposal acknowledged the transfer of some expenditure from AR5 to AR6 but did not consider that this would affect delivery of the new market design by October 2023:

> AEMO does not see this impacting the go-live of the program, as critical path activities have been maintained and delays can be appropriately managed with resource and schedule contingency.[156]

The ERA reviewed the revised costs for the three projects AEMO identified as having the largest change in forecast costs from the AR5 to AR6 period. These were the settlement reform project, reserve capacity mechanism project and STEM project.

The total forecast capital costs for the settlement reform project have increased from $4.6 million in AEMO's initial proposal to $6.2 million in its revised forecast. In its revised forecast, AEMO has reduced its internal and external labour costs and significantly increased its estimate of consulting costs to deliver the project. AEMO forecast zero contingency for this project in its revised proposal, down from an estimated contingency of $0.4 million in its initial proposal.

The total forecast capital costs for the reserve capacity mechanism project have increased from $9.2 million in AEMO's initial proposal to $11.3 million in its revised forecast. The expenditure expected to be completed in the AR5 period is approximately $600,000 less than initially expected. However, the forecast expenditure for the AR6 period has increased by 80 per cent from $3.4 million to $6.2 million. The increase in forecast AR6 expenditure has altered the expected expenditure across the two allowable revenue periods from 63 per cent in AR5 and 37 per cent in AR6 in AEMO's initial proposal, to 45 per cent in AR5 and 55 per cent in

[155] Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination*, p. 2. (online)

[156] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 52. (online)

AR6 in AEMO's revised proposal. Again, AEMO has forecast zero contingency for this project in its revised proposal, down from a contingency of $0.6 million in its initial proposal.

The total forecast capital cost for the STEM project has not changed significantly between AEMO's initial and revised proposals at around $1.2 million. Between its initial and final proposals, AEMO has increased its estimate of internal labour costs for this by approximately $0.4 million and reduced its forecast contingency by the same amount.

In two of the projects above there has been an overall increase in total project costs and in all three projects, AEMO has significantly reduced or removed its forecast contingency costs and increased its base project forecasts. In the draft determination, one of the main changes the ERA made was to reduce forecast project contingency amounts where the costs did not meet the funding requirements in the WEM Rules. Once AEMO has reduced or removed project contingency amounts and increased its base project forecasts, any program-wide changes the ERA applies to forecast project contingency amounts, as outlined in section 6.1.6, will not reduce the forecast costs for these projects.

The ERA's technical consultant, Intelligent Energy Systems (IES) commented on AEMO moving costs from contingency to base forecast capital project costs:

> While the total estimated WEM Reform capex was maintained at $91.2 million this was accomplished by reducing the contingency component and increasing the labour component. The labour cost was redistributed between the internal and external labour categories and in general was higher. While AEMO stated in its resubmission that labour rates were revised due to market conditions the relative increase in labour costs for some projects was extremely high.
>
> Aggregating internal and external costs the percentage increase in the resubmission labour costs (estimate at completion) relative to the original proposal ranged from single figures to well over 50% for these six projects.[157]

The ERA has considered this point in the final determination. AEMO is halfway through the WEM reform program and may choose to reduce contingency and increase base project costs if the forecast project costs are more certain and if anticipated contingencies have not materialised or are unlikely to materialise. Further, moving forecast cost from contingency into base forecasts avoids any cost reductions the ERA may make to forecast project contingency amounts. However, the ERA has also recalculated AEMO's forecast capital labour costs as outlined in section 6.1.2. The additional labour costs added to base project forecasts will be subject to the ERA's adjustments.

For the final determination, the ERA has also reviewed new information and explanation from AEMO for two projects where the ERA did not approve costs in the draft determination.

AEMO has provided further explanation of the type of market procedures that the system operation planning tool project will produce. These were the market procedures that did not fit easily into one of AEMO's other WEM reform workstreams.[158]

The other aspect of the planning tool project was to modify existing power system management tools so they could interface with new systems introduced through the WEM reform capital program. AEMO provided three more detailed examples of anticipated system modifications and the reasoning behind them.[159] AEMO's revised proposal acknowledges that expenditure on this project would not improve its performance in managing the system but

[157] Intelligent Energy Systems, 2022, *Review of AEMO's allowable revenue and forecast capital expenditure 2022-23 to 2024-25: ERA final report*, p. 21 (online)

[158] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 49. (online)

[159] Ibid, p. 49.

was necessary to maintain system management performance under the new market arrangements.

For the dispatch simulator training project, AEMO notes that its current dispatch training simulator would be obsolete when the new market commences, as it reflects the current market design:

> This project provides the integration between market systems (WEMDE, ST PASA, Forecasts) and the existing DTS, which will allow AEMO to build training packages that much more closely match the expected operation of the SWIS and allow controllers and operational staff to use the systems in ways that will mimic real time operation.[160]

AEMO states that resourcing constraints would prevent it from completing the project before the new market starts and instead has proposed 12 months' work on the project from May 2023 to April 2024. However, AEMO is confident it can continue to manage the system without the revised dispatch training simulator, given its current team of experienced control room operators.

AEMO's additional information on these two projects better explains what the projects will achieve and how both projects are intended to enable AEMO to fulfil its obligations under the WEM rules. AEMO has clarified that the projects are not to improve the performance of its management of the power system but to enable AEMO to maintain current performance standards as market conditions continue to change. Given this more fulsome explanation, the ERA has included approval of some forecast costs for these two projects in the final determination as noted in Table 39 below.

In the draft determination, the ERA approved forecast capital costs consistent with 14 projects that were expected to be substantially complete or around half-way through as AEMO entered the AR6 period.[161] Given the forecast costs for these projects are known – for example, consultants are hired, software licences are purchased - any significant changes to forecasts could affect AEMO's ability to deliver the reform program.

In the final determination the ERA retains this view and has approved the capital costs of these 14 projects as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6.2). Refer to Table 39 below.

In the draft determination, the ERA expressed its concerns about the quality and robustness of the financial data AEMO provided.[162] Questions over the data quality undermine the ERA's confidence that it is only approving prudent and efficient costs, consistent with the requirements in the WEM Rules. Similarly, the ERA is mindful of market participant concerns that AEMO's forecast costs are increasing and that these increases flow through to the market fees they incur.[163] However, AEMO is tasked with implementing market reforms that are supported by the Minister for Energy, EPWA and market participants. Consequently, AEMO should be appropriately funded to deliver these reforms.

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160 Ibid, p. 50.

161 Subject to the ERA's adjustments to labour capital costs and contingency amounts made across AEMO's AR6 capital program.

162 Economic Regulation Authority, 2022, *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft Determination*, Sections 5.1.2, 6.1.1 and 6.1.6, (online).

163 Collgar Wind Farm's submission identified that market fees comprise approximately 10 per cent of its operating costs.

The ERA has therefore approved the majority of forecast project costs to enable AEMO to deliver the WEM reform program by the revised commencement date of October 2023. The only forecast cost the ERA has not approved are consistent with its adjustments to forecast capital labour costs and forecast contingency amounts across AEMO's entire capital program as described sections 6.1.1 and 6.1.6.

Table 39: WEM reform forecast capital expenditure ($ million)

WEM reform projects	Base project cost	Contingency	Total project cost
Projects that are almost complete			
AEMO's initial proposal	0.4	-	0.4
ERA's draft determination	0.4	-	0.4
Variance (%)	-	-	-
AEMO's revised proposal	0.5	0.1	0.6
ERA's final determination	0.5	-	0.5
Variance (%)	-	(100%)	(16%)
Projects that are halfway through			
AEMO's initial proposal	19.7	6.3	26.0
ERA's draft determination	20.0	3.6	23.7
Variance (%)	2%	(43%)	(9%)
AEMO's revised proposal	29.7	4.9	34.6
ERA's final determination	28.3	2.5	30.8
Variance (%)	(5%)	(49%)	(11%)
Projects beginning in AR6			
AEMO's initial proposal	10.0	3.9	13.9
ERA's draft determination	10.0	3.2	13.2
Variance (%)	-	(18%)	(5%)
AEMO's revised proposal	12.7	2.9	15.7
ERA's final determination	10.6	2.1	12.7
Variance (%)	(16%)	(30%)	(19%)
Total WEM reform forecast capital expenditure			
AEMO's revised proposal	**42.9**	**7.9**	**50.8**
ERA's final determination	**39.4**	**4.6**	**44.0**
Variance (%)	**(8.2)**	**(41.8)**	**(13.4)**

Source: AEMO proposal and ERA's analysis.

A full list of approved forecast costs, by project is provided in Appendix 8.

6.1.3 Western Australian DER program

This section details the ERA's determination of AEMO's forecast capital expenditure on its DER program over the AR6 period.

AEMO's DER work program arose from the State Government's DER Roadmap, which contains a series of actions to integrate electricity generated from rooftop solar systems into the WEM and ensure the ongoing stability of the electricity network.[164]

The ERA's final determination is to approve $4.9 million in forecast capital costs for the DER program in AR6, which includes $0.3 million in contingency. This is 25 per cent lower than AEMO's revised proposal of $6.5 million.

AEMO's initial and revised proposals and the reasons for the ERA's determination are detailed below and summarised in Table 40.

Table 40: Determination of capital expenditure on DER program

DER projects	Base project cost	Contingency	Total project cost*
AEMO's initial proposal	8.0	1.4	9.4
ERA's draft determination	3.9	0.3	4.2
Variance (%)	(52)	(78)	(56)
AEMO's revised proposal	5.3	1.3	6.5
ERA's final determination	**4.6**	**0.3**	**4.9**
Variance (%)	(13)	(77)	(25)

**Total project cost has accounted for the ARENA grant ($1.5 million over the AR6 period).*

Note: Totals may not add due to rounding.

6.1.3.1 Initial proposal and draft determination on forecast DER capital expenditure

AEMO's initial proposal

In its initial proposal, AEMO estimated it would spend $11.9 million on its DER program across the AR5 period, which was under the AR5 budget of $14.6 million approved by the ERA.[165]

AEMO completed establishing the DER register in the AR5 period under budget. Three projects – project symphony, technology integration and DER participation – will continue into

[164] Australian Energy Market Operator, 2020, *Adjustment to 2019-22 Forecast Capital Expenditure – DER Roadmap Implementation Costs*, pp. 6-7. (online).

[165] AEMO received a $1 million grant from the Australian Renewable Energy Agency (ARENA) that will be applied to *Project Symphony* in AR5.

the AR6 period due to delays with project partners, resource availability and project scope refinement.[166]

In its initial proposal, AEMO sought $9.4 million for the DER program in AR6 to complete three in-flight projects at an estimated cost of $3.2 million and commence four new projects at an estimated cost of $6.2 million. [167,168]

Stakeholder views in response to the ERA issue paper

In its issues paper, the ERA noted that two new projects – market visibility and DER data access and management – were driven by AEMO's own initiative based on its assessment of market and system need, and not directly arising from any actions in the DER Roadmap.[169]

The market visibility project is intended to expand AEMO's existing suite of data dashboards and data visualisation packages to include specific information for DER aggregators. This will include more information for DER aggregators, such as participation requirements, market outcomes and conditions. AEMO identified the key objective of this project as being to encourage the active participation of DER in the WEM and SWIS, given the increasing impact of DER on the power system. AEMO sought $1.5 million over AR6 to fund the market visibility project.

The DER data access and management project is intended to enhance the existing DER register, with inclusion of improved distribution network level data on passive DER generation and consumption. This additional data will inform AEMO's operation and understanding of risks associated with DER tripping and weather-driven events. AEMO sought $2.1 million over AR6 to fund this project.

The ERA acknowledged there are benefits to increasing awareness of, and access to, market data, particularly for new and potential entrants to the DER market. However, given that these two projects – market visibility and DER data and access management – are driven by AEMO's own initiative, the ERA sought feedback via the issues paper from market participants on AEMO including these costs in its proposal.

A range of stakeholders expressed concern over AEMO's request for funding for these two projects. Alinta Energy questioned whether spending on projects not directly related to AEMO's obligations was necessary to AEMO's functions under the WEM Rules and noted its doubts about whether such investment was prudent, efficient, and reduced costs over the longer term.[170]

The AEC considered projects driven by AEMO's initiative should not automatically receive funding until the benefits and market need were justified with sufficient detail, such as who is driving the need, who benefits from the project, and whether this project will be the best use of resources.[171] Bluewaters Power considered these projects should be assessed to identify

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166 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, pp. 114-115. (online).

167 The funding sought for ERA approval is lower than the funding required to complete the in-flight projects. This is due to the application of a $1.5 million grant from ARENA that will be applied to *Project Symphony* in AR6.

168 There is an additional DER project – DER Network Services Marketplace Trial & Design – which is treated as an operating expense and discussed in section 5.1.7.

169 Economic Regulation Authority, 2022, *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Issues paper*, p. 26. (online).

170 Alinta Energy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

171 Australian Energy Council, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

any additional benefit to the market and if the cost was appropriate.[172] Synergy recommended these projects be deferred.[173]

ERA's review, findings and draft determination

The ERA considered the evidence provided by AEMO was not sufficient to conclude the necessity for the market visibility and DER data access and management projects. Neither project is necessary for the successful completion of the in-flight projects, or the commencement of other projects required by the DER Roadmap. In its initial proposal, AEMO indicated that these projects are driven by system and market needs. Further, there was limited support from market participants for these projects as indicated by feedback on the ERA's issues paper.

For the reasons outlined above, the ERA considered the costs proposed by AEMO for these two projects did not meet the requirements of the WEM Rules. Following clause 2.22A.6(c) and (d), the ERA rejected the costs for these two projects in the draft determination. The ERA recommended AEMO consider these costs in future review periods or provide further evidence to quantify the benefits prior to the ERA's final determination on AR6.

In the draft determination, the ERA also rejected the following costs:

- $0.9 million AEMO proposed for engaging external consultants where the scope of work was not sufficiently advanced. The ERA recommended that AEMO submit an in-period request for this funding once the scope of activities is sufficiently granular to develop a thorough estimate. This is further explained in Appendix 9.
- $0.2 million in the project cost for the electric vehicles in the DER register project. The ERA compared AEMO's cost of establishing the DER Register – which it completed under budget – with its proposed cost to upgrade the existing register with electric vehicle data and identified cost and resource inefficiencies. This is further explained in Appendix 9.

As a result, the ERA's draft determination on the DER program was $4.2 million (including $0.3 million contingency), which was $5.2 million or 56 per cent lower than AEMO's initial proposed cost of $9.4 million.[174]

6.1.3.2 Revised proposal and final determination on forecast DER capital expenditure

AEMO's revised proposal

In its revised proposal, AEMO estimates it will spend $9.4 million on its DER program across the AR5 period.[175]

Following the ERA's draft determination, AEMO submitted its revised proposed costs of $6.5 million on the DER program for AR6, which was $2.9 million lower than AEMO's initial

[172] Bluewaters Power, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

[173] Synergy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper,* (online).

[174] The ERA considers the cost of the DER program for AR6 is $5.7 million, which will be partly funded by $1.5 million ARENA grant in AR6 and therefore the ERA's draft determination is for the difference ($4.2 million). This is consistent with AEMO's approach in its proposal to the ERA and further explained in Appendix 9.

[175] AEMO received a $1 million grant from the Australian Renewable Energy Agency (ARENA) that will be applied to *Project Symphony* in AR5.

proposal but $2.3 million higher than the ERA's draft determination (Table 40). The variance in AEMO's initial and revised proposals is largely due to a:

- $3.6 million decrease following the exclusion of the market visibility and DER data and access management projects. AEMO accepted the ERA's draft determination to reject these costs and excluded them from its revised proposal.
- $1.6 million increase in costs for project symphony over what was previously estimated. This is discussed further below.
- $0.5 million decrease following the exclusion of forecast budgets to engage external consultants where the scope of work was not sufficiently advanced. AEMO accepted the ERA's determination to reject these costs and excluded them from its revised proposal. This is discussed further below.
- $0.2 million increase in project financing costs due to an increase in the forecast interest rate. This was explained in section 5.1.6.

ERA's review, findings, and final determination

The DER capital projects are necessitated by the DER roadmap and are part of AEMO's functions under the WEM Rules. The ERA has reviewed the project scopes and evaluated the prudence and efficiency of the estimated project costs to partly reject labour costs and contingency costs as outlined in sections 6.1.1 and 6.1.6.2, respectively. The ERA's final determination on the DER program is $4.9 million (including contingency), which is $1.6 million or 25 per cent lower than AEMO's revised proposed cost of $6.5 million.

The ERA's final determination on each of the DER projects is summarised below and detailed in Appendix 9.

Project symphony

Since its initial proposal, the estimated cost of project symphony in AR6 has increased by $1.6 million to $4.2 million.[176] AEMO indicated this is largely due to "significant scope movement from AR5 into the AR6 period, driven by project partner delays."[177,178]

The forecast base project cost (excluding contingency) for AR6 has increased by $1.1 million since AEMO's initial proposal to $3.3 million. The additional $1.1 million covers labour costs for the three-month delay, four new FTEs and a two-fold increase in project financing costs. Furthermore, AEMO's estimated contingency for this project has increased three-fold between its initial and revised proposals, from $0.3 million to $0.9 million.

Although the timeline to deliver project symphony has increased, the overall whole of life project cost has not increased materially (by $0.3 million to $10.1 million). The project was materially under budget in AR5.[179]

Successful completion of project symphony is critical for the delivery and progress of the DER roadmap. The project is already significantly underway so the ERA is concerned that delivery of the DER roadmap could be affected if the cost of project symphony changes substantially. The ERA approves the capital costs of this project, as proposed, subject to the substituted

[176] AEMO's revised proposal seeks $2.7 million for Project Symphony to cover the shortfall between the total project cost ($4.2 million) and the $1.5 million ARENA grant.

[177] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination*, p. 54. (online).

[178] The estimated completion date for Project Symphony was initially estimated as December 2022. This was delayed to June 2023 in AEMO's initial submission, then to September 2023 in AEMO's revised submission.

[179] The ERA had approved a budget of $8.1 million for Project Symphony in AR5. AEMO is on track to spend $5.9 million over AR5.

capital labour costs (as outlined in section 6.1.1). The ERA has substantially rejected contingency costs that were unjustified and duplicated (section 6.1.6.2).

The ERA's final determination for project symphony is $1.8 million, which includes $0.1 million in contingency. [180] This is $0.8 million, or 35 per cent lower, than AEMO's revised proposal of $2.7 million. The largest component of the cost rejection was in contingencies, which are $0.7 million or 88 per cent lower than the contingencies proposed by AEMO. The ERA's determination on project symphony costs acknowledges external funding of $1.5 million through an ARENA grant.

Other DER projects

AEMO's revised proposed costs for the remaining DER projects are largely in line with the ERA's draft determination. The ERA upholds the reasons underlying its draft determination and approves the capital costs of these projects, as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1.2) and the partial rejection of contingencies (as outlined in section 6.1.6.2).

The ERA's final determination for the remaining DER projects is $3.1 million, which includes $0.2 million in contingency. This is $0.7 million or 17 per cent lower than AEMO's revised proposal of $3.8 million.

Table 41 below summarises the ERA's draft and final determinations and AEMO's proposed costs. Further details on each project are presented in Appendix 9.

Table 41: ERA's final determination, DER program ($ million)

DER projects	AEMO's initial proposal	ERA's draft determination	AEMO's revised proposal	ERA's final determination
Project symphony*	1.1	1.0	2.7	1.8
Technology integration	1.2	0.7	0.7	0.5
DER participation	0.9	0.4	0.8	0.7
DER participation implementation	2.0	1.8	1.8	1.5
Market visibility	1.5	-	-	-
Data and access management	2.1	-	-	-
EVs in DER register	0.6	0.3	0.5	0.4
Total	**9.4**	**4.2**	**6.5**	**4.9**

**The proposed and determined costs for project symphony presented in this table have accounted for the ARENA grant ($1.5 million in AR6), and therefore the actual project cost is higher.*

[180] The ERA considers the cost of Project Symphony in the DER program in AR6 is $3.3 million, which will be partly funded by $1.5 million ARENA grant in AR6 and therefore the ERA's determination is for the difference ($1.8 million). This is consistent with AEMO's approach in its proposal to the ERA and further explained in Appendix 9.

6.1.4 WEM sustaining capital expenditure program

This section details the ERA's determination of AEMO's sustaining capital expenditure, which includes expenditure on AEMO WA's IT lifecycle replacement and upgrades, rule changes, and control room tools and equipment. It also includes AEMO's Western Australian share of investment to maintain critical enterprise-wide systems that the WEM relies on to operate securely. This includes cyber security and the energy management system.

The ERA determined $12.6 million for AEMO's sustaining capital expenditure in AR6, which includes $1.4 million in contingency. This is 15 per cent lower than AEMO's revised proposal of $14.7 million.

AEMO's initial and revised proposals and the reasons for the ERA's determination are detailed below and summarised in Table 42.

The sustaining capital expenditure program spans 12 projects and 34 sub-projects. Details of each project, including the ERA's determination and AEMO's proposal, are presented in Appendix 10.

Table 42: Determination of sustaining capital expenditure

Sustaining capital expenditure	Base project cost	Contingency	Total project cost*
AEMO's initial proposal	13.5	2.0	15.4
ERA's draft determination	9.4	1.1	10.5
Variance (%)	(30%)	(45%)	(32%)
AEMO's revised proposal	12.8	1.9	14.7
ERA's final determination	**11.2**	**1.4**	**12.6**
Variance (%)	(12%)	(26%)	(14%)

Note: Totals may not add due to rounding.

6.1.4.1 Initial proposal and draft determination on forecast WEM sustaining capital expenditure

AEMO's initial proposal

AEMO's proposed sustaining capital program of $15.4 million (including contingency) was a combination of 34 individual projects, most of which were IT capital projects. The projects were grouped into two workstreams: Western Australian technology ($9.7 million) and enterprise systems ($5.8 million).

The WEM sustaining capital program projects have not yet commenced and are proposed to commence in AR6 as they are still in the concept phase of project planning. In its proposal, AEMO stated that these projects are critical upgrades and system lifecycle replacements across AEMO's IT systems that operate the Western Australian power system and markets.[181]

[181] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25,* p. 78. (online).

Western Australian technology

The Western Australian technology workstream includes three groups of projects: capability uplift, lifecycle and WEM rule changes. These are summarised below:

- Capability uplift projects, which will increase AEMO's ability to monitor, predict and manage power system issues. AEMO proposed $1.3 million for the following three projects:
  - Wide area monitoring systems (WAMS) software: monitor aspects of power system security, such as system strength and inertia, in the WEM.
  - Transient stability tool: monitor wind turbine operation to provide real-time identification of system security problems associated with intermittent generation, such as wind farms.
  - Introduction of AEMO's operations simulator tool (currently operating in the NEM): improve AEMO's ability to predict and analyse wind and solar generated energy's impact on the power system.
- Lifecycle projects, which will upgrade hardware and software to ensure AEMO's 470 IT systems are fit for purpose, reliable, and cost effective to run. AEMO proposed $7.7 million for the following six projects:
  - Enterprise data platform (EDP): deliver data automation, a central data repository, data consumption, analytics and visualisation, data governance and data support and maintenance.
  - Legacy market systems: upgrade existing, or legacy, components of AEMO's WA market applications.
  - Integration project: replace nine unsupported applications with applications based on AEMO's preferred IT structure and framework. These changes will improve visibility of critical market transactions and enhance the security of data exchanges.
  - Perth computer room: replace all end-of-life computer room hardware with current equipment to reduce the risk of technical failure and associated business impacts.
  - Itron Upgrade 2: upgrade AEMO's load forecasting software to support market operations.
  - Certificate authority: develop a solution to enable participants access to AEMO's systems once the existing 'public key infrastructure' expires in the AR6 period.
- WEM rule changes: $1.0 million in funding to cover the generic cost of any WEM rule changes that may occur during the AR6 period.

Enterprise workstream

AEMO's enterprise workstream, estimated at $5.8 million in AR6, covers a further four projects: energy management system, cyber, operational forecasting and infrastructure (Norwest data centre). These are national projects, with costs allocated to AEMO's Western Australian operations using different methods outlined below:

- AEMO's energy management system (EMS) is critical to monitor, control and optimise energy management. The same version of EMS exists in both the WEM and NEM and will reach end of life in July 2024. AEMO allocated 18 per cent of the EMS costs to the WEM based on the use of the system and the costs provided by the vendor.
- AEMO's cyber security program involves ransomware resilience, threat detection and response, threat and vulnerability management and identity and access management.

This is a national program as AEMO considers its Western Australian operations benefit from economies of scale and experience by using the national cyber security team in place of adopting a standalone cyber security project. AEMO allocated 11.8 per cent of the cyber costs to the WEM based on the proportional average use of the system in the WEM compared to the NEM.

- The infrastructure (Norwest data centre) project will replace end-of-life data centre hardware to reduce the risk of technical failure and associated adverse business impacts. The Norwest data facility hosts both WEM and NEM system management and market operations application and services. AEMO allocated 11.7 per cent of the costs to the WEM based on the number of WEM servers (218) relative to the total number of operational servers (1860).[182]
- Operational forecasting is an AEMO-wide program of work to uplift its forecasting capabilities. Forecasting accuracy has become difficult with increased penetration of variable renewable technology, including distributed energy resources and climate induced stress from extreme weather events. This project is being delivered nationally and will be first established in the NEM. The capability in the WEM will be built subsequently, using the NEM platform as a baseline. The costs for the Western Australian platform will be incurred by the WEM directly.

AEMO provided that the sustaining capital expenditure projects would not result in any meaningful operational efficiencies. However, the benefits relate to market efficiency gains that are generally hard to quantify.

ERA's review, findings and draft determination

Given the highly technical nature of the sustaining capital workstream, the ERA sought advice from a specialist consultant, Intelligent Energy Systems (IES) to inform its determination.

IES relied on information provided by AEMO, including details of AEMO's purchasing and market testing processes, to validate AEMO's cost assumptions. IES noted that 31 of the sustaining capital program projects proposed by AEMO are internally developed. Many of these projects relate to bespoke systems within the lifecycle project streams, cyber security, and operational forecasting systems. AEMO's reason for adopting these projects is to reduce future costs and remove external vendor support reliance. IES recommended the following:[183]

- Rejecting licence and cloud costs for projects where AEMO did not adequately explain why licence costs were required, or where cloud costs were treated as a capital expense rather than an operating expense.
- Rejecting costs associated with penetration testing in the lifecycle projects. AEMO allocated penetration testing costs to each lifecycle project in a generic 'per application' allowance to all underlying projects. This sometimes resulted in penetration testing costs being up to 40 per cent of some projects' base costs. Penetration costs have been removed from projects, including the Itron project, that will not interface with applications external to AEMO's systems.

The ERA considered IES's advice when making its draft determination. The ERA also reviewed the project scopes and evaluated the prudence and efficiency of the estimated project costs independent of IES's review. The ERA concurred with IES's recommendations to partially reject the proposed spend on AEMO's sustaining capital program expenditure relating to licence and cloud costs and penetration testing.

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182 Ibid, p. 130.

183 Intelligent Energy Systems, 2022, *Review of AEMO's allowable revenue and forecast capital expenditure 2022-23 to 2024-25: ERA final report*, p. 21 (online)

The ERA also partly rejected labour costs and contingency costs as outlined in sections 6.1.1.2 and 6.1.6.2, respectively. The ERA's draft determination on the sustaining capital expenditure program was $10.5 million. This was $4.9 million or 32 per cent lower than AEMO's proposed cost of $15.4 million.

6.1.4.2 Revised proposal and final determination on forecast WEM sustaining capital expenditure

AEMO's revised proposal

Following the ERA's draft determination, AEMO submitted its revised proposed costs of $14.7 million on sustaining capital expenditure in AR6, which was $0.7 million lower than its initial proposal but $4.2 million higher than the ERA's draft determination.[184] The variance in AEMO's initial and revised proposals is largely due to a:

- $0.7 million decrease following the partial rejection of the WEM rule change costs. AEMO accepted the ERA's draft determination to reject costs of $0.7 million and excluded them from its revised proposal.
- $0.3 million decrease following the partial rejection of the penetration testing costs in the lifecycle EDP program. AEMO accepted the ERA's draft determination to reject costs of $0.3 million and excluded them from its revised proposal.
- $0.2 million increase due to increased staff salaries (see section 6.1.1.2).

In response to the ERA's draft determination to reject software costs on the basis it was unclear whether licencing costs should be capitalised, AEMO provided the ERA its Fixed Assets and Intangibles Policy, which confirmed these projects satisfy the criteria for licence costs to be capitalised.

AEMO maintained its initial AR6 proposal for the other WEM sustaining capital expenditure projects and considered all projects are necessary for AEMO to perform its core system management and market operation functions. AEMO did not accept the ERA's partial rejection of contingency and labour costs as outlined earlier.

Table 43: Variance in AEMO's proposed WEM sustaining capital expenditure ($ million)

Project	AEMO's initial proposal	AEMO's revised proposal	Variance in AEMO's proposals
Western Australian technology			
Capability uplift	1.3	1.3	-
WEM rule changes	1.0	0.3	(0.7)
Lifecycle	7.4	7.1	(0.3)
Enterprise systems			
Energy management system	1.4	1.4	-
Cyber	3.0	3.1	0.1
Operational forecasting	1.1	1.2	0.1

[184] AEMO's revised submission notes a revised proposed cost of $14.4 million; however, financial tracking sheets provided confidentially to the ERA note a cost of $14.7 million.

Project	AEMO's initial proposal	AEMO's revised proposal	Variance in AEMO's proposals
Infrastructure (Norwest Data Centre)	0.2	0.2	-
Total	**15.4**	**14.7**	**(0.7)**

Note: totals may not add due to rounding.

Source: ERA analysis of AEMO data.

ERA's review findings and final determination

The ERA independently reviewed AEMO's proposal and considered IES's recommendations.

IES's final determination key findings for AEMO's sustaining capital projects were:[185]

- There was little to no information to substantiate AEMO's cost validation through alternative cost estimates or quotes.
- The operational efficiency benefits relating to market gains are generally hard to quantify, however AEMO is not required to provide this information.
- There is a lack of identification of the critical risks associated with failing to undertake each of the lifecycle projects, resulting in poor transparency of the critical nature of these projects.

IES's final recommendation was to partially reject capital expenditure across the sustaining capital projects, including maintaining the initial classification of the 0 per cent contingency factor, accepting AEMO's accounting treatment of software license costs as not double counted, and rejecting AEMO's revised proposal labour cost increases.

The ERA noted the commencement of the WAMS project is dependent on infrastructure being developed and implemented by Western Power by October 2022. As a result, the project may not commence if Western Power has not built the infrastructure by October 2022. According to clause 2.22A.6 of the WEM Rules, the ERA recommends AEMO consider these costs in a future review period once the timing of the project is more certain. The ERA rejects this project's costs of $0.2 million in AR6.

Subsequent to the AR6 draft determination, AEMO confirmed to the ERA that it has rechecked the accounting treatment of software licence costs in the AR6 capital expenditure and operating expenditure forecasts. AEMO has confirmed that software licence costs are costed to each sustaining capital project and have not been double-counted in the operating expenditure forecast. The ERA reviewed AEMO's policy and considers AEMO has sufficiently justified the prudence and efficiency of the software costs initially rejected in its draft determination.

In this final determination, the ERA has approved these software costs.

The ERA has reviewed the project scopes and evaluated the prudence and efficiency of the estimated project costs to partly reject the labour costs and contingency costs, as outlined in sections 6.1.1.2 and 6.1.6.2, respectively. The ERA's final determination on the sustaining capital expenditure program is $12.6 million (including contingency), which is $2.2 million, or 15 per cent, lower than AEMO's revised proposed cost of $14.7 million.

[185] Intelligent Energy Systems, 2022, *Review of AEMO's allowable revenue and forecast capital expenditure 2022-23 to 2024-25: ERA final report*, p. 21 (online)

The ERA's determination on each of the sustaining capital expenditure programs is summarised below (Table 44). Each of the programs listed in Table 44 are comprised of several sub-projects. Further details on the proposed and determined costs for each project are presented in Appendix 10.

Table 44: ERA's final determination, sustaining capital expenditure ($ million)

Project	AEMO's revised proposal	ERA's final determination	Variance
Western Australian technology			
Capability uplift	1.3	1.0	(0.3)
WEM rule changes	0.3	0.3	(0.1)
Lifecycle	7.1	6.1	(1.1)
Enterprise systems			
Energy management system	1.4	1.4	-
Cyber	3.1	2.6	(0.5)
Operational forecasting	1.2	1.0	(0.2)
Infrastructure (Norwest data centre)	0.2	0.2	-
Total	**14.7**	**12.6**	**(2.2)**

Note: totals may not add due to rounding.

Source: ERA analysis of AEMO data.

6.1.5 Potential projects not currently included in AR6 forecast

AEMO's initial proposal identified several projects for which "insufficient information is available at the time of preparing the AR6 proposal to inform a robust capex forecast."[186] These projects include:

- 5-minute settlement (see section 5.1.7) – this project aligns the frequency of settlement of market transactions with the frequency of dispatch in the WEM by increasing the frequency at which market transactions are settled from every 30 minutes to every five minutes.
- DER participation implementation – this project builds on from the project symphony orchestration pilot and the DER participation project design program. DER participation will be fully implemented in the WEM once the detail of key policy decisions and new market arrangements are in place.
- Reserve capacity mechanism and cost allocation reviews – a future requirement for funding for reforms to AEMO's systems and processes may arise following Energy Policy WA's reviews of the reserve capacity mechanism and cost allocations.

AEMO considered that these capital expenditure projects may arise during the AR6 period but has not included them in the AR6 expenditure forecast due to uncertainty surrounding their timing and scope. AEMO suggests that the potential additional expenditure associated with these projects ranges from $32 million to $64 million. AEMO modelled the impact of incurring

[186] Ibid, p. 78. (online).

the additional expenditure of these three projects on WEM fees in AR6 and AR7 and found that the average WEM fee would increase to between $2.403/MWh and $2.536/MWh by the end of the AR7 period.[187]

In its response to the issues paper, Bluewaters noted that it was yet to see a cost benefit analysis that provides comfort to market participants that 5-minute settlement should proceed. Bluewaters considered that the WEM may continue to introduce poor value-for-money reform at the expense of market participants and, ultimately, consumers.

Perth Energy acknowledged the extensive changes being made to the WEM and how AEMO operated and that substantial increases in AEMO's operating and capital expenditure were likely to be justified. However, Perth Energy requested that AEMO's move to 5-minute settlement was backed up by some analysis, based on experience within the NEM, and showing how the cost of 5-minute settlement will flow through to customers. Perth Energy was concerned about AEMO's ability to deliver its project commitments due to the significant delay in acknowledging that the new WEM start needed to be pushed back.

Perth Energy considered that spreading the cost of implementing DER aggregation participation might not be fair if it is spread across the wholesale market instead of directed to Synergy's customers unless residential customers are made contestable customers.

Synergy supported AEMO's proposal to exclude less certain projects, like 5-minute settlement, participation of DER aggregation, and participation in stage two, Energy Transformation Strategy projects, from the AR6 forecast until they are better understood or required by policy and substantiated by an out of period funding request.[188] Synergy recommended the ERA and AEMO take any opportunity to defer capital projects (such as the DER projects not specified as DER roadmap actions and discretionary IT projects such as cyber security), except for WEM reform.

6.1.6 Contingency costs

6.1.6.1 Initial proposal and draft determination on proposed contingency costs

AEMO's forecast cost estimates for all capital expenditure projects included a contingency cost, reflecting AEMO's level of confidence in its base cost estimate and an assessment of project-specific risks.[189] Once approved by the ERA, AEMO holds the contingency costs in reserve to cover and alleviate cost exposure associated with specific risks and uncertainty and only releases it if that risk is realised, subject to senior management approval and a formal change request process.[190]

AEMO also has several other mechanisms at its disposal for addressing uncertainty in forecasting project costs for the AR6 period:

[187] Australian Energy Market Operator, 2021, *Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2021-25*, p. 74. (online)

[188] Synergy, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Issues paper,* (online)

[189] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 24. (online).

[190] Ibid, p. 49.

- The WEM Rules allow for allowable revenue recovery or capital expenditure of at least the lower of 10 per cent or $10 million greater than the amount in the ERA's determination at the end of the review period.[191]
- If a project does not have a defined scope, AEMO can request a small sum of money for regulatory planning.[192]
- AEMO can make an in-period submission for funding when the scope and details of a project become known.[193]

In practice, AEMO can address the uncertainty in each capital expenditure project using any or all options, depending on the stage of project development. In its initial proposal, AEMO considered that it is generally more beneficial to market participants and AEMO to "slightly overestimate" the forecast capex amount in each period.[194]

There is no requirement for AEMO to spend up to its approved forecast amount in the review period and, once the ERA approves AEMO's forecast capital expenditure, AEMO does not need to spend the approved contingency costs on the projects the funds were approved for, which may result if the anticipated risks associated with these projects do not arise.

The ERA has no regulatory oversight over any unspent contingency costs. In AR5, the ERA approved $11.4 million in project contingency costs of which, AEMO used $5.2 million for the relevant AR5 projects. For the remaining projects in AR5, for which a $6.3 million contingency cost was identified, AEMO did not use the approved contingency costs for the projects they were approved for, and instead used them for other capital projects.

AEMO's initial proposal

AEMO's initial proposal indicated that it has changed the way it sets project contingency costs from AR5, in which it relied on a standard contingency factor, to place more emphasis on quantifying project risks, which reduce as the project matures.[195] [196] AEMO developed its own methods for calculating the contingency costs associated with individual projects, drawing from other recognised methods of contingency cost calculation, and based on the projects' stage of development:

- Method 1 – used for calculating a contingency cost percentage that is multiplied against the project's base cost estimate to produce a contingency cost for the project. This percentage is calculated using AEMO's fixed contingency cost calculator, at the idea stage of a project, based on a predefined (fixed) list of 10 questions, to assess risk across all projects.
- Method 2 – used for calculating the 'most likely' contingency cost for a project in the planning and execution stage, and updated throughout each project lifecycle as the expected monetary value (EMV) of a tailored list of risks associated with that project.[197] The EMV of a specific risk to a project is calculated using AEMO's EMV Tool by estimating the probability of that risk occurring and multiplying it by the estimated cost of the impact

[191] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.13, (online).

[192] Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submission under the WEM Rules and GSI Rules*, p. 3. (online).

[193] Ibid, p. 9.

[194] Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 24. (online).

[195] Ibid, p. 47. (online).

[196] AEMO used the 'cone of uncertainty' to illustrate its assumption of how the level of uncertainty changes over the lifecycle of a project. Ibid, p. 49.

[197] The lists of different risks identified between projects vary.

of that risk occurring. The contingency cost is then calculated by summing the EMVs of all identified risks for a particular project.

- Method 3 – a method combining method 1 and method 2 above, in which project managers can opt to carry-forward 5 per cent of the contingency cost calculated using method 1 when developing method 2, to ensure ‘’unknown unknowns” can be catered for.

AEMO also employed a fourth method of contingency cost calculation for one specific project, the STEM Reform project, which was estimated based on the contingency cost of a previous project involving the same IT systems.

With method 3, AEMO indicated that project managers each had discretion about whether they would carry 5 per cent of the fixed contingency amount forward to the EMV tool to cover “unknown unknown” risks. Every project manager took this option. Thus, AEMO’s proposed contingency costs were largely based on the use of AEMO’s fixed contingency cost calculator (method 1, used for 23 projects) or the combination of the fixed contingency cost calculator and the EMV tool (method 3, used for 16 projects). A summary of the number of projects using each method of contingency cost calculation is provided in Appendix 11.

AEMO noted in its initial proposal that many of its projects were at the very early stage of conception, with contingency cost calculations using AEMO’s fixed contingency cost calculator, ranging from 5 per cent to 80 per cent.[198] Additionally, project contingency cost calculations at a program level ranged from 10 per cent to 33 per cent, with an average of 26 per cent.

AEMO considered that these contingency cost levels were reasonable and efficient when compared to AEMO’s past performance, when reflecting on internal models and studies of project cost overruns, and when compared to estimations from other estimating tools.[199]

In its initial proposal, AEMO also considered that building in project contingency costs reduces the need to make substantially costly in-period adjustments to the forecast, through in-period submissions. Several stakeholders commented on the use of in-period submissions for additional funding.

Stakeholder feedback on issues paper

Alinta considered that while AEMO’s claim that the contingency amount proposed for the AR6 period would avoid it making substantially costly in-period adjustments appeared logical, AEMO may not use the contingency cost for this intended purpose and may spend it regardless of whether it was required.[200] Given this, and that the ERA has no oversight over how contingency costs are spent once approved, Alinta did not support allowing AEMO any contingency costs, and instead, recommended that AEMO be required to make an in-period submission should it require additional allowable revenue.

Synergy, Perth Energy, and the AEC also supported deferring projects with uncertain costs and making in-period submissions.[201] Synergy considered this would achieve an appropriate balance between the accuracy of project costs and the allowable revenue, market transparency, and the certainty and consistency of market fees.

198 Australian Energy Market Operator, 2021, *Proposal to the Economic Regulation Authority, Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, p. 47. (online)

199 Ibid, p. 48. (online)

200 Alinta Energy, 2022, Submission to *Australian Energy Market Operator’s allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Issues paper,* (online)

201 Synergy, Perth Energy and Australian Energy Council submission to issues paper (online)

However, Perth Energy suggested more work was needed to develop certainty or defer the work for these future projects to AR7. The AEC considered the ERA should not approve allowable revenue and capital expenditure requests relating to future market reforms that do not have regulatory certainty in terms of government approval, timeframes, design, and implementation. Nevertheless, the AEC considered that deferring projects with uncertain costs to in-period submissions would minimise contingency costs and allow the ERA to scrutinise the projects when they are better defined.

The AEC further noted that the effect of delaying projects is that:

- there is no way for market participants to accurately include unknown future costs in their long-term contracts
- market participants risk impacting their competitiveness if the costs they include are too high
- if market participants defer including these costs, then future contracts may not reflect all the market fees.

Accordingly, the AEC suggested that AEMO should continually refine the potential costs and give regular updates to assist market participants in their forecasting.

The AEC also indicated that AEMO should be required to provide transparency on how it used the excess contingency costs in AR5 to help inform the ERA's decision making on appropriate contingencies for AR6, and that AEMO be required to disclose to the market how it will spend the contingency balance, should it not fully use the approved AR6 contingency funds on the identified AR6 projects.

Collgar recognised the uncertainty around future policy decisions and that resourcing presents substantial challenges in forecasting workflows, resources, and budgets.[202] Accordingly, Collgar supported having an additional pool of money for these activities but considered this should only be accessed when the activities eventuate and should be subject to the same regulatory oversight.

Collgar considered that contingency costs must only be used for approved projects and minor *ad hoc* expenses, not for substantial projects not approved in the initial proposal. Collgar indicated that release of approved funding could be subject to a trigger event (such as a policy decision being made), thereby saving the additional process and cost of in-period submissions and allowing for swift implementation.

Synergy considered the ERA should challenge the level of contingency costs in the WEM reform forecast and the most appropriate form of financial governance to ensure AEMO works within the base cost estimate and only spends contingency costs where there is a compelling case to do so.

Synergy recommended the ERA closely scrutinise the contingency cost included in AEMO's forecast because, while there was no incentive for AEMO to over-forecast (because it is a not-for-profit organisation), there is also no incentive for AEMO to stretch to deliver projects at a lower cost to market participants and consumers. Synergy recommended the ERA consider the appropriateness of contingency costs applied to each project forecast, and where it is high, seek further information from AEMO. If appropriate justification is not provided, Synergy recommended the project be disallowed until a fully formed business case is provided to the ERA.

[202] Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Issues paper,* (online)

The combination of the annual true-up process and AEMO's new reporting obligations (to be included in ERA's new regulatory reporting guidelines) will provide transparency and accountability in relation to how AEMO spends excess contingency funds, helping to allay the concerns expressed by stakeholders above.[203]

ERA's review, findings and draft determination

Consistent with Synergy's recommendations, and based on the understanding that the inclusion of contingency costs in project cost estimation is good practice, the ERA conducted a detailed assessment of AEMO's methods of calculating contingency costs, summarised below.[204] The ERA first considered whether the methods would consistently produce the same results if applied, for example, by different project managers for the same project, and whether the method effectively measures the contingency costs that it sets out to measure.[205]

AEMO did not provide the ERA with measures of reliability and validity for its contingency methods, noting instead that it would test this later in the AR6 review period once some of the projects had been completed. The ERA considers that the contingency cost calculation methods could have been applied to previously completed projects in AR5 or to projects completed in the NEM, where the contingency cost calculators are also employed, to test how reliably and validly its methods produced the actual contingencies required for these completed projects.[206]

At a high level, the use of method 1 to provide contingency cost estimations at the concept stage of project development, producing much larger estimations to reflect the larger uncertainty at this stage of development compared to projects at the planning and execution stage, appears reasonable.

However, once the much larger contingency is approved by the ERA it is locked in for the review period. Later, as more details about the project materialise, the extra approved contingency cost becomes redundant and is available to spend, without regulatory oversight. Given the option to make an in-period submission, a more efficient solution may be to propose contingency costs when the details of the projects firm-up.

Whilst method 1 likely employs a more consistent approach to contingency cost estimation than the other methods, because it employs the same predefined list of 10 questions to assess risks across all projects, the identification of risks for a specific project using method 3 is more subjective, with one project manager possibly identifying different risks to another project manager.[207] Additionally, the higher the number of risks included in the contingency cost calculation using method 3, the higher the contingency cost that will be calculated for that project.

Subjectivity characterises any method of contingency calculation and is difficult to minimise.[208] However, the goal is to limit subjectivity as far as possible, without making the method too rigid, to guard against bias. In the case of a regulated entity that is seeking funding over a

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203 Wholesale Electricity Market Rules (WA), 12 April 2022, Rules 2.22A.7 to 2.22A.9 and 2.22A.11, (online).

204 Economic Regulation Authority, 2019, *Australian Energy Market Operator Allowable Revenue and Forecast Capital Expenditure 2019/20 to 2021/2022 – Final Determination*, p. 31. (online).

205 That is, the ERA considered the reliability and validity (respectively) of AEMO's methods.

206 Given the use of the same calculators in the NEM, the methods could also have been tested using completed east coast projects.

207 In some of AEMO's EMV workbook calculators, project managers identified only two risks, whilst in others, project managers identified up to 9 risks. This may also vary for projects in different stages of development.

208 Transport and Infrastructure Council, 2018, *Australian Transport Assessment and Planning Guidelines, 02 Optimism Bias*, p. 8, (online) [accessed 31 January 2022].

three-year period, bias may result in the entity padding out costs to ensure that it has sufficient funds at the end of the review period to complete its projects.

Method 3, used in the planning and execution stage of the project, also allows for the allocation of costs for 'unknown unknowns,' which is not provided at the concept stage of development in method 1, when the least certainty about a project exists. This appears to be an illogical application of this parameter, which is largely unnecessary, given the overspend allowance in the WEM Rules and GSI Rules.

In contrast to the application of the EMV of risks to calculation of the required contingency costs for projects in the current context using method 3, the EMV statistical technique is commonly employed to calculate the average outcome when the future includes scenarios that may or may not happen, using decision tree analysis.[209]

The use of EMV in decision tree analysis requires a risk neutral assumption (neither risk averse, nor risk seeking).[210] To the extent that AEMO expresses a preference for overestimating costs, that AEMO can add any number of risks to its calculation of contingency costs, and that any unused contingency costs can be applied to projects that AEMO would like to undertake (without regulatory oversight), the use of EMV in contingency cost estimation in the current context is problematic.

The estimate of the required contingency cost using method 4 (based on a related earlier project) is a relatively quick method of estimation that can be useful when there is a high degree of uncertainty associated with a project or there is no other method available. However, in comparison to other methods, this method lacks precision because each project has unique constraints and requirements such that, factors and allowances developed for the previous project (that might not be applicable to the current project) will be applied.[211]

Whilst the methods chosen by AEMO for contingency cost calculation in AR6 include probabilistic elements, which is a step up from the deterministic approach used in AR5, AEMO may have done better to employ just the one recognised, rigorous, probabilistic method and applied that consistently across all projects. This would have led to a simpler process of contingency cost estimation and review, without using unnecessary parameters, thus ensuring greater discipline on the calculation of AEMO's contingency costs.[212] [213]

AEMO originally provided contingency cost calculators for its capital projects to the ERA to support its proposed contingency costs for AR6 with its initial proposal on 17 December 2021. Following requests for further information on these calculators, AEMO provided a selection of revised contingency cost calculators to the ERA on 22 February 2022. The ERA's assessment of AEMO's contingency cost calculators was based on the most recent version of the calculator submitted for each project, whether submitted in December or February.

Given the lack of a consistent approach to contingency cost calculation in the AR6 proposal, the ERA employed a principles-based approach to assessment of AEMO's calculations,

[209] For an example, see Figure 11-15, pp. 345 of Project Management Institute (2017). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*. Sixth edition.

[210] Project Management Institute (2008). *A Guide to the Project Management Body of Knowledge (PMBOK Guide)*. Fourth edition, (online) [accessed 27 January 2022].

[211] Transport and Infrastructure Council, 2019, *Australian Transport Assessment and Planning Guidelines, 01 Cost Estimation*, p. 4, (online) [accessed 31 January 2022].

[212] Consistent with the principle of parsimony. Bakhshi, P. and Touran, A. (2014). *An overview of budget contingency calculation methods in construction industry*. Procedia Engineering, Vol. 85, pp.52-60. (online) [accessed 7 February 2022].

[213] Transport and Infrastructure Council, 2018, *Australian Transport Assessment and Planning Guidelines, 02 Optimism Bias*, p. 6, (online) [accessed 31 January 2022].

drawing from a review of the literature on contingency cost estimation.[214] The main principles employed in the ERA's assessment and the areas that they relate to are set out in Appendix 11.

The ERA identified several issues with the contingency cost calculations for the AR6 proposal, summarised in Table 45.

Table 45: Issues with contingency cost calculations

Method	Issue
Method 1	• The value of each risk rated as 'N/A' or 'immaterial' was added to the total risk in the contingency cost calculator as 0.5 per cent. • Different scales were used to calculate different contingency cost percentages for different projects, with one scale producing significantly higher costs.
Methods 2 and 3	• "Unknown unknown" risks were valued at 5 per cent of the cost calculated using the method 1 contingency cost calculator and carried forward to the calculation of contingency costs using method 2, at the planning and execution stage of development. • Some total estimated forecast capital costs in the contingency cost calculators were greater than in AEMO's proposal, as they represented projects spanning both AR5 and AR6, rather than just the AR6 period. Consequently, the calculated contingency costs were larger than required for AR6. • AEMO carried contingency costs forward from AR5 to AR6. • In some contingency cost calculators, it appeared from the wording that the EMV was calculated prior to determining the impact and likelihood of the project, rather than the other way around, or that the cost impact of the risk was mistakenly entered into the EMV column (given the comparably higher risk impacts observed in the calculator). • Contingency costs were included for risks that the ERA considered would not be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to achieve the lowest practicably sustainable cost.[215] For example: - Allowance was included for risks that were considered unlikely to happen and rare, despite AEMO having access to overspend provisions. - Allowance was included for 'possible' risks, which can be responded to very subjectively, leading to bias in estimation. - Often the risks identified in calculating contingency costs could be mitigated by coordination between different AEMO project managers, planning or maintaining a dialogue with EPWA. • Contingency costs were calculated for delays in several projects against the base estimate for just one specific project, on which the time frame for completion of the other projects was considered dependent. • Contingency costs were included to allow for more resourcing of projects that were already in-flight, in which project managers should have already had a good understanding of the resources needed and included them in base estimates.

[214] This analysis involves the application of principles that are considered to reflect the intention of regulation to the assessment of AEMO's funding determination by the ERA, to ensure that the assessment is consistent, transparent, and fair.

[215] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(b), (online). See also section 1.2.1 of this determination.

Method	Issue
	• "Ball-park" impact costs were used in the EMV contingency calculator for some projects because the project manager considered that they were unable to cost the risks at that time. • Contingency costs were included for projects where it was considered that market participants may not see the value in the infrastructure being developed by AEMO and may choose not to use it. • In one contingency cost calculator, labour rate increases were allowed for in contingency cost calculations that were already included in base cost estimates.
All methods	• The sum of the contingency costs for each project were rounded up to the nearest whole number.

Source: ERA analysis of AEMO data

The ERA's principles-based assessment of the contingency cost calculations and its rationale for rejecting any costs is presented in Appendix 11. In the draft determination, the ERA rejected forecast contingency costs included for:

- unknown unknowns
- risks with impact values that were rated as "N/A" or "Immaterial"
- rounding of risk percentages up the nearest whole number
- risks that were considered unlikely to happen or rare
- other costs, including projects that had been calculated using a bespoke method.

The ERA also substituted proposed contingency costs carried forward from AR5 to AR6 with AR6 costs alone.

Compared to the figures provided in the AR6 proposal, the actual contingency percentages provided to the ERA by AEMO and calculated using method 1, ranged from 9.5 per cent to 43.80 per cent, while the contingency percentages identified in projects using method 3 ranged from 9.21 per cent to 39.11 per cent.

Following the ERA's assessment, the contingency percentages using method 1, ranged from 7.00 per cent to 43.30 per cent, whilst the contingency percentages calculated using method 3, ranged from 0.00 per cent to 38.14 per cent.

Based on the ERA's principles-based approach to assessing AEMO's contingency calculations and the base cost estimates set out in the sections above, the ERA's draft determination on AEMO's proposed contingency costs was $8.2 million. This was $6.5 million or 44 per cent lower than the $14.7 million in contingency costs proposed by AEMO. The ERA considered AEMO had not sufficiently justified the prudence or efficiency of all proposed contingency costs, as required by the WEM Rules. The ERA's detailed analysis of contingency costs is presented in Appendix 11.

In the draft determination, the ERA did not substitute the contingency cost calculations using different scales for different projects or rejected imprudent risk cost calculations. The ERA suggested that AEMO rework its contingency cost calculations and provide further information ahead of the ERA's final determination to ensure that:

- The same scale was used in method 1 (ranging from 0 to 1) for all projects where costs were calculated using the fixed calculator.

- EMV calculations were correctly derived from likelihood and cost impact estimates.
- Only the costs for risks that would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to achieve the lowest practicably sustainable cost for projects were included in AEMO's contingency calculations using the EMV Tool, particularly for those projects that were already in train.

AEMO needed to resubmit the contingency cost calculators to the ERA in sufficient time to allow for assessment, prior to the ERA making its final determination.

6.1.6.2 Revised proposal and final determination on forecast project contingency amounts

AEMO's revised proposal

In its revised proposal, AEMO maintains that its approach to forecasting contingency costs is a "prudent, reasonable and repeatable method." AEMO states that it has considered the ERA's feedback on the contingency calculation method and has revised several of the parameter inputs to the calculator accordingly (rounding, consistent scales, updating risk calculations).

AEMO has re-submitted contingency calculators for all relevant capital expenditure projects, making several amendments both in line with, and independent of, the ERA's recommendations, while maintaining its approach in others. AEMO's responses to issues raised in the draft determination are detailed in Table 25 of AEMO's revised proposal.[216]

Based on its revisions, AEMO proposes a revised total contingency amount of $11 million, with individual project contingencies reportedly ranging from 6 per cent to 30 per cent.

Stakeholder feedback on draft determination

The AEC supported the ERA's draft determination on AEMO's proposed contingency costs, noting that contingency costs deserve scrutiny because AEMO does not need to spend the approved contingency costs on the projects the funds are approved for.[217] The AEC suggested that AEMO should be required to disclose to the market how it would seek to spend the contingency balance should it not fully use the approved AR6 contingency on the identified projects, in advance, in its AR6 proposal, and not retrospectively through the annual true-up process or reporting obligations, after the funds have already been spent.

The AEC also broadly supported deferring projects with uncertain costs or outcomes to an in-period submission as a way of minimising contingency costs and allowing the ERA to scrutinise the projects when they are better defined, though it reiterated its concern that market participants could face significant unknown costs through AR6 by deferring projects.

Collgar supported the ERA's view that contingency values must be calculated using a risk-based approach, consistently applied across projects.[218] However, Collgar was concerned with the ERA's finding that projects not approved in AEMO's AR5 proposal were undertaken during the AR5 period using funding from projects that were completed under budget or not commenced or contingency funding. Collgar, considered that:

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216 Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination,* p. 66. (online).

217 Australian Energy Council, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination,* (online)

218 Collgar Wind Farm, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination,* (online)

- While this may be permitted under the WEM Rules, it raises questions around the effectiveness of the regulatory process, especially if AEMO is given additional funding through AR6 for projects that had funding previously approved that was reallocated for other purposes. Collgar considered that this contributes to further escalation in market fees.
- This demonstrates that AEMO materially overestimated contingencies in the AR5 period. Collgar noted that, given this, it does not support substantial contingencies being approved in AR6, providing the potential for surplus funds to be used for unapproved projects.

While Collgar stated its preference not to have the uncertainty associated with in-period submissions, it considered that this may be the best option in circumstances where the scope and/or cost of a project is very uncertain, ensuring that additional funds are only provided if required and AEMO can demonstrate costs will be efficiently and prudently incurred. Collgar considered that this would mitigate the risk of AEMO using contingency funding for unapproved projects.

Synergy considered that the forecast contingency amounts calculated using AEMO's new contingency calculator are higher than the amounts market participants would consider reasonable for similar projects or programs of work undertaken by commercial organisations and that the level of contingency should reflect the project scope and financial risks.[219] Synergy supported the ERA's requirement for AEMO to recalculate the contingency amounts in its proposal and the removal of the impact of unknown, unjustified and immaterial risks. Synergy also recommended that AEMO and the ERA take a high-level view of the portfolio of work to review and standardise the risk assessment and contingency amounts applied to each project.

Synergy noted that it remains concerned about the significantly high level of investment and associated contingency proposed for the AR6 period. Synergy considered that increased stakeholder transparency and independent oversight are both required to ensure AEMO's proposed work program is prudent and efficient, and to help address significant issues in AEMO's investment planning and forecasting processes.

Synergy considered transparency in planning, expenditure forecasting, and financial management will help market participants better understand the implications on WEM fees. Synergy anticipated that the regulatory and financial reporting guidelines, to be developed after the ERA's final determination, would provide the necessary transparency addressing concerns raised in response to AEMO's AR6 proposal, that the ERA has no oversight of, including:

1. How contingency costs are spent once approved.

2. Where approved forecast capital expenditure was spent or proposed to be spent against projects that were not specifically included in the AR5 proposal until AEMO lodged AR6.

[219] Synergy, 2022, Submission to *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025 – Draft determination,* (online)

ERA's review, findings and final determination

AEMO's contingency calculators have varied both within and between proposals.[220] The ERA considers that AEMO's hybrid method of contingency calculation is inconsistent and does not measure what it sets out to measure, for the reasons set out below.

In the most recent version of the contingency calculators, AEMO has removed the rounding up of contingency cost percentages, ensured that the contingency funds reflect the outstanding spend to completion on projects in AR6 (and not AR5), and employed a consistent scale in the fixed calculator.

However, despite the decision in the draft determination to use a scale with impact values ranging from 0 to 1, the impact values range from 0.05 to 1. In the scale used in the previous version of the fixed calculator, risks with impacts of N/A were valued at 0.05 (a contingency percentage of 5 per cent). In its revised proposal, AEMO states that the use of N/A may be misleading and notes that it has updated all contingency calculators to use 'immaterial.'

AEMO disagrees with the ERA's blanket removal of risks with an 'immaterial' impact and considers that, if all immaterial risks are removed from the fixed calculator, then a project may return a zero per cent contingency, "where it is relatively small and well understood."[221] [222] AEMO believes that it is unreasonable to determine any project is completely risk-free, and that the 5 per cent contingency applied by including these immaterial risks is an appropriate approach. AEMO notes that risks with no impacts are not included in the calculator.

In contrast to AEMO's revised proposal, in the final version of the fixed calculators, N/A has been changed to "minor" but still retains the impact value of 5 per cent. Intuitively, any risk described as having a "minor" impact could require some small level of funding if the risk arises. However, in the fixed calculator, the rating of minor (and the contingency percentage of 5 per cent) has been awarded to risks explicitly described as having "no impact" to AEMO's business.[223]

Regardless of the size of the project and how well it is understood, it is not valid or prudent to provide funding for a risk that has no impact. It is also not unreasonable to expect that a portion of the projects undertaken by AEMO will be able to be completed without access to contingency funds. The ERA's review of projects undertaken in AR5 supports this assumption (see section 2). The possibility that a portion of projects will not require contingency funds is not allowed for in AEMO's proposal. Considering the above, the ERA rejected the impact value of 5 per cent for any risks rated as having a 'minor' impact.[224]

The latest version of the EMV contingency calculator continues to include an allowance for "unknown unknowns'" in the summation of the costs of risks in the planning and delivery stage. Consistent with AEMO's initial proposal, this is calculated as 5 per cent of the contingency cost determined using the fixed contingency calculator.

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[220] The first set of contingency calculators were overly conservative, with contingency percentages ranging up to nearly 150 per cent of the base cost. The second set of contingency calculators were used in the draft determination and had reduced contingency percentages, but they were plagued with the list of reliability and validity issues outlined in Table 45, above.

[221] Australian Energy Market Operator, 2022, *Response to the ERA's AR6 Draft Determination,* p. 67. (online).

[222] If a project is relatively small and well understood, there should be low costs and minimal risks, if there is a risk at all, given the opportunity to mitigate known risks.

[223] 'No impact to AEMO business' was one of several scores that could be selected to describe any 'change impact to AEMO's business' associated with a project in the fixed calculator.

[224] Similarly, where risks were identified as being 'not an issue,' the corresponding contingency was removed from the fixed calculator. This occurred for one particular risk in three calculators.

However, the fixed calculator does not remain fixed as a calculation that occurs at the concept stage of project development. Instead, the fixed calculator, which includes generalised risks relevant to the idea phase of a project, is recalculated in the planning and delivery phase, when there should be more certainty about the project, with five per cent of the newly calculated contingency then feeding into the EMV tool to account for unknown unknowns. In some cases, the unknown unknown costs have increased compared to the costs in the previous calculators for the same project.

The project contingency percentages recorded in the fixed contingency calculators in the revised proposal ranged between 9 per cent and 27.5 per cent, consistent with AEMO's statement in its final proposal. In contrast, individual project contingency costs calculated using the fixed contingency calculator and feeding into contingency costs using the EMV calculator, ranged between 14 per cent and 69.5 per cent.[225]

In its revised proposal, AEMO reasoned that "unknown unknowns" are a widely accepted element of risk management for projects. AEMO considered that while there are means to better identify and convert to "known unknowns" some element of uncertainty will always remain, and a management reserve is often retained to account for these risks. AEMO stated that its fixed contingency tool is used to estimate known unknowns (general risk categories but not defined risks) and so it is a reasonable model for assigning some unknown unknown risk cost as it moves through the project stages.

Similarly, in its revised proposal, AEMO continues to include an allowance for risks that are considered "rare" or "unlikely" to occur in its EMV calculator. AEMO disagreed with the removal of lower likelihood risks from the calculator, noting that the risks have a scaled likelihood, which is used to calculate the total cost of the risk, consistent with broadly accepted risk management practices and AEMO's broader risk management framework. AEMO noted that its approach to EMV calculations already takes materiality into account, with many more risks under management not included in the calculation. As an example, AEMO noted that for WEM Reform there are approximately 130 active risks under management, with only approximately 40 per cent (52) of these costed.

AEMO was correct when it noted that risks that are rated as rare and unlikely and unknown unknowns are broadly accepted risk management ratings. However, it is not clear that the use of these ratings is appropriate in the WEM context, where AEMO's request for funding can only be approved if it includes only the costs that would be incurred by a prudent provider of AEMO's services, acting efficiently, to achieve the lowest practicably sustainable cost. In this context, it does not make sense to approve funding for risks that are either not known or are considered unlikely to happen.[226]

The approval of funding for risks that are unknown, rare, or unlikely to occur is especially problematic if the funding is approved for such events, and they do not materialise, these funds, which are taken from market fees, can be used as AEMO pleases, without regulatory scrutiny. As noted in the draft determination, the WEM Rules and GSI Rules allow several different options for addressing uncertainty, including an overspend provision.[227]

In its revised proposal, AEMO noted that it recognises there is the potential to use the overspend provision, but that this is a regulatory construct and AEMO requires a total view of potential costs for its budget and investment planning activities. However, as noted by IES, the dollar amounts are still available to AEMO which can make the necessary budgetary

[225] Four projects have contingency percentages higher than 30 per cent.

[226] A scale that rates the likelihood as low, moderate, high, and extreme may have been more appropriate.

[227] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.12, (online).

provisions but exclude the amounts from the AR6 request. The ERA has therefore removed costings for unknown unknowns, and rare or unlikely risks from the EMV calculators.

The large number of risks under management for WEM Reform suggests a possible lack of discipline in the identification of critical risks and/or that risk mitigation has been ineffective. Generally, there should not be more than about 15 to 20 risks included in the contingency calculations. With approximately 130 risks, it is possible that the risks are correlated and/or measuring the same thing. [228]

In its review of the EMV calculators, the ERA considered whether the risk title, description of the risk, and statement of what would occur if the risk materialised were consistent, and whether the risks were valid considerations for AEMO within the context of the WEM Rules. Consideration was also given to whether there was overlap between risks identified in the same project, whether there was consistency between risks identified in different projects, and whether the risks, and risk costings reflected the progress of the project through the planning and delivery stage of development. Where risks were considered invalid or overlapping, they were rejected to ensure efficiency and prudency in the EMV costings.

The ERA also reviewed the cost assumptions in the EMV calculators, many of which were global, rather than detailed, statements of costs. Accordingly, the costings were compared to the project costs summarised in the financial tracking sheets, and where appropriate the cost assumptions were adjusted to ensure consistency between the two.[229]

All EMV calculators were checked to ensure accuracy in calculation, and labour costs were adjusted downward to reflect the 10 per cent difference between tier rates and actual labour rates, and to remove 4.2 per cent for public holidays.

For the STEM reform project, for which AEMO initially used a bespoke contingency calculator (method 4), relying on the contingency cost of a previous STEM reform project to set a contingency cost, AEMO employed the fixed calculator to set a new lower, contingency cost estimate. However, AEMO simply upped the base estimate by the remaining contingency amount such that it came up relatively square with the amount of funding it initially requested.

In its revised proposal, AEMO notes that during the review period, some of the calculators submitted were using “old” risk scales. AEMO stated that the existence of the different scales was due to top-down review or challenge by AEMO’s governance, which concluded that the first iteration of the model was overly conservative (calculating contingency figures higher than required). As such, the calculator was adjusted to reflect an agreed higher risk threshold or lower contingency cost. Further changes were also made to the scale employed in the EMV calculator in the latest proposal.

The ERA considers that the ongoing development of the contingency calculation model through the funding approval process is unfortunate, as it has contributed to the lack of consistency observed in the application of the calculators to projects in the WEM. In future, testing of the reliability and validity of the contingency calculators, and subsequent revisions to the contingency calculators, should take place prior to submitting a request for funding.

For the reasons set out above, the ERA considers AEMO has not sufficiently justified the prudence or efficiency of its revised proposed contingency costs as required by the WEM Rules. Based on the ERA’s review of the revised contingency calculators and changes to the

[228] Australian Government, Department of Infrastructure, Regional Development and Cities, November 2018. *Guidance note 3A Probabilistic Contingency Estimation*, pp.22-23. (online).

[229] Discrepancies were found between contingency costs recorded in the contingency calculators and contingency costs included in the financial tracking sheets. See Appendix 11

base cost estimates set out in the sections above, the ERA's final determination on AEMO's proposed contingency costs is $6.3 million. This is $4.7 million or 43 per cent lower than the $11.0 million in contingency costs proposed by AEMO in its revised proposal.

7. Detailed assessment of AEMO's GSI costs

7.1 AEMO's GSI functions

AEMO has several functions under the GSI Rules, which include operating and maintaining the Gas Bulletin Board, administering the registration process for gas market participants' registration, preparing, and publishing the Gas Statement of Opportunities (GSOO) and monitoring and assisting the ERA with GSI Rules compliance.

7.2 GSI allowable revenue

7.2.1 Initial proposal and draft determination for GSI allowable revenue

AEMO's actual AR5 allowable revenue of $4.8 million was 20 per cent less than the ERA's approved allowable revenue for AR5 of $6.1 million.

Labour costs account for 56 per cent of AEMO's AR6 initial proposed allowable revenue for GSI, $5.5 million and represent a 3 per cent increase since AR5. During the AR6 period, AEMO is required to undertake a review of GSOO and to publish it by July 2024. Labour costs associated with AEMO's GSOO do not appear to be included for 2022/23 in its proposal, as AEMO intends to outsource this work to consultants.

In its initial proposal, AEMO proposed allowable revenue of $5.5 million for the AR6 period.

AEMO included a remuneration adjustment in its proposed labour costs consistent with its Enterprise Agreement (EA). The EA resulted in an increase of 2.8 per cent to GSI labour costs. A portion of AEMO's national cyber security support is also allocated to GSI labour costs.

Other large changes in AR6 allowable revenue compared to AR5 included financing costs and an approximately 71 per cent increase in utility and occupancy costs. There were no capitalised accommodation costs included due to a change in accounting policy whereby AEMO now expenses accommodation rent rather than capitalising it, as in AR5.

Under the IT and telecommunications category, there was a 64 per cent or $0.008 million decrease in cloud costs for AR6, an increase of 106.66 per cent to $0.137 million for software support contracts, and a 116 per cent increase to $0.031 million for minor purchases. The increase in software support contracts also includes cloud service contract costs.

In the draft determination, the ERA considered that AEMO's proposed GSI allowable revenue for AR6 has been adequately explained in its proposal and was sufficient to cover AEMO's GSI functions. AEMO's AR6 GSI allowable revenue is only marginally higher than its actual spend for AR5, with the increase in labour costs explained by an increase in salaries required by the EA and an increase in consultant fees for them to undertake the five yearly GSOO review. The ERA considered AEMO sufficiently justified the prudence and efficiency of its proposed GSI allowable revenue for AR6.

The ERA's draft determination approved the GSI allowable revenue of $5.5 million as proposed by AEMO.

7.2.2 Revised proposal and final determination for GSI allowable revenue

AEMO accepted the ERA's draft determination on proposed GSI allowable revenue. In its revised proposal AEMO updated its forecast to include increases caused by external factors: a revised EA that took effect in December 2021 for forecast staff costs and updated interest rates for forecast borrowing costs. Following these adjustments, AEMO's revised proposal GSI allowable revenue increased to $5.8 million. This is an increase of $0.5 million, or 9 per cent, on its initial proposal.

7.3 GSI forecast capital expenditure

7.3.1 Initial proposal and draft determination for GSI forecast capital expenditure

In its initial proposal, AEMO proposed forecast capital expenditure of $0.4 million for two capital expenditure projects in AR6:

- $0.23 million for the Gas Bulletin Board lifecycle investment.
    - The bulletin board is a public website containing information and data on the production, transmission, storage, and usage of natural gas in Western Australia.
    - AEMO proposes to upgrade the bulletin board website to a new form of code and to move the data into its own digital platform (the cloud). AEMO carried out a similar project during the AR5 period for the STEM that was delivered for $0.4 million. The bulletin board project is proposed to be carried out entirely by AEMO's staff with all costs associated with this project being labour.
- $0.15 million for the GSI allocation (0.6 per cent) of the AEMO-wide cyber security project.
    - AEMO commenced a central cyber security program in 2019, which covers all aspects of cyber security. AEMO suggested that the benefit of AEMO's Western Australian operation sharing AEMO's national cyber security program is a much lower cost compared to developing and delivering its own cyber security program.

The two GSI capital expenditure projects are necessary to ensure AEMO's GSI functions are efficient and compliant with the National Institute of Standards and Technology. In the draft determination, the ERA considered that AEMO had sufficiently justified the prudence and efficiency of its proposed GSI forecast capital expenditure for AR6.

The draft determination approved the GSI capital expenditure of $0.4 million as proposed by AEMO.

7.3.2 Revised proposal and final determination for GSI forecast capital expenditure

In its revised proposal on GSI forecast capital expenditure AEMO:

- Revised the forecast capital financing element to recognise the change to forecast interest rates (as noted in section 7.2.2).

- Retained its 'tier-rate' approach to estimate capital labour costs, rather than adopt the approach required in the ERA's proposal guideline of substituting actual salary costs wherever possible.

In its revised proposal, AEMO proposed $0.38million in GSI forecast capital expenditure.[230]

In its final determination, the ERA has approved GSI forecast capital expenditure of $0.34 million for the AR6 period. The ERA began with AEMO's proposed GSI forecast capital expenditure and then substituted capital labour costs (as outlined in section 6.1.1.2) and partially rejected contingency calculation amounts (as outlined in section 6.1.6.2).

[230] The revised proposal states the proposed GSI forecast capital expenditure is $0.39 million; however, one of the financial sheets provided to the ERA had a value of $0.34 million. The ERA notes there was significant inconsistency in reporting this capital expenditure item, with the proposal, the financial tracking sheets, the workforce plan, and the depreciation schedule having differing values.

Appendix 1 List of Tables

Appendix 2 List of Figures

Appendix 3 AEMO's functions under the WEM Rules and GSI Rules

WEM Rules[231]

The functions conferred on AEMO in the WEM under the WEM Regulations and AEMO Regulations, as set out in the WEM Rules, are presented below.

2.1A. Australian Energy Market Operator

2.1A.1A. The function of ensuring that the SWIS operates in a secure and reliable manner for the purposes of the WEM Regulations is conferred on AEMO.

2.1A.2. The WEM Regulations also provide for the WEM Rules to confer additional functions on AEMO. The functions conferred on AEMO are:

(a) to operate the Reserve Capacity Mechanism, the Short Term Energy Market, the LFAS Market, and the Balancing Market;

(b) to settle such transactions as it is required to under these WEM Rules;

(c) to carry out a Long Term PASA study and to publish the Statement of Opportunities Report;

(cA) to procure adequate Ancillary Services where Synergy cannot meet the Ancillary Service Requirements;

(d) to do anything that AEMO determines to be conducive or incidental to the performance of the functions set out in this clause 2.1A.2;

(e) to process applications for participation, and for the registration, de-registration, transfer and Essential System Services accreditation of facilities;

(f) to release information required to be released by these WEM Rules;

(g) to publish information required to be published by these WEM Rules;

(h) to develop WEM Procedures, and amendments and replacements for them, where required by these WEM Rules;

(i) to make available copies of the WEM Procedures, as are in force at the relevant time;

(iA) to monitor Rule Participants' compliance with WEM Rules relating to dispatch and Power System Security and Power System Reliability;

(j) to support:

i. the Economic Regulation Authority's monitoring of other Rule Participants' compliance with the WEM Rules;

[231] Wholesale Electricity Market Rules (WA), 12 April 2022, (online)

ii. the Economic Regulation Authority's investigation of potential breaches of the WEM Rules (including by reporting potential breaches to the Economic Regulation Authority); and

iii. any enforcement action taken by the Economic Regulation Authority under the Regulations and these WEM Rules;

(k) to support the Economic Regulation Authority in its market surveillance role, including providing any market related information required by the Economic Regulation Authority;

(l) to support the Coordinator and the Economic Regulation Authority in their roles of monitoring market effectiveness, including providing any market related information required by the Coordinator or the Economic Regulation Authority;

(lA) to contribute to the development and improve the effectiveness of the operation and administration of the Wholesale Electricity Market, by:

i. developing Rule Change Proposals;

ii. providing support and assistance to other parties to develop Rule Change Proposals;

iii. providing information to the Coordinator as required to support the Coordinator's functions under these WEM Rules; and

iv. providing information and assistance to the Coordinator and the Economic Regulation Authority as required to support the reviews they carry out under the WEM Rules;

(lB) to develop and maintain a Congestion Information Resource;

(lC) to establish, maintain and update a DER Register in accordance with clause 3.24;

(lD) to participate in the Technical Rules Committee and provide advice on Technical Rules Change Proposals as required by the Economic Regulation Authority under the Access Code, to provide submissions as part of the public consultation process in respect of Technical Rules Change Proposals and to develop and submit Technical Rules Change Proposals relating to System Operation Functions;

(lE) to support each Network Operator in relation to the standard or technical level of performance in respect of a Technical Requirement applicable to Transmission Connected Generating Systems and perform the associated functions set out in Chapter 3A of these WEM Rules;

(lF) to advise and consult with each Network Operator in respect of AEMO's System Operation Functions as contemplated under the Technical Rules applicable to the Network; and

(lH) to contribute to, provide information and assist with, the development of the Transmission System Plan in accordance with section 4.5B;

(II) to support the Coordinator's role, and to facilitate and implement decisions by the Coordinator and the Minister regarding the evolution and development of the Wholesale Electricity Market and the WEM Rules, and the management of Power System Security and Power System Reliability in the SWIS; and

(m) to carry out any other functions conferred, and perform any obligations imposed, on it under these WEM Rules.

GSI Rules[232]

8 Functions and powers of the Coordinator, AEMO and ERA

(1) AEMO has the following functions and powers:

(a) to establish, operate and maintain the GBB;

(b) to register or deregister certain Gas Market Participants as Registered Participants;

(c) to register or deregister certain Facilities and to exempt certain facilities from the requirement to be registered;

(d) to prepare and publish the GSOO;

(e) [Blank];

(f) Procedure making functions, to the extent to which the Procedures relate to its functions under the Rules;

(g) [Blank];

(h) [Blank];

(i) [Blank];

(j) information gathering and disclosure functions, to the extent to which the information gathering and disclosure functions relate to its other functions conferred on AEMO under the GSI Act, the GSI Regulations and the Rules;

(ja) to support:

(i) the ERA's monitoring of person's compliance with the Rules or Procedures;

(ii) the ERA's investigation of breaches or possible breaches of the Rules or the Procedures (including by reporting possible reaches to the ERA); and

(iii) any enforcement action taken by the ERA under the GSI Regulations or Rules;

[232] Gas Services Information Rules, 17 December 2021, (online).

(jb) to provide information to and assist the Coordinator as required to support the Coordinator's functions under the Rules;

(jc) to support the Coordinator's role, and to facilitate and implement decisions by the Coordinator and the Minister, regarding the evolution and development of the GSI Rules; and

(k) any other functions conferred on AEMO under the GSI Act, the GSI Regulations and the Rules.

Appendix 4 AEMO's obligations under the WEM Rules and GSI Rules

WEM Rules[233]

2.22A. Determination of AEMO's budget

2.22A.1. Subject to the requirements of this section 2.22A, AEMO may recover its costs for performing its functions under the WEM Regulations and the WEM Rules.

2.22A.2. For the Review Period, AEMO must seek the determination of its Allowable Revenue and Forecast Capital Expenditure from the Economic Regulation Authority for its functions, in accordance with the proposal guideline referred to in clause 2.22A.9.

2.22A.3. AEMO's proposal under clause 2.22A.2A(a) or clause 2.22A.2B(a) or AEMO's application for reassessment under clause 2.22A.12 or clause 2.22A.13 must, to the extent practicable, identify proposed costs that are associated with a specific project or where that is not practicable, one or more specific functions.

2.22A.4. If AEMO appoints a Delegate, then its proposal for, or application for reassessment of, its Allowable Revenue and Forecast Capital Expenditure must separately itemise the amount payable to the Delegate.

…

2.22A.7. By 30 June each year, AEMO must publish on the WEM Website a budget for the costs AEMO will incur in performing its functions for the coming Financial Year (including, without limitation, the amount to be paid to a Delegate). AEMO must ensure that its budget is:

(a) consistent with the Allowable Revenue and Forecast Capital Expenditure determined by the Economic Regulation Authority for the relevant Review Period and any reassessment; and

(b) reported in accordance with the Regulatory Reporting Guidelines issued by the Economic Regulation Authority from time to time in accordance with clause 2.22A.9.

2.22A.8. By 31 October each year, AEMO must publish on the WEM Website a financial report showing AEMO's actual financial performance against its budget for the previous Financial Year (including, without limitation, the actual amount paid to a Delegate compared to the budgeted amount). The report must be in accordance with the Regulatory Reporting Guidelines issued by the Economic Regulation Authority from time to time in accordance with clause 2.22A.9.

…

2.22A.11. Where the revenue earned for the functions performed by AEMO via Market Fees in the previous Financial Year, is greater than or less than AEMO's

[233] Wholesale Electricity Market Rules (WA), 12 April 2022, (online).

expenditure for that Financial Year, AEMO's current year's budget must take into account any difference between AEMO's Market Fees revenue and AEMO's expenditure in the previous Financial Year by:

(a) decreasing the budgeted revenue by the amount of any revenue surplus; or

(b) increasing the budgeted revenue by the amount of any revenue shortfall.

2.22A.12. Where, taking into account any adjustment under clause 2.22A.11, AEMO's budget is likely to result in revenue recovery, over the relevant Review Period, being at least the lower of 10% of the Allowable Revenue or $10 million, greater than the Allowable Revenue determined by the Economic Regulation Authority, AEMO must apply to the Economic Regulation Authority to reassess the Allowable Revenue.

2.22A.13. AEMO must apply to the Economic Regulation Authority to determine the adjusted Forecast Capital Expenditure for the current Re view Period if the capital expenditure, over the relevant Review Period, is likely to be at least the lower of 10% of the Forecast Capital Expenditure or $10 million, greater than the Forecast Capital Expenditure determined by the Economic Regulation Authority.

2.22A.13A. If AEMO underspends on the Allowable Revenue and/or Forecast Capital Expenditure determined by the Economic Regulation Authority in a Review Period, then, for the next Review Period, the $10 million threshold in clause 2.22A.13 is to be increased to the amount equal to 30 per cent of the underspend plus $10 million.

2.22A.14. AEMO may apply to the Economic Regulation Authority, at any time during a Review Period, for additional costs to be considered by the Economic Regulation Authority as part of the Allowable Revenue and Forecast Capital Expenditure for that Review Period:

(a) for the Allowable Revenue:

i. costs previously rejected by the Economic Regulation Authority pursuant to clause 2.22A.6;

ii. new costs for new projects or new functions conferred on AEMO since AEMO's proposal for its Allowable Revenue for the current Review Period was submitted; and

iii. costs which were not able to be estimated with reasonable confidence at the time the Allowable Revenue for the current Review Period was submitted; and

(b) for the Forecast Capital Expenditure:

i. costs previously rejected by the Economic Regulation Authority pursuant to clause 2.22A.5;

ii. new costs for new projects or new functions conferred on AEMO since AEMO's proposal for its Forecast Capital Expenditure for the current Review Period was submitted; and

iii. costs which were not able to be estimated with reasonable confidence at the time of the Forecast Capital Expenditure for the current Review Period was submitted.

…

2.22A.16. AEMO must make an application under clauses 2.22A.12 or 2.22A.14(a) by 31 March for the Economic Regulation Authority to make a determination before the commencement of the Financial Year to which it relates.

GSI Rules[234]

107 AEMO functions for determination of Allowable Revenue by ERA

(1) Subject to the requirements of this Part, AEMO may recover its costs for performing its functions under the GSI Act, the GSI Regulations and GSI Rules.

…

111A Determination of AEMO's Budget

(1) AEMO must—

(a) by 30 June each year, publish on the GSI Website the AEMO Budget for the AEMO costs AEMO will incur in performing its functions for the coming Financial Year; and

(b) by 31 October each year, publish on the GSI Website a financial report showing AEMO's actual financial performance against its budget for the previous Financial Year, in accordance with the regulatory reporting guidelines issued by the ERA in accordance with subrule 109(7)(b).

(2) AEMO must ensure its budget is:

(a) consistent with the Allowable Revenue and Forecast Capital Expenditure determined by the ERA for the relevant Review Period and any adjustment; and

(b) reported in accordance with the regulatory reporting guidelines issued by the ERA in accordance with subrule 109(7)(b).

(3) Where the revenue earned for the functions performed by AEMO via GSI Fees in the previous Financial Year is greater than or less than AEMO's expenditure for its functions for that Financial Year, the AEMO Budget must take into

[234] Gas Services Information Rules, 17 December 2021, (online).

account any difference between GSI Fees revenue and AEMO's expenditure in the previous Financial Year by:

(a) decreasing the budgeted revenue by the amount of any revenue surplus; or

(b) increasing the budgeted revenue the amount of any revenue shortfall.

(4) Where, taking into account any adjustment under subrule (3), the AEMO Budget is likely to result in revenue recovery, over the relevant Review Period, being at least the lower of 10% of the Allowable Revenue or $0.5 million greater than the Allowable Revenue determined by the ERA, AEMO must apply to the ERA to reassess AEMO's Allowable Revenue for the Review Period.

(5) Where the AEMO Budget is likely to result in capital expenditure, over the relevant Review Period, being at least the lower of 10% of the Forecast Capital Expenditure or $0.5 million, greater than AEMO's Forecast Capital Expenditure determined by the ERA, AEMO must apply to the ERA to reassess AEMO's Forecast Capital Expenditure for the Review Period.

(6) AEMO must make an application to the ERA under subrule 4 or with respect to Allowable Revenue under subrule 110(2) by 31 March for the ERA to make a determination of the Allowable Revenue before the commencement of the Financial Year to which the relevant AEMO Budget relates.

…

114 AEMO may recover AEMO's functions, costs Regulator Fees and Coordinator Fees

For each Financial Year, AEMO may recover from Registered Shippers and Registered Production Facility Operators:

(a) an amount equal to the AEMO Budget;

(b) an amount equal to the Regulator Fees, which amount must be consistent with the amount notified by the ERA in accordance with subrule 110A(3) or, where such amount has not been notified by the ERA in accordance with subrule 110A(3), published by AEMO in accordance with subrule 110A(5) or subrule 110A(6); and

(c) an amount equal to the Coordinator Fees, which amount must be consistent with the amount notified by the Coordinator in accordance with subrule 110B(3) or, where such amount has not been notified by the Coordinator in accordance with subrule 110B(3), published by AEMO in accordance with subrule 110B(5) or subrule 110B(6).

Appendix 5 ERA's obligations under the WEM Rules and GSI Rules

WEM Rules[235]

2.22A. Determination of AEMO's budget

...

2.22A.2B Notwithstanding clause 2.22A.2A, for the Review Period from 1 July 2022 to 1 July 2025 the following applies:

(a) the Economic Regulation Authority must publish a proposal guideline by 31 October 2021;

(b) AEMO must submit a proposal for its Allowable Revenue and Forecast Capital Expenditure to the Economic Regulation Authority for the Review Period by 31 December 2021;

(c) the Economic Regulation Authority must publish on its website a draft determination of AEMO's Allowable Revenue and Forecast Capital Expenditure for the Review Period for public consultation by 31 March 2022; and

(d) the Economic Regulation Authority must prepare and publish on its website its final determination of AEMO's Allowable Revenue and Forecast Capital Expenditure for the Review Period by 31 May 2022.

…

2.22A.5. The Economic Regulation Authority must take the following into account when determining AEMO's Allowable Revenue and Forecast Capital Expenditure or an application for reassessment to the Allowable Revenue or Forecast Capital Expenditure:

(a) the Allowable Revenue must be sufficient to cover the forward looking costs of performing AEMO's functions in accordance with the following principles:

i. recurring expenditure requirements and payments are recovered in the year of the expenditure; and

ii. capital expenditure is to be recovered through the depreciation and amortisation of the assets acquired by the capital expenditures in a manner that is consistent with generally accepted accounting principles;

(b) the Allowable Revenue and Forecast Capital Expenditure must include only costs which would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to

[235] Wholesale Electricity Market Rules (WA), 12 April 2022, (online).

achieve the lowest practicably sustainable cost of performing AEMO's functions, while effectively promoting the Wholesale Market Objectives;

(c) where possible, the Economic Regulation Authority should benchmark the Allowable Revenue and Forecast Capital Expenditure against the costs of providing similar functions and/or projects in other jurisdictions;

(d) where costs incurred by AEMO relate to both the performance of functions in connection with the WEM Rules, and the performance of AEMO's other functions, the costs must be allocated on a fair and reasonable basis between:

i. costs recoverable as part of AEMO's Allowable Revenue and Forecast Capital Expenditure; and

ii. other costs not to be recovered under the WEM Rules; and

(e) any other matters the Economic Regulation Authority considers relevant to its determination.

2.22A.6. The Economic Regulation Authority may do any or all of the following in respect to AEMO's proposal under clause 2.22A.2A(a) or clause 2.22A.2B(a):

(a) approve the costs of any project;

(b) approve the costs of AEMO performing its functions;

(c) if the Economic Regulation Authority considers that some costs do not meet the requirements of clause 2.22A.5, reject the costs fully or partially, or substitute those costs with costs the Economic Regulation Authority considers meets the requirements of clause 2.22A.5; and

(d) recommend to AEMO that some of the costs be considered in a subsequent Review Period or in accordance with clause 2.22A.14 .

…

2.22A.15. The Economic Regulation Authority may request information from AEMO in relation to the performance of its functions under this section 2.22A. AEMO must provide the information to the Economic Regulation Authority by the time specified in a request, which must be reasonable.

…

2.22A.17. The Economic Regulation Authority may amend a determination under clause 2.22A.2(c) if AEMO makes a reassessment application under clauses 2.22A.12 or 2.22A.13 or 2.22A.14 and the Economic Regulation Authority: (a) must take the matters referred to in clause 2.22A.5 into account in determining any reassessment; (b) may consider as part of its amended determination any earlier determined costs where the Economic Regulation Authority reasonably considers it necessary to review those earlier determined costs as part of the reassessment; (c) is not required to reassess earlier determined costs in making its redetermination of the Allowable Revenue or Forecast Capital

Expenditure; and (d) must complete such public consultation as the Economic Regulation Authority considers appropriate in the circumstances.

GSI Rules[236]

108A ERA to determine Allowable Revenue and Forecast Capital Expenditure for AEMO

(1) The ERA must determine the Allowable Revenue and Forecast Capital Expenditure for AEMO for each Review Period for performing its functions, in accordance with this Part.

(2) By 31 October of the year prior to the start of a Review Period, AEMO must submit a proposal to the ERA for its Allowable Revenue and Forecast Capital Expenditure for the performance of its functions over that Review Period, in accordance with the proposal guidelines referred to in subrule 109(7)(a).

(3) By 31 March of the year in which the Review Period commences, the ERA must publish on its website a draft determination of AEMO's proposed Allowable Revenue and Forecast Capital Expenditure for public consultation.

(4) The ERA must prepare and publish on its website its final determination of the Allowable Revenue and Forecast Capital Expenditure of AEMO by 30 April of the year in which the Review Period commences.

(5) Where the ERA does not determine the Allowable Revenue and Forecast Capital Expenditure of AEMO by the date in subrule 108A(4) or 108B(1)(d), the GSI Fees calculated under Division 4 of Part 7 of the Rules for the current Financial Year continue to apply until the ERA makes a determination.

(6) AEMO's proposal under subrule 108A(2) or 108B(1)(b) or application for adjustment under subrule 111A(4) or 111A(5) must, to the extent practicable, identify proposed costs that are associated with a specific project or where not practicable, a specific function or functions.

108B Transitional provisions for the Review Period from 1 July 2022 to 1 July 2025

(1) Notwithstanding rule 108A the following apply:

(a) the ERA must publish a proposal guideline by 31 October 2021;

(b) AEMO must submit a proposal for its Allowable Revenue and Forecast Capital Expenditure to the ERA for the Review Period by 31 December 2021;

(c) the ERA must publish on its website a draft determination of AEMO's Allowable Revenue and Forecast Capital Expenditure for the Review Period for public consultation by 31 March 2022; and

[236] Gas Services Information Rules, 17 December 2021, (online).

(d) the ERA must prepare and publish on its website its final determination of AEMO's Allowable Revenue and Forecast Capital Expenditure for the Review Period by 31 May 2022.

109 Matters for consideration by ERA in determining Allowable Revenue and Forecast Capital Expenditure

(1) The ERA must take the matters set out in this rule into account, and any other matters the ERA considers relevant to its considerations when—

(a) determining the Allowable Revenue and Forecast Capital Expenditure of AEMO under rule 108A and 108B; and

(b) approving adjustments to the current Allowable Revenue and Forecast Capital Expenditure for AEMO under rule 110.

(2) The Allowable Revenue of AEMO must be sufficient to cover the forward looking costs of performing AEMO's functions in accordance with the following principles—

(a) recurring expenditure requirements and payments are recovered in the year of the expenditure; and

(b) capital expenditures are to be recovered through the depreciation and amortisation of the assets acquired by the capital expenditures in a manner that is consistent with generally accepted accounting principles.

(3) The Allowable Revenue and Forecast Capital Expenditure for AEMO must include only costs which would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, seeking to achieve the lowest practicably sustainable cost of delivering AEMO's functions, while effectively promoting the GSI Objectives.

(4) Where possible, the ERA should benchmark the Allowable Revenue and Forecast Capital Expenditure for AEMO against the costs of providing similar functions and/or projects in other jurisdictions.

(5) Where costs incurred by AEMO relate to both the performance of functions in connection with the Rules, and the performance of AEMO's other functions, the costs must be allocated on a fair and reasonable basis between—

(a) costs recoverable as part of AEMO's Allowable Revenue and Forecast Capital Expenditure; and

(b) other costs not to be recovered under the Rules.

(6) The ERA may approve project and/or function costs or, if some costs do not meet the requirements of this rule 109, reject fully or partially or substitute those costs and recommend to AEMO that some of the costs be considered in a subsequent Review Period and/or in a reassessment.

110 ERA may adjust Allowable Revenue or Forecast Capital Expenditure

(1) The ERA must reassess and may adjust the Allowable Revenue and/or Forecast Capital Expenditure for the current Review Period for AEMO where—

(a) AEMO applies to the ERA to reassess the Allowable Revenue under subrule 111A(4); and/or

(b) AEMO applies to the ERA to reassess the Forecast Capital Expenditure under subrule 111A(5).

(2) During a Review Period, AEMO may apply to the ERA for approval of an adjustment to its Allowable Revenue and/or Forecast Capital Expenditure for that Review Period:

(a) costs previously rejected pursuant to rule 109;

(b) new costs for project and/or functions since AEMO'S proposal for its Allowable Revenue and Forecast Capital Expenditure for the current Review Period; and

(c) costs which were not able to be estimated with reasonable confidence at the time of the relevant Allowable Revenue and Forecast Capital Expenditure review process.

(3) If the ERA receives an application from AEMO under subrule (2), the ERA may make a determination to adjust the Allowable Revenue and Forecast Capital Expenditure for the Review Period for AEMO.

(4) The ERA may seek information from AEMO in relation to the performance of its functions under this Division 2.

(5) The ERA must undertake such consultation as the ERA considers appropriate in the circumstances, in relation to applications for adjustment of the current Allowable Revenue and Forecast Capital Expenditure for AEMO referred to in subrule (1), and may do so in relation to an application for adjustment under subrule (2).

Appendix 6 AR5 project analysis

Table 46: Comparison of AR5 determination against AR5 forecast costs ($'000)

	AR5 determination*			AR5 forecast actual			Total variance
Project	**WEM**	**GSI**	**Total**	**WEM**	**GSI**	**Total**	
Power system operation	516		516	5,130		5,130	(4,614)
System management system upgrade	2,215		2,215	3,646		3,646	(1,431)
Reduction of prudential exposure phase 2	2,478		2,478	3,069		3,069	(591)
POMAX database and metering	968		968	1,270		1,270	(302)
POMAX settlements replacement	1,521		1521	3,337		3,337	(1,816)
Business continuity capability	229	-	229	90	-	90	139
STEM Fortran replacement	448	-	448	653	-	653	(205)
Hardware and software lifecycle support	864	55	919	250	20	270	649
Enhanced control room tools	69	-	69	-	-	-	69
Demand and renewable energy forecasting	89	-	89	95	-	95	(6)
Market operator interface	363	-	363	-	-	-	363
PASA process improvement	-	-	-	176	-	176	(176)
System management application remediation	179	-	179	-	-	-	179
Spinning reserve cost allocation rule change	129	-	129	301	-	301	(172)
Administration improvements to outage process rule change	553	-	553	-	-	-	553

	AR5 determination*			AR5 forecast actual			Total variance
Identify and access management	112	56	168	-	-	-	168
Accommodation	2,054	131	2,185	2,225	131	2,356	(171)
Digital roadmap	4546	291	4837	5,376	193	5,569	(732)
WEM reform	48,457	-	48,457	36,383	-	36,383	12,074
DER roadmap	14,600	-	14,600	10,170	-	10,170	4,430
Total	**80,390**	**533**	**80,923**	**72,171**	**344**	**72,515**	**8,408**

Source: ERA analysis of AEMO data.

**AR5 determination includes 2020 in-period proposal and all contingencies.*

Table 47: AR5 forecast costs for projects not included in AR5 determination ($'000)

Project	Forecast costs
BMO tie-break	84
Malaga DC refresh	950
WEM market modelling	566
Reserve Capacity Mechanism pricing	3,013
WA Electricity Demand Forecasting	80
Control room BT phone upgrade	189
Sundry small projects – under $50,000	86
Total costs	**4,968**

Source: ERA analysis of AEMO data

Appendix 7 Evaluation of tier costing method

This appendix details the ERA's analysis of AEMO's method for determining labour costs as part of its proposed operating and capital expenditure in AR6. The ERA's determination on labour costs relating to operating and capital expenditure is presented in sections 5.1.1 and 6.1.1 respectively.

Evaluation of AEMO tier costing method

AEMO has provided some supporting information on the tiers they used for estimating in-house staff rates. The ERA has identified problems with AEMO's sampling, method, and costing, as set out below.

Problems with the sample

Nominally, AEMO uses five groupings with two tiers in each grouping reflecting permanent and contract staff. Tiers one to five are for permanent staff and tiers six to ten are for contract staff. The only difference between the permanent and contract staff are the entitlements where permanent staff have access to the bonus system and long service leave. The top category (tier 5 for permanent and tier 10 for contract staff) covers a single position - the Executive General Manager of Western Australian Operations. The sample of staff labour rates was provided for a sample of 370 people, grouped into tiers one to four.

It is not clear how the sample relates to labour rates in Western Australia. Other jurisdictions such as Melbourne and New South Wales have higher costs for comparable positions.[237] A sample of 370 exceeds the total number of staff working in Western Australia at least three times. This skews the costs upwards.

Problems with the method

While the method employed to determine labour rates might be appropriate for an internal budget estimate, it is too imprecise for an allowable revenue determination. This is because the sample is not weighted by the labour reflected on the projects or by jurisdiction. This means that, for any group of staff, if either the lower cost employees or higher cost employees conduct most of the work, the actual costs will diverge materially from the estimated costs.

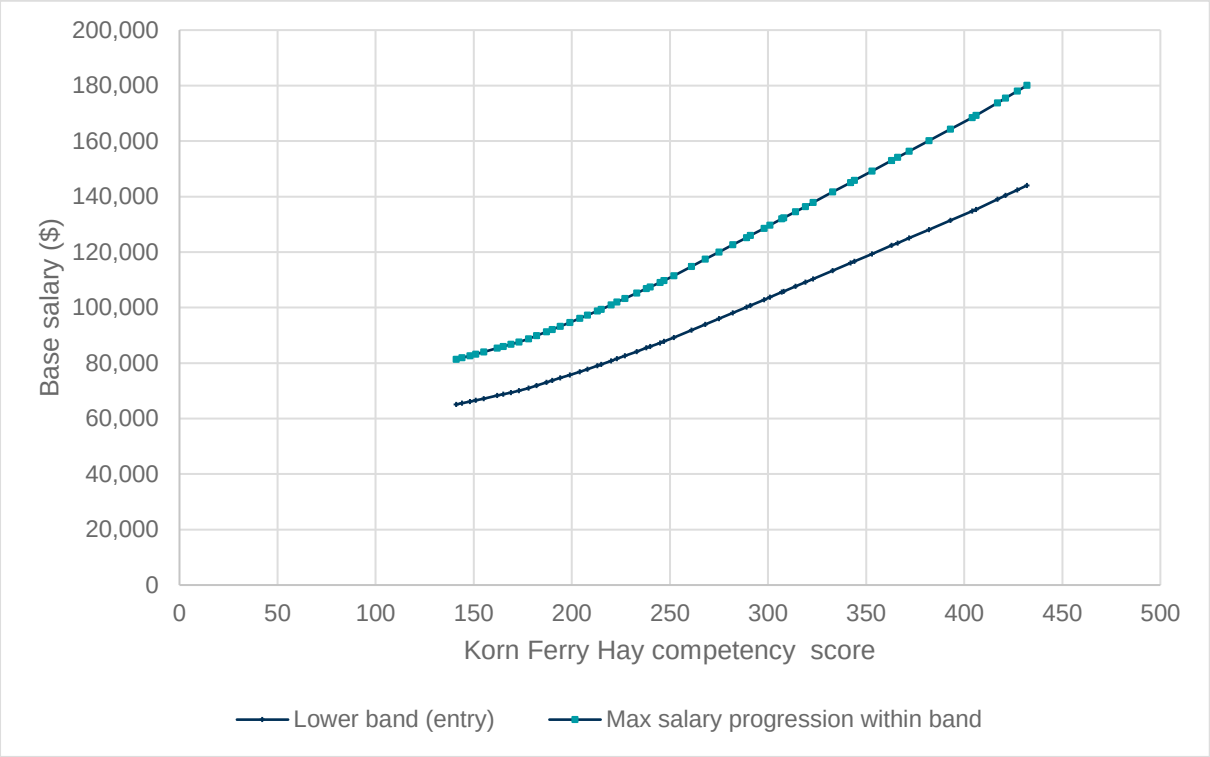
Problems with the costing

There is a fundamental disconnection between AEMO's remuneration policies and the tier rates. AEMO remunerates its employees based on a continuum of positions remunerated based on a measure of workplace skills and competence termed the Korn Ferry Hay competency score. Employees (if employed consistent with the enterprise bargaining agreement; EBA) enter the organisation at 80 per cent of the 75th percentile of the industry ranking for a position, based on the Korn Ferry Hay's score, and work their way to the 75th percentile for their competency band.[238] The salary points based on the scores form a continuum of salary, with no clear grouping (Figure 8).

[237] Obtain supporting reference from salary surveys.

[238] Australian Energy Market Operator, 2018, *Enterprise bargaining agreement, Fair Work Commission*, p. 32, (online).

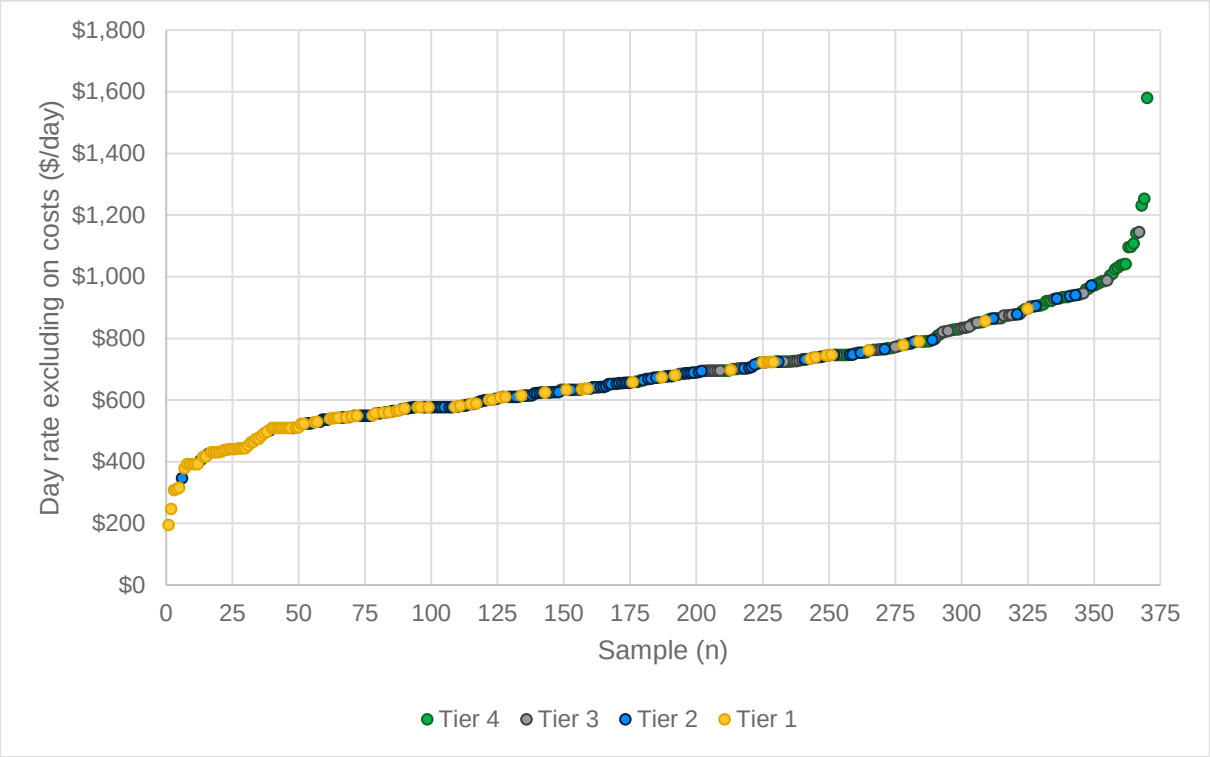
Figure 8: AEMO salaries by Korn Ferry Hay competency score



Source: ERA analysis of AEMO enterprise bargaining agreement

This method does not apply a degree of segregation or grouping that is implied by the use of separate tiers, where people are classed into one of five base groupings along their organisational or management strata, being: analyst, senior, principal/lead, specialist/management, or executive general manager. No data is provided on the salary level for the fifth tier. The data on the tiers indicates that, in practice, role salaries are not segregated into such groupings. The top 15 per cent of the sample contains representatives from all four tiers (Figure 9).

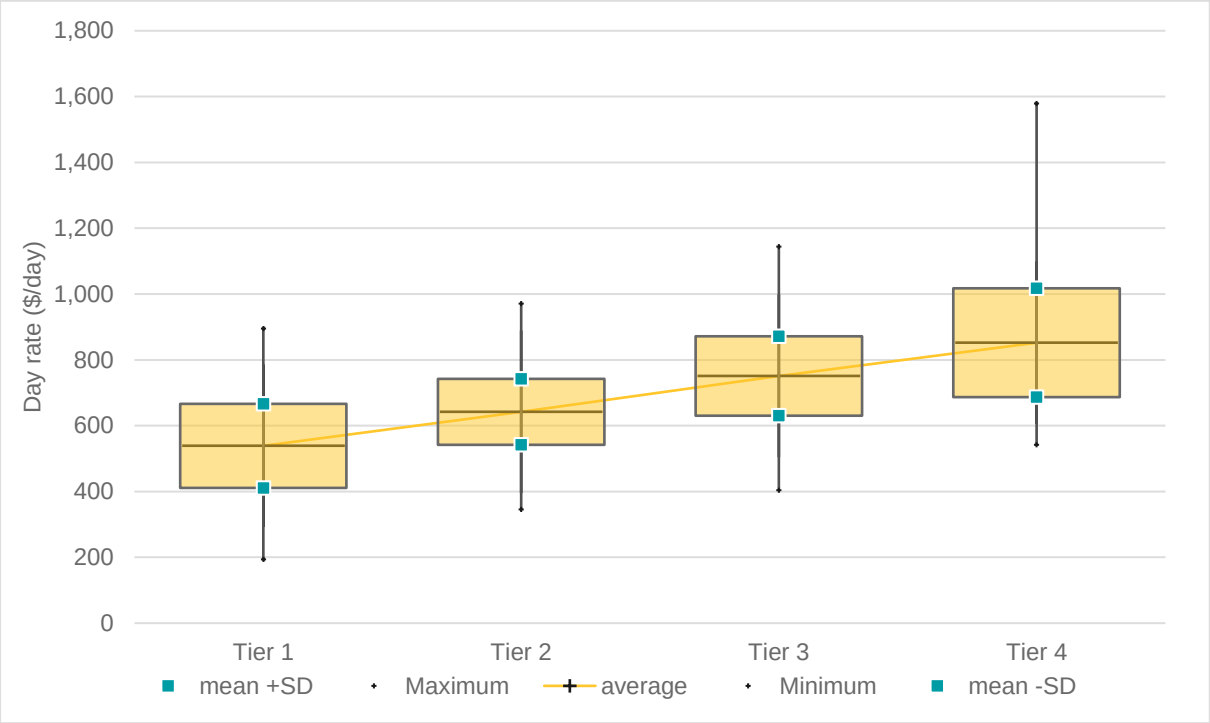
Figure 9: AEMO tier day rate population sample



Source: ERA analysis of AEMO data

The degree of overlap between the tiers is apparent in Figure 10, where the population within one standard deviation of the mean in one tier substantially overlaps the population in the neighbouring tiers. This indicates that the population segregation along management lines using the tiers bears no close relationship with remuneration in practice.

Figure 10: Population distribution statistics for the tiers



Source: ERA analysis of AEMO data

AEMO's use of the tier method was rejected for the DER roadmap funding because the overlap between tiers of actual salaries did not reflect "a robust clustering of competencies and responsibilities to use as the basis for forecasting new staff costs." The ERA found that the use of the tiers "overestimated the cost of existing staff".[239] In the material provided to the ERA on the tiers, AEMO acknowledged that even without accounting for any weighting for duties performed, the rates over-estimate project costs. This poses a risk to market participants (and therefore consumers) that the projects are likely to cost less than anticipated. AEMO is also at risk if its proposal is rejected as it may have inadequate staff to complete the necessary tasks.

In an effort to avoid capitalising staff leave entitlements, AEMO made several adjustments to the tier rates and the project workforce plan. In calculating the working days in the year, AEMO reduced the number of working days in the year from around 260 days down to 230 days – ten for public holidays and 20 for annual leave days. While AEMO reduced the salary package cost to maintain relativity, it grossed up the FTE count in the workforce plan to compensate. Grossing up the person hours to compensate for leave renders the adjustments pointless, and excessively complicates the workforce costings.

Conclusion

Without a material improvement in the method since it was first presented in AEMO's DER roadmap AR5 in-period proposal, the tiers do not provide a sound basis for quantifying staff costs. In place of the tier rates, the ERA has substituted actual staff salaries and entitlements. Fixed term contract staff rates are based on a combination of indicative staff costs at a

[239] Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period submission for implementation of the distributed energy resources roadmap - Determination Report*, pp. 15-21. (online)

comparable level, with comparable titles moderated with salary survey information published by recruitment consultants.

Appendix 8 WEM reform projects

This appendix outlines the ERA's analysis and draft and final determination on the WEM reform projects in the proposed capital expenditure program for AR6. The ERA's final determination is presented in section 6.1.2.2.

WEM reform in the AR5 period

AEMO proposed forecast capital expenditure of $51.2 million to cover its obligations under (former) market rule 1.20.1: "To prepare for Wholesale Electricity Market and Constrained Network Access Reform; and to facilitate the implementation of Wholesale Electricity Market and Constrained Network Access Reform (including through transitional measures)."

The subject matter areas covered by the phrase 'Wholesale Electricity Market and Constrained Network Access Reform' were defined by the Minister for Energy in a letter to AEMO (published on the ERA's website).[240]

In its AR5 proposal, AEMO acknowledged that the 'precise detail' of reforms was not fully defined and so they were expecting some variance in the proposed WEM reform capital expenditure forecasts. The anticipated variance was reflected in the contingency levels applied to the base cost forecasts; an average contingency of 31 per cent. AEMO's AR5 proposal stated that AEMO "considers the increase in activity required to deliver this expenditure is well within its capabilities" and it is "well placed to commence delivery of the WEM reform program subject to funding approval".[241]

The $51.2 million forecast capital expenditure for AR5 was to cover "market and regulatory design activity and the design and implementation of the new IT systems required to enable WEM reform, programme management costs, hardware and software costs, certification borrowing costs and a contingency allowance."[242] Of this $51.2 million forecast:

- $12 million was for contingency costs.
- $39.3 million was for base costs. The two largest cost categories were:
  - Staffing at $34.1 million
  - Production of the IT platform at $3.8 million.

The assumption at the time was that AEMO would change the reserve capacity mechanism, enable grid scale storage to connect to the network, improve the ancillary services framework, and review and revise power system security and reliability requirements by the end of 2020. Following this, AEMO committed to delivering security constrained economic dispatch, constrained network access, five-minute dispatch and co-optimised energy and essential system service functionality by the proposed start date of the new market design, in October 2022. To deliver its obligations under the WEM reform program, AEMO expected that:

> adapting current applications (where appropriate) is the best and most prudent long-term solution. This includes a current design assumption that AEMO's NEMDE dispatch engine will be adapted for use in the WEM as the core market design features align with its capabilities.

[240] Australian Energy Market Operator, 2019, *2019-2022 Allowable Revenue and Forecast Capital Expenditure submission to the ERA*, p. 93. (online).

[241] Ibid, p. 47.

[242] Ibid, p. 77.

AEMO said it would consider building new or procuring IT systems (from external vendors) where necessary and cost effective. However, AEMO did not believe a broad vendor-driven approach to implementation is the most prudent strategy. The scale of expected change to AEMO's market and power system architecture is significant and while off-the-shelf management systems exist, AEMO believed that the risks of both higher costs and longer delivery times were significant.[243]

For AR5, AEMO's cost estimation methodology "is based on a top-down approach, given the early stage of market and regulatory design."[244] Labour estimates were based on AEMO's standard approach, plus comparisons with other projects. AEMO created 'teams' for key work areas: program management, market design, operational subject matter experts, IT design and management, and IT delivery and development.

AEMO then estimated the number of teams necessary to undertake the required activities. AEMO assumed that most of the staff needed (65 per cent) would be internal, with external contractors and consultants for the IT delivery and development activities. AEMO determined low, medium, and high cost estimates for other costs, such as hardware and software licences, certification of systems, and travel and expenses. The medium level estimates were used in AEMO's AR5 proposal. All estimated costs were allocated to one project code 'P1382 – WEM reform tranche 1 and 2'.

The evolution of AEMO's WEM reform program is summarised in Table 48 below, demonstrating how the forecast costs have changed over time.

Table 48: Evolution of the costs of AEMO's WEM reform program

Element	AR5 – Mar 2019	Jun 2020	Mar 2021	Aug 2021
Info available	High level design only	Draft WEM rules	Gazetted rules (tranches 0-3)	More rules Tranche 4a
Scope	Top down	Internal update	Bottom up build	Lessons learned from NEM
Base	48	54	69	75
Contingency costs	13 (27%)	7 (13%)	11 (16%)	15.7 (21%)
Total	**61**	**61**	**80**	**91.2**

Source: Representation of AEMO information

The following table illustrates the distribution of WEM reform project costs, including contingency costs, over the AR4, AR5 and AR6 periods, referred to in section 6.1.2. The table compares AEMO's initial WEM reform capital forecast estimates, provided with its proposal in December 2021 against revised financial estimates AEMO provided to the ERA in April 2022.

The highlighted figures in the table below are where project progress is less advanced in AEMO's revised financials than anticipated when AEMO provided its proposal.

[243] Ibid, p. 81.

[244] Ibid, p. 116.

Table 49: Distribution of WEM reform workstream and projects costs over the AR4, AR5 and AR6 periods compared over AEMO's initial and revised AR6 financial data

Workstream and project	AR4 $M and %	AR5 $M and %	AR6 $M and %	Total
WEM reform core (initial)	0.4 3%	6.1 42%	8.0 55%	14.5
WEM reform core (revised)	0.4 3%	5.7 40%	8.1 57%	14.1
Market and regulatory design (initial)	1.0 19%	4.3 79%	0.1 2%	5.5
Market and regulatory design (revised)	1.0 17%	4.5 76%	0.4 6%	6.0
Technical and process design (initial)	0.1 7%	1.5 90%	0.03 2%	1.6
Technical and process design (revised)	0.4 7%	1.5 89%	0.06 4%	1.6
Design planning and maintenance workstream total (initial)	**1.5 7%**	**11.9 55%**	**8.2 38%**	**21.6**
Design planning and maintenance workstream total (revised)	**1.5 7%**	**11.7 54%**	**8.5 39%**	**21.8**
Digital platform (initial)	-	6.0 48%	6.4 52%	12.4
Digital platform (revised)	-	4.1 35%	7.5 65%	11.7
Integration and market trial (initial)	-	0.3 6%	5.1 94%	5.5
Integration and market trial (revised)		0.2 3%	4.8 97%	5.0
Compliance reporting (initial)	-	-	2.6 100%	2.6
Compliance reporting (revised)	-	-	2.5 100%	2.5
Hypercare and support (initial)	-	-	2.0 100%	2.0 100%
Hypercare and support (revised)	-	-	1.6 100%	1.6 100%
Integration workstream total (initial)	**-**	**6.3 28%**	**16.1 72%**	**22.4**
Initiation workstream total (revised)	**-**	**4.3 21%**	**16.4 79%**	**20.8**
RCM reform (initial)	-	5.8	3.4	9.2

Workstream and project	AR4 $M and %	AR5 $M and %	AR6 $M and %	Total
RCM reform (revised)	-	63% 5.1 45%	37% 6.2 55%	11.3
STEM reform (initial)	-	0.01 1%	1.2 99%	1.2
STEM reform (revised)	-	0.01 1%	1.2 99%	1.2
Legacy workstream total (initial)	**-**	**5.8 56%**	**4.6 44%**	**10.4**
Legacy workstream total (revised)	**-**	**5.1 41%**	**7.4 59%**	**12.5**
Generator performance standards (initial)	-	0.9 100%	-	0.9
Generator performance standards (revised)	-	0.9 100%	-	0.9
Registrations reform (initial)	-	0.9 42%	1.3 58%	2.2
Registrations reform (revised)	-	0.6 30%	1.5 70%	2.1
Registration workstream total (initial)	**-**	**1.9 59%**	**1.3 41%**	**3.2**
Registration workstream total (revised)	**-**	**1.6 51%**	**1.5 49%**	**3.1**
Settlement enhancement (initial)	-	2.5 100%	-	2.5
Settlement enhancement (revised)	-	2.5 100%	-	2.5
Settlement reform (initial)	-	1.8 40%	2.7 60%	4.6
Settlement reform (revised)	-	2.3 38%	3.8 62%	6.2
Settlement workstream total (initial)	**-**	**4.3 61%**	**2.7 39%**	**7.1**
Settlements workstream total (revised)	-	**4.8 56%**	**3.8 44%**	**8.7**
Constraint management (initial)	-	1.3 98%	0.03 2%	1.4
Constraint management (revised)	-	1.3 96%	0.05 4%	1.4

Workstream and project	AR4 $M and %	AR5 $M and %	AR6 $M and %	Total
WEMDE (initial)	-	4.9 73%	1.8 27%	6.7
WEMDE (revised)	-	4.0 63%	2.3 37%	6.3
WEMDE user interface (initial)	-	2.7 51%	2.6 49%	5.4
WEMDE user interface (revised)	-	1.5 34%	2.8 66%	4.3
Real time market submissions (initial)	-	1.5 98%	0.03 2%	1.8
Real time market submissions (revised)	-	1.7 96%	0.07 4%	1.8
Dispatcher Training Simulator (DTS) integration and SCED offline tools (initial)	-	-	2.1 100%	2.1
Dispatcher Training Simulator (DTS) integration and SCED offline tools (revised)	-	-	1.9 100%	1.9
SCED workstream total (initial)	**-**	**10.5 62%**	**6.6 38%**	**17.1**
SCED workstream total (revised)	**-**	**8.5 54%**	**3.8 44%**	**15.6**
Outage management reform (initial)	-	1.6 94%	0.1 6%	1.7
Outage management reform (revised)	-	1.3 68%	0.6 32%	2.0
Commissioning test reform (initial)	-	0.1 7%	1.5 93%	1.6
Commissioning test reform (revised)	-	0.1 8%	1.3 92%	1.4
Forecast integration (initial)	-	0.9 89%	0.1 11%	1.0
Forecast integration (revised)	-	0.7 55%	0.5 45%	1.2
MT PASA (initial)	-	1.6 62%	1.0 38%	2.6
MT PASA (revised)	-	0.7 39%	1.1 61%	1.8
ST PASA (initial)	-	-	1.5 100%	1.5
ST PASA (revised)	-	0.03	1.6	1.6

Workstream and project	AR4 $M and %	AR5 $M and %	AR6 $M and %	Total
		2%	98%	
System operation planning tools (initial)	-	0.2	0.9	1.1
		17%	83%	
System operation planning tools (revised)	-	0.07	0.9	1.0
		8%	92%	
System planning workstream total (initial)	**-**	**4.4**	**5.1**	**9.5**
		44%	**56%**	
System planning workstream total (revised)	**-**	**2.9**	**6.0**	**8.9**
		33%	**67%**	
Overall WEM reform capital expenditure forecast (initial)	**1.5**	**45.1**	**44.6**	**91.2**
	7%	**49%**	**49%**	
Overall WEM reform capital expenditure forecast (initial)	**1.5**	**39.0**	**50.8**	**91.3**
	2%	**43%**	**56%**	

Source: ERA analysis of AEMO data

Overall, from AEMO's revised financials the WEM reform capital program will be slightly less advanced at the end of AR5 (43 per cent complete) than where AEMO was forecasting it would be (49 per cent complete), when AEMO made its initial proposal.

The following table provides information on the detail of costs approved, or rejected in the ERA's draft determination, for WEM projects. The forecast costs for seven projects have been revised across AR5 and AR6, these are:

- Forecast integration – initially AEMO estimated 89 per cent of the total project cost would be expended in AR5 leaving 11 per cent for AR6. In its revised proposal, AEMO expects 55 per cent would be expended in AR5 leaving 45 per cent for AR6. Effectively, there is a transfer of 34 per cent of total project costs from AR5 to AR6.
- Outage management reform – initially AEMO estimated 94 per cent of the total project cost would be expended in AR5 leaving 6 per cent for AR6. In its revised proposal, AEMO expects 68 per cent would be expended in AR5 leaving 32 per cent for AR6. Effectively, there is a transfer of 26 per cent of total project costs from AR5 to AR6.
- MT PASA – initially AEMO estimated 62 per cent of the total project cost would be expended in AR5, leaving 38 per cent for AR6. In its revised proposal, AEMO expects 39 per cent would be expended in AR5 leaving 61 per cent in AR6. Effectively there is a transfer of 23 per cent of total project costs from AR5 to AR6.
- RCM reform – initially AEMO estimated 63 per cent of the total project cost would be expended in AR5 leaving 37 per cent for AR6. In its revised proposal, AEMO expects 45 per cent to be expended in AR5 with 55 per cent in AR6. Effectively, there is a transfer of 18 per cent of total project costs from AR5 to AR6.
- WEMDE user interface – initially AEMO estimated 51 per cent of the total project cost would be expended in AR5 leaving 49 per cent for AR6. In its revised proposal, AEMO expects 34 per cent would be expended in AR5 leaving 66 per cent in AR6. Effectively there is a transfer of 17 per cent of total project costs from AR5 to AR6.

- Registrations reform – initially AEMO estimated 42 per cent of the total project cost would be expended in AR5 leaving 58 per cent for AR6. In its revised proposal, AEMO expects 30 per cent to be expended in AR5 leaving 70 per cent in AR6. Effectively, there is a transfer of 16 per cent of total project costs from AR5 to AR6.
- Digital platform – initially AEMO estimated 48 per cent of the total project cost would be expended in AR5 leaving 52 per cent for AR6. In its revised proposal, AEMO expects 35 per cent to be expended in AR5 with 65 per cent in AR6. Effectively, there is a transfer of 13 per cent of total project costs from AR5 into AR6.

Table 50: WEM reform forecast capital costs through the determination process ($ million)

WEM project	AEMO initial	Draft determination	Variance – draft to initial	AEMO revised	Final determination	Variance - final to revised
WEM reform core	8.0	6.7	(1.3)	8.1	7.7	(0.4)
Market and regulatory design	0.1	0.1	-	0.4	0.4	-
Technical and process design	0.04	0.04	-	0.06	0.06	-
Digital platform	6.4	5.5	(0.9)	7.5	6.0	(1.5)
Integration and market trial	5.1	5.1	-	4.8	3.9	(0.9)
Compliance reporting	2.6	2.6	-	2.5	2.1	(0.4)
Hypercare and support	2.0	1.9	(0.1)	1.6	1.3	(0.3)
RCM reform	3.4	3.3	(0.1)	6.2	5.8	(0.4)
STEM reform	1.2	0.6	(0.6)	1.2	0.9	(0.3)
Registrations reform	1.3	0.9	(0.4)	1.5	1.2	(0.3)
Settlement reform	2.7	2.5	(0.2	3.8	3.7	(0.1)
Constraint management	0.03	0.03	-	0.05	0.05	-
WEMDE	1.8	1.6	(0.2)	2.3	1.9	(0.4)
WEMDE user interface	2.6	2.6	-	2.8	2.6	(0.2)
Real time market submissions	0.03	0.03	-	0.07	0.07	-
Dispatcher training simulator	2.1	-	(2.1)	1.9	1.5	(0.4)

WEM project	AEMO initial	Draft determination	Variance – draft to initial	AEMO revised	Final determination	Variance - final to revised
(DTS) integration and SCED offline tools						
Outage management reform	0.1	0.1	-	0.6	0.6	-
Commissioning test reform	1.5	1.3	(0.2)	1.3	1.0	(0.3)
Forecast integration	0.1	0.1	-	0.5	0.4	(0.1)
MT PASA	1.0	0.6	(0.4)	1.1	0.8	(0.3)
ST PASA	1.5	1.5	-	1.6	1.2	(0.4)
System operation planning tools	0.9	-	(0.9)	0.9	0.7	(0.2)
Total	**44.6**	**37.2**	**(7.3)**	**50.8**	44.0	**(6.8)**

Source: AEMO data and ERA analysis

Note: Totals may not add due to rounding

Appendix 9 DER projects

This appendix further details the ERA's determination on capital expenditure for the DER work program, as provided in section 6.1.3.

In June 2020, the Minister for Energy placed new obligations on AEMO to implement part of the State Government's DER Roadmap.[245] The roadmap contains a series of actions to integrate electricity generated from rooftop solar systems into the WEM and ensure the ongoing stability of the electricity network.

AEMO developed its DER program to deliver action items defined by the roadmap. This included establishing the DER register, DER orchestration (Project Symphony), design work for DER participation, and commencing technology integration. To fund these new activities, the ERA approved an additional forecast capital expenditure of $14.6 million as an in-period proposal in AR5.[246] No contingency was approved but AEMO is allowed to exceed its budget by the higher of $10 million or 10 per cent, as permitted by the WEM Rules.[247]

The DER program for AR6 spans three in-progress projects and four new projects. The ERA's final determination of the AR6 costs for the DER program is $4.9 million, which includes $0.3 million in contingency. This is $1.6 million or 25 per cent lower than AEMO's revised proposal of $6.5 million.

Table 51: Determination of capital expenditure on DER program

DER projects	Base project cost	Contingency	Total project cost*
AEMO initial proposal	8.0	1.4	9.4
ERA draft determination	3.9	0.3	4.2
Variance (%)	(52%)	(78%)	(56%)
AEMO revised proposal	5.3	1.3	6.5
ERA final determination	**4.6**	**0.3**	**4.9**
Variance (%)	(13%)	(74%)	(25%)

**Total project cost has accounted for the ARENA grant ($1.5 million over the AR6 period).*

Note: Totals may not add due to rounding.

The ERA's draft and final determinations and AEMO's proposed costs for each of the DER projects is presented below.

245 Energy Transformation Taskforce, 2019, DER Roadmap, (online).

246 Economic Regulation Authority, 2020, *Australian Energy Market Operator in-period funding submission for implementation of the Distributed Energy Resources Roadmap actions – Determination report*, p. iii. (online).

247 Wholesale Electricity Market Rules (WA), 12 April 2022, Rules 2.22A.12 and 2.22.A.13, (online)

AEMO's initial proposal and the ERA's draft determination

In its initial proposal, AEMO sought $9.4 million for the DER program in AR6 to complete three in-flight projects at an estimated cost of $3.2 million and commence four new projects at an estimated cost of 6.2 million. [248,249]

After evaluating AEMO's AR6 proposal and supporting documents, the ERA rejected the following costs in the draft determination:

- A forecast budget to hire external consultants for cyber security assessment, testing and specification verification, and implementation. The ERA considered it was not possible to assess whether a forecast budget is the lowest practicably sustainable cost without assessing how the budget was developed. The ERA requested AEMO to provide its analysis in which it developed these forecast budgets, to assess its robustness and appropriateness. AEMO provided a rough order of magnitude (ROM) estimate, which it considered was the most accurate estimate possible at the time of submission, given the scope of work required for this line item was still not well defined. AEMO considered a more detailed scope and cost estimate would be developed in project execution. The ERA recommended that AEMO submit an in-period request for this funding once the scope of activities is sufficiently granular to develop a more precise estimate.
- A forecast budget to engage 2 FTE external consultants to develop its in-period funding proposal for the DER Participation Implementation project. The ERA noted that developing business cases and funding proposals – akin to developing an in-period proposal – are part of an organisation's business as usual activities and should not be considered a capital expense. Secondly, the ERA could not assess the robustness of this budget forecast to determine if the cost is the lowest practicably sustainable cost.
- Total project costs of $3.6 million for the market visibility and DER data access and management projects. The ERA noted there is merit in improving visibility of and access to improved market data but is concerned these projects' scopes are not necessitated from any action of the DER Roadmap and are instead, pursued by AEMO based on its assessment of market need. Stakeholders similarly raised concerns in their response to the ERA's issues paper. This is detailed further below.
- $0.2 million in the project cost for the EVs in the DER register project. The ERA compared AEMO's cost of establishing the DER Register, which it completed under budget, with its proposed cost to upgrade the existing register with EV data and identified cost and staff inefficiencies. For example, the core project management staff allocation in the EVs in the DER register project is approximately four times the allocation in the DER register project, with no complexity or reason for increased cost allocation identified. This is discussed further below.
- Some proposed contingency costs, consistent with the approach outlined in section 6.1.6 and Appendix 11.

The ERA's resulting draft determination for the DER program was as follows:

[248] The funding sought for ERA approval is lower than the funding required to complete the in-flight projects. This is due to the application of a $1.5 million grant from ARENA that will be applied to *Project Symphony* in AR6.

[19] There is an additional DER project – DER Network Services Marketplace Trial & Design – which is treated as an operating expense and discussed in section 5.1.7.

Table 52: Proposed costs by project for the DER capital expenditure program ($ million)

Project	AR6 proposal	Draft determination	Variance	Variance (%)
WA DER Program	**9.4**	**4.2**	**(5.2)**	**(56%)**
Project Symphony	1.1	1.0	(0.1)	(9%)
Technology integration	1.2	0.7	(0.5)	(42%)
DER participation	0.9	0.4	(0.6)	(61%)
DER participation implementation	2.0	1.8	(0.2)	(9%)
Market visibility	1.5	0.0	(1.5)	(100%)
DER data access & management	2.1	0.0	(2.1)	(100%)
EVs in DER register	0.6	0.3	(0.3)	(46%)

Source: ERA analysis.

Note: totals may not add up due to rounding.

Market Visibility and DER Data Access and Management projects

The market visibility project is intended to expand AEMO's existing suite of data dashboards and data visualisation packages to include specific information for DER aggregators. This will include information for DER aggregators such as participation requirements, and market outcomes and conditions. AEMO identified the key objective of this project as being to encourage the active participation of DER in the WEM and SWIS, given the increasing impact of DER on the power system.

In its initial proposal, AEMO sought $1.5 million over AR6 to fund the market visibility project, comprised of internal labour costs ($1.2 million), project contingency ($0.2 million), software ($0.07 million) and project financing costs ($0.02 million). Key project benefits include:

- A reduction in the load on operational staff responding to queries from new and emerging DER aggregators on the technical participation requirements.
- Improved accessibility of market information for DER aggregators.
- Increased knowledge of how devices and virtual power plants support grid security and operation.

The labour costs include $1.2 million across the following project components:

- data analysis tools and processes (13 months),
- system enhancements (12 months),
- external engagement and training (12 months),
- project management services (19 months).

The DER data access and management project was intended to enhance the existing DER register by sourcing improved distribution network level data to represent passive DER generation and consumption. This additional data will be used to gain better visibility of passive

DER and load, which will inform AEMO's operation and understanding of risks associated with DER tripping and weather-driven events.

In its initial proposal, AEMO sought $2.1 million over AR6 to fund this project, comprised largely of labour costs ($1.8 million), project contingency ($0.3 million) and project financing costs ($0.01 million). Key project benefits include:

- Enhanced existing data management and validation by verifying the DER Register dataset with data from the Clean Energy Regulator (CER).[250] This will build new data sources to enable greater visibility of active DER, loads and power flows in the distribution network.
- Established systems to couple DER data (standing and dynamic data) with local generation and load data, to provide more accurate data into AEMO's forecasting and operational tools. This will enhance AEMO's ability to operate the WEM and maintain system security through access and use of more granular data.

The labour costs include $1.8 million across the following project components:

- Legal and regulatory analysis services (4 months).
- Program delivery and management (11 months).
- Improved processes for managing decommissioned DER installations in the DER Register (2 months).
- Integration with external software interfaces to verify the compliance of DER devices with Australian Standards, to reduce manual effort (3 months).
- Implementation of data management systems (9 months).
- Testing and verification (3 months).
- Reporting and analytics (4 months).
- Automated data cleansing, to remove existing manual effort of managing data issues with Western Power (3 months).
- Enhanced visibility of DER performance risk for the AEMO control room, by providing active estimates of the risk of PV tripping based on PV generation, inverter types and geographic location of these inverters across the SWIS (3 months).
- Enhanced inputs into the ongoing spinning reserve calculation by integrating active estimates of the risk of PV trips (4 months).
- Validated DER register data with CER data, to verify accuracy of data provided by Western Power (4 months).

In its issues paper, the ERA noted these two projects were driven by AEMO's own initiative based on its assessment of market and system need, and not directly arising from any actions in the DER Roadmap.[251] The ERA acknowledged there are benefits to increasing awareness of, and access to, market data, particularly for new and potential entrants to the DER market. However, given that these projects are driven by AEMO's own initiative, the ERA sought feedback from market participants on AEMO including these costs in its proposal, particularly as the DER data access and management project is currently the largest in the proposed AR6 DER program.

[250] The Clean Energy Regulator collects and publishes a range of datasets such as small-generation units (solar panels, solar water heaters, air source heat pumps etc.) by postcode.

[251] Economic Regulation Authority, 2022, *Issues paper, Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025*, p. 26. (online).

A range of stakeholders expressed concern over AEMO's request for funding for these two projects in response to the ERA's issues paper.

Alinta Energy questioned whether spending on projects not directly related to AEMO's obligations, but driven by market need, is necessary to AEMO's functions under the WEM Rules and noted its doubts about whether such investment is prudent, efficient and reduces costs over the longer term:

> Alinta Energy contests whether this spending is necessary to AEMO's functions under the WEM Rules. Alinta Energy also doubts whether this investment would be prudent, efficient and reduce costs to customers over longer term per 2.22A.5 because:
>
> – AEMO does not attempt to forecast any quantitative benefits of this capex.
> – AEMO's AR6 proposal indicates that investment in systems and new functionality tends to 'snowball' and result in AEMO requesting increased allowable revenue in future periods to replace or upgrade systems and hire FTEs to support them.
> – These costs would be paid by all customers, even though rooftop solar PV owners cause the current issues faced.[252]

The Australian Energy Council (AEC) considered projects driven by AEMO's initiative should not automatically receive funding until the benefits and market need have been justified with sufficient detail:

> The AEC considers that projects created by AEMO's own initiative should not automatically receive funding and may not be warranted during AR6 given the significant increase in WEM market participant fees. If these are genuine projects that truly meet a market need then AEMO should justify them to the ERA by providing more details on:
>
> – Who is driving the need?
> – Who benefits from these projects being delivered?
> – Why is AEMO uniquely responsible for meeting this need?
> – Is this the best use of resources?
> – Whether this will create any duplication of data.[253]

Bluewaters Power considered projects should be assessed to identify any additional benefit to the market and if the cost is appropriate:

> In order to question the reasonableness of AEMO's estimate, Bluewaters asks the ERA to scrutinise what additional benefit the market is expected to receive for the increase in cost and appropriateness of these increases, such as those outlined by the ERA in its issues paper relating to DER.[254]

Synergy recommended these projects be deferred:

> Synergy recommends the ERA and AEMO consider any opportunity to defer capital projects, with the exception of WEM Reform. A good example of where this could be considered prudent is in relation to the additional DER projects (those not specified as DER Roadmap actions).[255]

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252 Alinta Energy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

253 Australian Energy Council, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

254 Bluewaters Power, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

255 Synergy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 - Issues paper*, (online).

The proposal guideline and the WEM Rules require the ERA to firstly assess whether the project is necessary and there is a clear connection between the forecast cost, AEMO's functions and the project scope. Secondly, the ERA must consider whether the project is costed efficiently.[256]

AEMO noted the scope of the DER Roadmap does not confine AEMO to proposed projects. AEMO considered the scope of these projects are driven by system and market needs and would be required to support systems and market operations. AEMO considered these projects arise from its obligations under WEM Rules 1.2.1(a) to (e), 2.1A.1A and 2.1A.2(d) and (n), and disagreed with the ERA's assertion in its issues paper that the projects are out of scope.[257]

The ERA requested AEMO to provide evidence of any stakeholder consultation or market assessment that it relied upon to guide its assessment of the necessity for these projects. The ERA also asked AEMO if it had identified any quantifiable benefits in pursuing these projects or any quantifiable benefits in not carrying out these projects (the opportunity cost of these projects).

AEMO advised comprehensive stakeholder engagement had not yet been undertaken for the two projects. AEMO advised it intended to undertake detailed options assessments and needs analysis as the projects progress.

AEMO considered these projects were crucial for:

- Supporting efficient and prudent operational decision-making resulting from access to improved data that better reflects DER and generation patterns across the SWIS. Without undertaking the data access and management project, AEMO considers it will have to continue to utilise unreliable data sources and make more conservative operational decisions (such as constraining lower cost non-synchronous generators) to provide wider stability margins.
- Encouraging active participation of DER in the WEM and SWIS. Without undertaking the market visibility project, AEMO considers it will have to continue relying on inefficient tools such as emergency solar management and applying constraints to inverter based generators to manage DER.

The ERA considered the evidence provided by AEMO was not sufficient to conclude that either project is necessary for the successful completion of the in-flight projects or the commencement of other projects required by the DER Roadmap. In its proposal, AEMO considered these projects are driven by system and market needs; however, based on stakeholder feedback to the issues paper, it appears there is limited support from market participants for the projects.

Beyond the concern of project scope and necessity, the ERA was also concerned about the prudency and efficiency of the project costs. For example:

- Project cost included a forecast budget for 10 FTEs as a mixture of contracted staff and technology to measure and communicate data to AEMO. AEMO indicated the exact mix of staff would be established in the detailed design phase of the project but is expected

[256] Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submissions under the WEM Rules and GSI Rules*, Section 3.8.1, p. 8. (online)

[257] WEM Rule 1.2.1(a)-(e) outline the WEM Objectives. WEM Rule 2.1A.1A confers the function of ensuring that the SWIS operates in a secure and reliable manner on AEMO. WEM Rule 2.1A.2(d) allows AEMO to do anything that it determines to be conducive or incidental to the performance of the functions under the WEM Rules. There is no WEM Rule 2.1A.2(n).

to remain within the forecast budget. The ERA considered the scope of these staff was vague and unclear, and should be deferred until sufficient clarity is available.

- A core component of the project involves validating Clean Energy Regulator (CER) data with data on the existing DER register.[258] The ERA noted the following issues with this undertaking:
  - The CER data is based on information provided voluntarily so there is likely to be an information gap.
  - Consumers have up to 12 months to provide data, so there is likely to be an information lag.
  - This project component precedes other milestones in the project. If there are validation issues resulting from the concerns outlined above, it could result in the project timeline being delayed or the project scope being escalated.

In the draft determination, the ERA did not approve any funding for these two projects.

AEMO's revised proposal and the ERA's final determination

In its revised proposal, AEMO estimates it will spend $9.4 million on its DER program across the AR5 period and will remain under-budget.[259]

Following the ERA's draft determination, AEMO submitted its revised proposed costs of $6.5 million on the DER program for AR6, which was $2.9 million lower than AEMO's initial proposal but $2.3 million higher than the ERA's draft determination. The variance in AEMO's initial and revised proposals is largely due to:

- $3.6 million decrease following the exclusion of the market visibility and DER data and access management projects. AEMO accepted the ERA's draft determination to reject these costs and excluded them from its revised proposal.
- $1.6 million increase in Project Symphony than previously estimated. This is discussed further below.
- $0.5 million decrease following the exclusion of forecast budgets to engage external consultants where the scope of work was not sufficiently advanced. AEMO accepted the ERA's determination to reject these costs and excluded them from its revised proposal. This is discussed further below.
- $0.2 million increase in project financing costs due to an increase in the forecast interest rate.

The ERA reviewed the project scopes and evaluated the prudence and efficiency of the estimated project costs to partly rejected labour costs and contingency costs as outlined in sections 6.1.1 and 6.1.6 respectively. The ERA's final determination on the DER program is $4.9 million (including contingency), which is $1.6 million or 25 per cent lower than AEMO's revised proposed cost of $6.5 million.

The ERA's determination on each of the DER projects is summarised below.

[258] CER data includes data on small scale technologies such as solar water heaters, solar pumps, solar panels, wind and hydro systems by postcode.

[259] AEMO received a $1 million grant from the Australian Renewable Energy Agency (ARENA) that will be applied to *Project Symphony* in AR5. AEMO's budget for the DER program in AR5 was $14.6 million.

Table 53: Proposed DER program costs in AR6 ($ million)

DER projects	AEMO's initial proposal	ERA's draft determination	AEMO's revised proposal	Variance between AEMO's proposals
Project Symphony*	1.1	1.0	2.7	1.6
Technology integration	1.2	0.7	0.7	(0.5)
DER participation	0.9	0.4	0.8	(0.1)
DER participation implementation	2.0	1.8	1.8	(0.2)
Market visibility	1.5	0.0	0.0	(1.5)
Data and access management	2.1	0.0	0.0	(2.1)
EVs in DER register	0.6	0.3	0.5	(0.1)
Total	**9.4**	**4.2**	**6.5**	**(2.9)**

**The proposed and determined costs for Project Symphony presented in this table have accounted for the ARENA grant ($1.5 million in AR6), and therefore actual project cost is higher.*

Project Symphony

Project Symphony (DER marketplace orchestration pilot) will deliver a virtual power plant pilot to test and demonstrate the technical capability of DER aggregators. The project commenced in 2020 from DER Roadmap actions 22 and 23.

AEMO noted that Project Symphony will be partially funded by a grant from the Australian Renewable Energy Agency (ARENA). The ARENA grant contracts set out four milestones that are spread across FY22 and FY23, resulting in $1 million payable in AR5 and $1.5 million payable in AR6. The $1.5 million grant in AR6 will partially cover AEMO's expected cost of $2.6 million in AR6. As a result, AEMO's proposal to the ERA covers the shortfall between the project cost and the ARENA grant.

In its revised proposal, AEMO provided it has adjusted the scope and budget of the project since its initial estimate due to delays with project partners. The completion of the project was delayed from December 2022 to June 2023 in its initial AR6 proposal and subsequently delayed to September 2023 in its revised proposal. Since its initial proposal, the estimated cost of Project Symphony in AR6 has increased by $1.6 million to $4.2 million.[260] AEMO indicated this is largely due to "significant scope movement from AR5 into the AR6 period driven by project partner delays".[261,262]

A $1.6 million increase within 4 months – between AEMO's initial and revised proposals – without a sufficiently detailed explanation is concerning. The base project cost (excluding contingency) for AR6 has increased by $1.1 million since AEMO's initial proposal to $3.3 million. The additional $1.1 million covers labour costs for the 3-month delay, four new FTEs

260 AEMO's revised proposal seeks $2.7 million for Project Symphony to cover the shortfall between the total project cost ($4.2 million) and the $1.5 million ARENA grant.

261 Australian Energy Market Operator, 2022, *Proposal to the Economic Regulation Authority, Response to the ERA's Draft Determination,* p. 54. (online).

262 The estimated completion date for Project Symphony was initially estimated as December 2022. This was delayed to June 2023 in AEMO's initial submission, then to September 2023 in AEMO's revised submission.

and a two-fold increase in project financing costs. Furthermore, AEMO's estimated contingency for this project has increased three-fold between its initial and revised proposals, from $0.3 million to $0.9 million.

While the ERA is concerned about the delays in delivery for Project Symphony, the overall whole of life project cost has not increased materially (by $0.3 million to $10.1 million). The project was materially under-budget in AR5.[263]

Successful completion of Project Symphony is critical for the delivery and progress of the DER Roadmap. The project is already significantly underway so the ERA is concerned that delivery of the DER Roadmap could be affected if the cost of Project Symphony changes substantially. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1). The ERA has substantially rejected contingency costs that were unjustified and duplicated (section 6.1.6).

The ERA's final determination for Project Symphony is $1.8 million, which include $0.1 million in contingency. This is $0.8 million or 35 per cent lower than AEMO's revised proposal of $2.7 million. The largest component of the cost rejection was contingencies, which are $0.7 million or 88 per cent lower than the contingency proposed by AEMO.

Technology integration and DER participation implementation projects

The technology integration project commenced in AR5 to uplift system security parameters such as system restart and under frequency load shedding. AEMO included costs of $0.7 million in its revised proposal which is $0.5 million lower than its initial proposal ($1.2 million) but consistent with the ERA's draft determination of $0.7 million.

The DER participation implementation project is a new project proposed to commence in AR6 to build the interface with WEM systems that will enable DER aggregators to participate in the WEM. AEMO included costs of $1.8 million in its revised proposal which is $0.2 million lower than its initial proposal ($2.1 million) but consistent with the ERA's draft determination of $1.8 million.

AEMO's revised proposal for these two projects is largely in line with the ERA's draft determination. AEMO excluded costs of a forecast budget for consultants to conduct a cyber security assessment and prepare an in-period proposal ($0.5 million) consistent with the ERA's draft determination.

The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA's final determination for the technology integration and DER participation implementation projects is $0.5 million (including $0.06 million contingency) and $1.5 million (with no contingency) respectively.

DER participation project

The DER participation project commenced in AR5 to develop market design and initial rules to enable DER participation in the WEM. AEMO included costs of $0.9 million in its revised

[263] The ERA had approved a budget of $8.1 million for Project Symphony in AR5. AEMO is on track to spend $5.9 million over AR5.

proposal which is unchanged from its initial proposal ($0.9 million) but higher than the ERA's draft determination of $0.4 million.

In its draft determination for the DER participation project, the ERA rejected costs of $0.4 million allocated for a forecast implementation budget. The ERA considered it was not possible to assess whether a forecast budget is the lowest practicably sustainable cost without assessing how the budget was developed.

As part of its revised proposal, AEMO provided it further clarified the project scope and developed a bottom-up estimate of the staffing required to deliver the refined work scope. It estimated additional labour at a cost of $0.3 million which was allocated from the $0.4 million forecast budget previously rejected by the ERA. AEMO provided its internal steering committee approved the work program and the staff allocation. As a result, the revised project cost has not materially changed since AEMO's initial proposal.

The ERA considers AEMO has sufficiently justified the scope of the additional staff. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA's final determination for this project is $0.7 million, which includes $0.1 million in contingency. This is $0.2 million or 18 per cent lower than AEMO's proposal of $0.9 million.

Electric vehicles in the DER register project

The EVs in DER register project is driven by the DER roadmap, actions 15 and 16.[264] Under action 16, the State Government released its WA EV plan, which includes visibility of EVs as one of its key elements.

AEMO advised the DER register currently captures EV information from a generation perspective. This project will build mechanisms to capture data on EV charging equipment and batteries that are not exporting to the grid.

In its initial proposal, AEMO sought $0.6 million over AR6 to fund this project, comprised largely of internal labour costs ($0.5 million), project contingency ($0.08 million) and project financing costs ($0.05 million).

AEMO advised it intended to deliver this project at the lowest practicably sustainable cost by expanding the existing DER register systems and build on similar work already undertaken in the NEM to define data requirements. In supporting documents provided confidentially to the ERA, AEMO noted that it considered alternative solutions to meet its obligation to deliver the DER Roadmap, actions 15 and 16, such as establishing a register for EVs separate to the DER register. However, AEMO did not provide cost benefit analyses of alternative solutions to support its conclusion that this project would be delivered at the lowest practicably sustainable cost.

AEMO explained that the project cost has been estimated based on its experience developing similar DER registers in the WEM and NEM. In its draft determination, the ERA noted that AEMO completed the DER register with an estimated labour cost of $0.95 million but proposes more than half that cost to expand the existing register for EV data. The ERA considered the staff allocation on the proposed EVs in the DER register project is inefficient compared to the

[264] DER Roadmap Action 15 requires AEMO to "deliver a register of static DER data for the SWIS, with processes to support data collection and future DSO functionality" and "establish the required regulatory arrangements for the DER register for the SWIS and the functions and obligations for AEMO, Western Power and DER providers". Energy Transformation Taskforce, 2019, DER Roadmap (online).

completed DER register project. For instance, the core project management team for the EVs in DER register project are forecast to use nearly four times the staff utilised in establishing the DER register.[265]

Given that AEMO has demonstrated it successfully completed the DER register project within its allocated staffing, the ERA scaled back the proposed staff for the EVs in the DER register project in line with the DER register project. This resulted in the ERA's draft determination of the project cost reducing to $0.3 million.

In its revised proposal, AEMO applied the learnings from the DER Register project and amended the staff allocation across each labour category (business management, technical delivery, project management and subject matter experts). AEMO also reduced the proposed project contingency, resulting in a total estimated project cost of $0.5 million. This is 24 per cent lower than AEMO's initial proposal.

The ERA considers the revised base project cost reflects a more efficient and prudent cost than AEMO's initial estimate. The ERA has approved the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.4 million, which includes contingency of $0.04 million. This is $0.1 million or 19 per cent lower than AEMO's proposed cost of $0.5 million.

[265] In this analysis, the 'core project management team' includes all non-technical roles such as project manager, program manager, program owner, business lead, subject matter experts, project management analysts and support staff, and lawyers. Technical roles excluded from this analysis are IT developers, solution architects, business analysts, test analysts and solution designers. The 'resources' referred to in this analysis is the number of FTE days across the project.

Appendix 10 Sustaining capital program projects

This appendix further details the ERA's determination on capital expenditure on the sustaining capital expenditure program, as provided in section 6.1.3.

AEMO's sustaining capital expenditure includes expenditure to upgrade and replace AEMO's IT lifecycle and control room tools and equipment in Western Australia. It also includes Western Australia's share of investment to maintain critical enterprise-wide systems the WEM relies, such as cyber security and the energy management system. AEMO considers this expenditure is essential for it to perform market and system operations functions as required by the WEM Rules.

In its initial proposal, AEMO proposed $15.8 million for 39 projects – 35 projects related to AEMO's WA technology upgrades, with the remaining four projects relating to the Western Australian portion of AEMO's national enterprise system projects. The ERA's draft determination was $10.6 million, which was $5.1 million or 32 per cent lower than the cost proposed by AEMO.

In its revised proposal, AEMO proposed $14.7 million, which is $0.7 million lower than its initial proposal but $4.2 million more than the ERA's draft determination.

The ERA's final determination on the sustaining capital expenditure program is $12.6 million, which includes $1.4 million in contingency. This is $2.2 million or 15 per cent lower than AEMO's revised proposal (Table 54).

The reasons underlying the ERA's determination for each project is detailed below.

Table 54: Final determination, sustaining capital expenditure ($ million)

	AEMO initial proposal	ERA draft determination	AEMO revised proposal	ERA final determination
WA Technology				
Capability uplift projects				
WAMS	0.2	0.1	0.2	-
Transient stability tool	0.2	0.2	0.2	0.2
Operations simulator	0.9	0.5	0.9	0.9
WEM rule changes projects				
WEM rule changes	1.0	0.3	0.3	0.3
Lifecycle projects				
Lifecycle Perth computer room	2.0	1.9	2.1	1.9
Lifecycle Itron upgrade	0.4	0.3	0.4	0.3
Lifecycle Certificate authority	0.3	0.2	0.3	0.3
Lifecycle enterprise data platform (EDP)	1.9	1.4	1.7	1.4
Lifecycle legacy market systems	1.9	1.5	1.7	1.3

	AEMO initial proposal	ERA draft determination	AEMO revised proposal	ERA final determination
Lifecycle integration	1.2	1.0	1.0	0.9
Enterprise system projects				
EMS upgrade	1.4	1.8	1.4	1.4
Cyber	3.0	1.3	3.1	2.6
Operations forecasting	1.1	0.1*	1.2	1.0
Infrastructure (Norwest)	0.2	0.2	0.3	0.2
Total	**15.7**	**10.5**	**14.7**	**12.6**

Source: AEMO data and ERA analysis

**This value was incorrectly noted as 0.1 instead of 1.1 in the draft determination.*

WA technology

The WA technology workstream covers upgrades and lifecycle replacements of AEMO's WEM-specific IT systems. This workstream is comprised of three main programs – capability uplift, WEM rule changes, and lifecycle. Each of these are discussed below.

Capability uplift

AEMO's capability uplift projects are designed to uplift AEMO's ability to monitor, predict and manage power system issues. AEMO noted this program is driven by increased power system complexity and issues arising from increasing penetration of PV in the WEM.

AEMO proposed $1.3 million for three projects in the capability uplift program – WAMS, transient stability tool and operations simulator. WAMS and the transient stability tool are power system control room projects, designed to enable more accurate monitoring of the WEM. The operations simulator is designed to improve AEMO's ability to predict and analyse wind and solar generated energy inputs into the grid. AEMO noted it developed its cost estimates based on the cost of implementing similar projects in the NEM.

The ERA's final determination of the capability program is $1.0 million, which is $0.3 million lower than AEMO's proposal.

Each of the three projects in this program are discussed below.

WAMS

AEMO proposes to install GE Digital Energy's Wide Area Monitoring System (WAMS) and control software in the control room to provide visibility of real-time data streamed from Western Power's planned trial installation of Phasor Measurement Units (PMU) in the WEM. WAMS will monitor system strength and inertia in the WEM, however the WAMS and control software will not work until Western Power's PMUs are installed in the WEM. Data collected by WAM from Western Power's PMU's will be saved in the WAM database and used for power system simulation and forecasting and will be used to identify the causes of power system inefficiencies to support incident investigations. This project is to take place in October 2023 at a proposed cost of $0.2 million.

Given this project is dependent on Western Power's PMUs being installed in the WEM, the ERA considers there is not sufficient evidence to conclude the project will commence as planned. If the PMUs are not installed, the project cannot commence.

According to clause 2.22A.6 of the WEM Rules, the ERA recommends AEMO consider these costs in a future review period once the timing of the project is more certain. The ERA's final determination does not approve this project's costs of $0.2 million in AR6.

Transient stability tool

The transient stability tool will improve AEMO's ability to monitor wind turbine operation and turbine oscillation, to provide real-time identification of system security problems associated with intermittent generation. AEMO considers the additional information provided by the transient stability tool will improve its ability to detect and mitigate power system security issues. The tool will also provide better feedback to Western Power on limit equations by benchmarking against the real time limits and provide greater scheduling accuracy. This project is targeted to commence in August 2023 and to be completed in January 2024.

In its draft determination the ERA partially rejected contingency costs to approve a total project cost of $0.2 million. This was largely consistent with AEMO's proposed cost of $0.2 million.

AEMO's revised proposal of $0.2 million is in line with its initial proposal and the ERA's draft determination. The ERA upholds its draft determination and approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.4 million, which includes contingency of $0.04 million. This is $0.04 million lower than AEMO's proposed cost of $0.2 million.

Operations simulator

The operations simulator is a tool designed to improve AEMO's ability to predict and analyse wind and solar generated energy's impact on the power system. AEMO has implemented a similar tool in the NEM and proposed to update the existing NEM tool for inclusion in the WEM. AEMO considers this is the most efficient solution for the WEM as it will leverage the NEM experience in developing this tool.

In its initial proposal, AEMO included costs of $0.9 million for this project to cover the costs of licences, hardware and staff to onboard the WEM model into the existing NEM model. In its draft determination, the ERA rejected $0.4 million proposed due to uncertainty regarding the number of licences required and whether the licencing cost had been treated using the appropriate accounting method (i.e. should licencing costs be capitalised). The ERA approved $0.5 million in its draft determination.

In its revised proposal, AEMO provided the ERA with its Fixed Assets and Intangibles Policy which confirmed the licence costs can be treated as capital expenditure. The ongoing annual software and hardware maintenance fees would be treated as operating expenditure. AEMO confirmed the number of additional software licences required as there is sufficient capacity in the existing infrastructure to accommodate WEM requirements.

The ERA considers AEMO has sufficiently justified the prudence and efficiency of the software costs initially rejected in its draft determination. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The

ERA has determined forecast capital expenditure on this project as $0.9 million, which includes contingency of $0.07 million. This is $0.05 million lower than AEMO's proposed cost of $0.9 million.

WEM Rule changes

In its initial proposal, AEMO included $1 million to accommodate any WEM rule changes that arose during AR6. AEMO considered this cost estimate was consistent with stakeholder feedback during the AR5 process that AEMO should have a minimum provision in its funding allocation to develop and implement rule changes. AEMO used the its "t-shirt sizing" approach to estimate its rule change costs during the AR6 period, with provisions for a small, medium, large and extra-large rule change over the AR6 period.

In its draft determination, the ERA rejected $0.7 million of AEMO's proposed costs on the basis that AEMO had not sufficiently demonstrated appropriate governance over WEM rule change costs. AEMO had not identified any upcoming rule changes and it was uncertain if and how many rule changes may take place. Furthermore, the costs of any large rule change can be accommodated through an in-period request for funding. The ERA's draft determination was $0.3 million. This was supported by the ERA's independent technical consultant, IES.

AEMO accepted the ERA's draft determination of $0.3 million and noted it is not possible to accurately forecast the costs of any rule changes requiring system implementation after the new WEM takes effect. AEMO's revised proposal of $0.3 million is in line with the ERA's draft determination.

The ERA upholds its draft determination and approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.3 million, with no contingency. This is $0.07 million lower than AEMO's proposed cost of $0.3 million.

Lifecycle

The lifecycle program includes six main projects and 27 sub-projects to upgrade hardware and software to ensure AEMO's IT systems are fit for purpose, reliable and cost effective to run. 97 of AEMO's 470 IT systems are WEM specific. AEMO will upgrade the hardware and software of systems that will come out of vendor support in AR6. AEMO considers there will be significant risks on the confidentiality, availability and integrity of its data and systems if these legacy systems are not remediated prior to vendor support ending.

The ERA's final determination on the lifecycle program is $6.1 million, which is $1.1 million lower than AEMO's revised proposal of $7.1 million.

Each of the six lifecycle programs are presented below.

Lifecycle Perth computer room

This project will replace all end-of-life computer room hardware – such as user firewalls, internet firewalls, office core switches, and wireless access points, RTNET, WAN routers and DC core switches – with current equipment. AEMO considers this will reduce the risk of technical failure and associated business impacts.

In its initial proposal, AEMO estimated a cost of $2.0 million to cover largely hardware and labour costs. In its draft determination, the ERA rejected $0.1 million in proposed costs in line

with its determination on contingency costs. The ERA's draft determination was $1.9 million. This was supported by the ERA's independent technical consultant, IES.

AEMO does not support the ERA's partial rejection of contingency costs and maintained its initial proposed cost of $2.1 million in its revised proposal.[266] AEMO has not provided any further information for the ERA's final determination.

The ERA upholds its draft determination and approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $1.9 million, including a contingency of $0.16 million. This is $0.14 million lower than AEMO's proposed cost of $2.1 million.

Lifecycle ITRON upgrade

ITRON MetrixIDR is AEMO's load forecasting software which is a critical system that supports market operations. The first Itron upgrade took place in AR5 as part of the WEM Reform Program. Itron MetrixIDR produces load forecasts that are used in dispatch, and in the WEM short term PASA and medium term PASA. The second upgrade planned for AR6 is required to ensure Itron's continued operation.

In its initial proposal, AEMO proposed costs $0.4 million to largely cover labour and software costs and contingency. In its draft determination, the ERA rejected $0.1 million in contingency and software costs, due to uncertainty whether the licencing cost had been treated using the appropriate accounting method (i.e. should licencing costs be capitalised). This was supported by the ERA's independent technical consultant, IES.

In its revised proposal, AEMO provided the ERA with its Fixed Assets and Intangibles Policy which confirmed the licence costs can be treated as capital expenditure. The ongoing annual software fees would be treated as operating expenditure.

The ERA considers AEMO has sufficiently justified the prudence and efficiency of the software costs initially rejected in its draft determination. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.3 million, which includes contingency of $0.02 million. This is $0.07 million lower than AEMO's proposed cost of $0.4 million.

Lifecycle certificate authority

This project relates upgrades of public key infrastructure (PKI) certificates, which govern access to AEMO's systems. Existing PKI security is outdated and poses a security risk. The existing PKI security will expire during the AR6 period, and a solution must be implemented to prevent participants' access to AEMO systems being revoked. AEMO proposed a new national enterprise solution.

In its initial proposal, AEMO proposed costs of $0.3 million for this project to largely cover labour and contingency costs. In its draft determination, the ERA approved the proposed costs subject to a partial rejection of contingency costs.

[266] AEMO's revised proposal notes a total cost for this project as $2.0 million; however, financial documents provided confidentially to the ERA note a total project cost of $2.1 million. This is likely a rounding error.

AEMO does not support the ERA's partial rejection of contingency costs and maintained its initial proposed cost of $0.3 million in its revised proposal.[267] AEMO has not provided any further information for the ERA's final determination.

The ERA upholds its draft determination and approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.3 million, including a contingency of $0.02 million. This is largely consistent with AEMO's proposed cost of $0.3 million.

Lifecycle enterprise data platform (EDP)

This project consists of ten separate sub-projects to replace certain functional capabilities of legacy applications with an EDP capability. This will allow AEMO to build a central data repository to improve data automation, data consumption, analytics and visualisation, data governance and data support and maintenance. These projects will provide an enterprise integration capability for these deliverables.

In its initial proposal, AEMO included costs of 1.9 million, with software costs accounting for approximately 20 per cent of the total cost. The ERA considered AEMO had not sufficiently justified the licence and penetration testing costs as well as the appropriate accounting treatment of licences and cloud costs. The ERA also partially rejected contingency and labour costs. The ERA's draft determination was $1.4 million, which was $0.5 million lower than AEMO's initial proposal.

AEMO accepted the ERA's rejection of penetration testing costs and excluded them from its revised proposal. AEMO noted it will leverage an existing enterprise capability so will not require additional penetration testing for this project.

In its revised proposal, AEMO provided the ERA with its Fixed Assets and Intangibles Policy which confirmed the licence costs for this project can be treated as capital expenditure. AEMO noted the software licences are critical to uplift the EDP to support the additional data requirements of the ten sub-projects. AEMO's revised proposal notes a project cost of $1.7 million.[268]

The ERA considers AEMO has sufficiently justified the prudence and efficiency of the software costs initially rejected in its draft determination. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $1.4 million, which includes contingency of $0.2 million. This is $0.28 million lower than AEMO's proposed cost of $1.7 million.

Lifecycle legacy market systems

This project consists of ten separate sub-projects to upgrade legacy components of WA Market applications to ensure AEMO's entire software stack remains supported. Underlying project durations are for two or three months between December 2023 and June 2025.

[267] AEMO's revised proposal notes a total cost for this project as $2.0 million; however, financial documents provided confidentially to the ERA note a total project cost of $2.1 million. This is likely a rounding error.

[268] AEMO's revised proposal notes a total cost for this project as $1.6 million; however, financial documents provided confidentially to the ERA note a total project cost of $1.7 million. This is likely a rounding error.

In its initial proposal, AEMO proposed costs of $1.9 million for this project, largely for labour costs and contingency. In its draft determination, ERA rejected costs for upgrading the Gas Bulletin Board (GBB) on the basis the cost had already been included in the GSI capital expenditure category. The ERA also partially rejected contingency costs. The ERA's draft determination was $1.5 million, which was $0.4 million lower than AEMO's initial proposal.

AEMO accepts the ERA's reason for rejecting the GBB upgrade but does not accept the ERA's partial rejection of contingency costs. In its revised proposal, AEMO included a cost of $1.7 million for this project. AEMO has not provided any further information for the ERA's final determination.

The ERA upholds its draft determination and approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $1.3 million, including a contingency of $0.07 million. This is $0.37 million lower than AEMO's proposed cost of $1.7 million.

Lifecycle integration

This project consists of eight sub-projects to replace certain functional capabilities of legacy applications with an enterprise integration capability. AEMO considers this project will result in near real-time visibility of critical market transactions, enhanced security for data exchange and centralised access management and improved speed of market or business regulatory changes.

AEMO proposed costs of $1.2 million for this project in its initial proposal. Similar to its draft determination on the lifecycle EDP project, the ERA considered AEMO had not sufficiently justified the penetration testing costs.[269] This was supported by the ERA's independent technical consultant, IES. The ERA also partially rejected contingency and labour costs. The ERA's draft determination was $1.0 million, which was $0.2 million lower than AEMO's initial proposal.

AEMO accepted the ERA's draft determination of $1.0 million in its revised proposal and adjusted its revised proposal to include $0.06 million for penetration testing. The ERA upholds the reasons underlying its draft determination and approves a cost of $0.9 million for this project, which includes $0.1 million in contingency. The 0.2 million variance in the ERA's determination and AEMO's revised proposal is due to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6).

Enterprise systems

As a national organisation, AEMO has several central systems and services shared across all jurisdictions, including its energy management system (e-terra) and various accounting and HR systems. AEMO considers these shared systems and IT platforms help reduce software, hardware, support, and lifecycle costs.

Costs for using these systems in Western Australia are allocated on a causer or beneficiary pays basis, to the WEM cost centres. The method of allocation varies for each project.

[269] In the draft determination, the ERA noted the penetration testing costs were rejected because AEMO allocated these costs on a per application basis, which sometimes resulted in penetration testing costs being up to 40 per cent of some base costs. AEMO applied penetration costs to validate that no vulnerabilities were introduced through remediation work. However, many of the application costs, with penetration costs that AEMO included, do not and will not interface with applications external to AEMO systems.

Neither of AEMO's initial or revised proposals provide information on whether AEMO undertakes a quantitative analysis to compare the risks, benefits, and costs of providing standalone solutions for WA's enterprise systems instead of national solutions. There is little information in the proposal on how AEMO has determined that projects undertaken at the national level, over which the ERA has no regulatory oversight, are undertaken prudently or efficiently, to show that the costs allocated to AEMO WA are also prudent and efficient.[270]

However, the ERA cannot reject these project costs on the basis it cannot review the prudence or efficiency of the proposed costs without significantly affecting AEMO's ability to carry out its functions. Therefore, the ERA has approved the project costs largely in line with AEMO's revised proposal, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingencies.

The ERA's final determination on the enterprise systems program is $5.2 million which includes $0.7 million in contingency. This is $0.7 million lower than AEMO's revised proposal of $5.9 million.

Each of the four enterprise system projects are discussed below.

Energy management system

AEMO's energy management system (EMS) is used to monitor, control and optimise the flow of energy in the power system. AEMO considers the EMS is fundamental to its system operation functions in Western Australia.

The current EMS will reach its end of its life in July 2024. AEMO considers it would be an unacceptable risk to its critical operations if the EMS is not upgraded after July 2024. AEMO is upgrading the EMS nationally and the cost is being apportioned between the NEM and the WEM. AEMO has apportioned 18 per cent of the costs to Western Australia based on the WEM's use of the system calculated as the database point usage.

In its initial proposal, AEMO estimated a cost of $1.4 million, with approximately 20 per cent of the cost for software, and most of the remaining cost on hardware, labour and contingency. In its revised proposal, AEMO maintained its initial proposed cost of $1.4 million.

The ERA maintains it cannot assess the prudence or efficiency of costs determined at a national level and apportioned to Western Australia. However, the costs for this project – which AEMO considers is critical to its system operation functions – will be incurred by AEMO's Western Australian operations so it cannot reject these costs without significantly affecting AEMO's ability to carry out its functions under the WEM Rules. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $1.4 million, which includes contingency of $0.1 million.[271] This is largely consistent with AEMO's proposed cost of $1.4 million.

Cyber security

AEMO has a central cyber security program which covers all aspects of cyber security for the whole organisation. AEMO considers its investment in cyber security is essential to maintain

[270] The ERA received confidential financial tracking sheets for these projects on a national level and applied the cost allocation proportion to Western Australia to determine the cost allocated to the WEM.

[271] The draft determination incorrectly stated the ERA approved $1.8 million instead of $1.4 million.

the integrity of critical infrastructure and ensure AEMO's systems remain protected from cyber security incidents.

AEMO considers its Western Australian operations benefit from the advantage of economic scale and experience by utilising the national cyber security team in place of adopting a standalone cyber security project. As the project will take place at AEMO's national enterprise level, it has allocated 11.8 per cent of the project's costs to the WEM, based on a weighted average of the number of FTEs, assets, IT support and cloud costs.

AEMO proposed a cost of $3.0 million in its initial proposal. Approximately 12 per cent of this project's cost is for software, with most of the remaining costs being for internal labour.

In its draft determination, the ERA rejected the GSI-allocated cyber costs, which were also proposed in under the GSI capital expenditure program and were thus double-counted. The ERA also partially rejected contingencies and software costs on the basis AEMO had not provided sufficient information to justify the software costs could be capitalised. This was supported by the ERA's independent technical consultant, IES.

In its revised proposal, AEMO provided the ERA with its Fixed Assets and Intangibles Policy which confirmed the licence costs for this project can be treated as capital expenditure. AEMO's revised proposal notes a project cost of $3.1 million.[272]

The ERA maintains it cannot assess the prudence or efficiency of costs determined at a national level and apportioned to Western Australia. However, the costs for this project – which AEMO considers is critical to its system operation functions – will be incurred by AEMO's Western Australian operations so it cannot reject these costs without significantly affecting AEMO's ability to carry out its functions under the WEM Rules. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $2.6 million, which includes contingency of $0.3 million. This is $0.5 million lower than AEMO's proposed cost of $3.1 million.

Operational forecasting

Operations forecasting is an AEMO-wide program of work to uplift is forecasting capabilities. AEMO is developing a new method to improve its accuracy in forecasting power system requirements. AEMO considers this solution will benefit market participants by reducing the cost and complexity of data feeds as well as lowering the cost of frequency regulation.

This project is being delivered nationally and will be established in the NEM first. Once the solution has been built in the NEM, a WEM capability will be build using the NEM platform as the baseline. AEMO considers this method is efficient as WEM participants will only pay for the portion of capital expenditure to build the platform that benefits the WEM. In its initial proposal, AEMO provided a cost of $1.15 million. Approximately 10 per cent of the project's cost is for hardware with most of the remaining costs being for internal labour.

The ERA maintains it cannot assess the prudence or efficiency of costs determined at a national level and apportioned to Western Australia. However, the costs for this project – which AEMO considers is critical to its system operation functions – will be incurred by AEMO's Western Australian operations so it cannot reject these costs without significantly affecting AEMO's ability to carry out its functions under the WEM Rules. The ERA approves the capital

[272] AEMO's revised proposal notes a total cost for this project as $3.0 million; however, financial documents provided confidentially to the ERA note a total project cost of $3.1 million. This is likely a rounding error.

costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $1.0 million, which includes contingency of $0.2 million. [273] This is $0.2 million lower than AEMO's proposed cost of $1.1 million.

Infrastructure (Norwest data centre)

AEMO owns and operates its own data centre (Norwest) and hosts both WEM and NEM applications. AEMO considers the WEM receives the benefits of an enterprise-scale data centre capability at a relatively low cost.

AEMO considers the data centre requires critical hardware updates to ensure the security and integrity of the centre and mitigate the risk of business disruption due to failing hardware components. The cost to upgrade the facility has been forecast national based on historical actual costs. AEMO allocated 11.7 per cent of the cost to the WEM based on the proportion of WEM-specific servers in the data centre relative to NEM-specific servers.

In its initial proposal, AEMO included a cost of $0.2 million split between labour, hardware and contingency. AEMO maintained the cost of $0.2 million in its revised proposal.

The ERA maintains it cannot assess the prudence or efficiency of costs determined at a national level and apportioned to Western Australia. However, the costs for this project – which AEMO considers is critical to its system operation functions – will be incurred by AEMO's Western Australian operations so it cannot reject these costs without significantly affecting AEMO's ability to carry out its functions under the WEM Rules. The ERA approves the capital costs of this project as proposed, subject to the substituted capital labour costs (as outlined in section 6.1.1) and the partial rejection of contingency calculations (as outlined in section 6.1.6). The ERA has determined forecast capital expenditure on this project as $0.2 million, which includes contingency of $0.02 million. [274] This is largely consistent with its draft determination and AEMO's proposal.

[273] The draft determination incorrectly stated the ERA approved $1.8 million instead of $1.4 million.

[274] The draft determination incorrectly stated the ERA approved $1.8 million instead of $1.4 million.

Appendix 11 Contingency cost calculations

This appendix outlines the ERA's analysis of the contingency costs proposed in the capital expenditure program for AR6. The ERA's determination is presented in section 6.1.6.

A summary of the number of projects using each method of contingency cost calculation in AEMO's proposal for the draft determination is provided in Table 55.

Table 55: Showing the number of projects using each method of contingency cost calculation

Method	Number of Projects
Method 1 – Fixed calculator alone*	23
Method 2 – EMV tool alone	0
Method 3 – Combined methods 1 and 2	16
Method 4 – Bespoke method	1
No contingency allocated	2
No calculator provided as project complete	4
Total	**46**

Source: ERA analysis of AEMO data

Note: Two of the projects listed by AEMO reportedly use the fixed calculator to calculate the contingency for the project but the calculators for these projects were not provided to the ERA.

In AEMO's revised proposal for the final determination, AEMO submitted 19 fixed calculators and 14 combined methods (fixed calculator and EMV tool) calculators.

The main principles employed in the ERA's assessment of the contingency calculators and the areas that they relate to are set out in Table 56.

Table 56: Principles used to assess AEMO's contingency cost calculations

Area of consideration	Principle
General principles of cost estimation.	Including some contingency in a cost estimate is good practice. The more definition around a project (the further it is in its lifecycle), the fewer the execution uncertainties.[275] New technology that has no commercial history within the company or elsewhere requires more contingency.[276] Equipment cost estimates tend to be more accurate than estimates for other costs such that projects that have a high equipment percentage usually require less contingency.[277] As project complexity increases, the need for contingency also increases.[278]

[275] Borroughs, S.E. & Juntima, G., 2004, Exploring Techniques for Contingency Setting; *AACE International Transactions EST.03, Morgantown*, ES31-36, (online) [accessed 27 January 2022].

[276] Ibid, pp. EST.03.3.

[277] Ibid.

[278] Ibid.

Area of consideration	Principle
	If projects are cost driven, project owners are less likely to take actions and make changes that will put cost at risk.[279] Not all risks come to fruition in a project and not all projects use contingencies, so there should be left over contingency from within and across projects.[280] Contingency calculations should be WEM and AR6 project specific. If a calculated contingency amount is very small, the project is less likely to end in major overruns if risks materialise than if the calculated contingency is very large.[281] Extremely risky or highly uncertain projects should not be funded. Base estimates in cost estimation should be developed in a robust manner due to their critical role in setting the contingency value.[282] If a risk is likely to happen with a probable impact of $100,000, then $100,000 is needed to address that risk, not a small portion of it (e.g., $20,000).
Contingency cost calculation methods.	A probabilistic approach should be used for cost estimation for all major initiatives, and wherever possible otherwise.[283] Contingency calculation methods should be robust and consistent. Contingency calculation methods should be based on established, and repeatable methods of assessing project risks and determining input quantities, resulting in high quality estimates that are comprehensive and as accurate as possible, and can be easily and clearly traced, replicated, and updated.[284] The percentage included to accommodate risks should reflect the outstanding project spend (the base estimate) required for completion. Subjective assessments are always at risk of bias, so it is prudent to takes steps to limit that bias.[285] Uncertainty and risks identified in project cost estimates in the AR5 period do not necessarily indicate what will happen in the AR6 period and, as such, reliance on what happened in previous review periods could lead to over or under funding of AEMO.
WEM Rules relevant to contingency cost calculations.	If risks arise that are not accounted for in AEMO's calculations, they can be addressed using the lower of 10% or $10 million greater than the amount in the ERA's determination at the end of the review period.[286] Only costs which would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to achieve the lowest practicably sustainable cost of performing AEMO's

279 Ibid.

280 Halling. G. (2019). *Deriving certainty from uncertainty (Value from Project Risk and Contingency Management)*. PGCS, Canberra 20 & 21 August 2019. PowerPoint slides, (online) [accessed 28 January 2022].

281 The concepts of 'small' or 'large' projects and the threshold between them are somewhat subjective and can vary between jurisdictions and between industries. Transport and Infrastructure Council, 2019, *Australian Transport Assessment and Planning Guidelines, 01 Cost Estimation*, p. 4. (online) [accessed 31 January 2022].

282 Transport and Infrastructure Council, 2018, *Australian Transport Assessment and Planning Guidelines, 02 Optimism Bias*, p. 6. (online) [accessed 31 January 2022].

283 Ibid.

284 Australian Government, Department of Infrastructure, Regional Development and Cities, November 2018. *Cost Estimation Guidance Note - Overview* , p. 12. (online) [accessed 31 January 2022].

285 Ibid, p. 8.

286 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.13, (online).

Area of consideration	Principle
	functions, while effectively promoting the Wholesale Market Objectives, should be included.[287] With very uncertain projects, AEMO can wait till more details come to light and make an in-period submission.[288] Funding proposed and approval is tied, where practicable, to individual projects, or where not practicable, to specific functions, in AEMO's proposal.[289]
Risk impact and probability ratings using AEMO's methods.	Where there is no limit on the number of risks that can be identified, any risk can be considered 'possible' and can be included to pad out costs. Where there is access to an overspend provision: • It does not make sense to make an allowance for a risk that you consider is 'unlikely' to occur, or a risk that is rated as less than 'unlikely' (rare) to occur. • If risks are unlikely to occur, such that they are not applicable or so insignificant that they are not assessable, they should not be considered as risks. • If risks are likely to occur but their impact is 'immaterial' they should not have an impact value. Rounding of contingency values to the nearest, highest, whole number is not necessary to covering the probability and impact of identified risks.

Source: ERA analysis of AEMO data

The ERA's principles-based assessment of AEMO's contingency calculations and its rationale for a reduction in costs in its draft determination is presented in Table 57.

287 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(b), (online)

288 Economic Regulation Authority, 2021, *Guideline to inform AEMO funding submissions under the WEM Rules and GSI Rules*, Section 3.8.1, p. 8. (online)

289 Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.3, (online)

Table 57: ERA's assessment of contingency cost calculations in the draft determination on AEMO's AR6 proposal

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
'Unknown unknowns' valued at 5% of the value calculated using the fixed contingency calculator is carried forward to and included in the calculation of contingency using the EMV tool.	Estimation of contingency at the idea stage (e.g., $400,000 for an $800,000 project) is much larger than estimation of contingency at the execution phase (using the EMV tool). 5% of the contingency carried forward can be quite large.	Reject the 5% carried forward to execution stage in the EMV calculation.	• At the execution stage, the percentage included to accommodate risks should reflect the outstanding project spend required at that stage (not at the idea stage). • The risk of unknown unknown's materialising (e.g., a rule change affecting the project) is less likely the closer to completion a project is, as stakeholders (including EPWA) are fully informed of AEMO's progress. They do happen but not often. • No provision is made in AEMO's fixed contingency calculator for unknown unknowns, yet a portion of the fixed contingency is carried forward to the EMV tool to cover 'unknown unknown' risks.	**$897,376**

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
			• Not all risks come to fruition in a project and not all projects use contingencies, so there should be left over contingency from within and across projects to cover unknown unknowns if they arise. • If unknown unknowns arise, they can also be addressed using the $10m overspend provision. • Prudency principle.	
Value of each risk rated as 'N/A' or 'immaterial' is added to the total risk in the fixed calculator as 0.5%.	For a $500,000 project, this is an allocation of $2,500.	Reject impact values for risks that are labelled 'N/A' or 'immaterial.	• If risks are unlikely to occur, such that they are not applicable or so insignificant that they are not assessable, they should not be considered as risks. • If risks are likely to occur but their impact is 'immaterial' they should not have an impact value. • Not all risks come to fruition in a project and not all projects use contingencies, so there should be left over	**$191,927.49**

<table>
<tr><th>ERA's concern</th><th>Example</th><th>ERA's action</th><th>Principles and rationale for ERA's actions</th><th>Cost rejected</th></tr>
<tr><td></td><td></td><td></td><td>contingency from within and across projects to cover risks that are rated N/A or immaterial if they arise.
• If N/A or immaterial risks arise, they can also be addressed using the $10m overspend provision.
• Prudency principle.</td><td></td></tr>
<tr><td>Calculated risks are rounded up to the nearest whole number.</td><td>Total contingency percentage is calculated as 11.5% but rounded to 12%.</td><td>Reject rounding and work with actual calculated risks.</td><td>Rounding is not necessary to cover identified risks. Prudency principle.</td><td>$66,503.72</td></tr>
<tr><td>Different scales are used for different projects in the fixed calculator.</td><td>Table A
Impact | Value | Percentage
N/A | 0 | 0%
Low | 0.3 | 3%
Medium | 1 | 10%
High | 1.8 | 18%
Extreme | 3.5 | 35%

Table B
Impact | Value | Percentage
Immaterial/N/A | 0.05 | 0.5%
Low | 0.1 | 1%
Moderate | 0.25 | 2.5%
Major/High | 0.4 | 4%
Extreme | 1 | 10%</td><td>Require AEMO to review and recalculate contingency costs using the fixed contingency calculator and the range in Table B.</td><td>• Extremely risky projects should not be funded.
• With very uncertain projects, AEMO can wait till more details come to light and make an in-period submission.
• Contingency calculations should be robust and consistent.
• Contingency calculations should be based on established, 'repeatable' methods of</td><td>• No revision yet. The ERA requires that AEMO re-works its fixed contingency cost calculations using Table B (to ensure consistency across projects) and resubmits them prior to the ERA's final determination.</td></tr>
</table>

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
			assessing project risks and determining input quantities, resulting in high quality estimates that are comprehensive and as accurate as possible, and can be easily and clearly traced, replicated, and updated. • AEMO's proposal states that contingency values calculated using fixed contingency calculator range between 5 per cent and 80 per cent. Table B is more consistent with this range. • AEMO sent updated calculators to the ERA on 25 February 2020 that used the scale in Table B. However, not all calculators were updated, with 4 calculators still using the scale in Table A. • AEMO expressed a preference for overstating costs in its proposal.	

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
			• Subjective assessments are always at risk of bias, so it is prudent to takes steps to limit that bias. • Prudency principle.	
Other (aggregated) proposed costs inflated the contingency cost calculation at the project level	Examples include: Contingencies for specific projects as high as 102% and 93.22% were proposed as: AEMO carried forward some contingency costs from AR5 to AR6. The contingency cost calculators for some WEM Enterprise projects, included costs for both the NEM and the WEM (not just WA). AEMO employed a fourth method of contingency cost calculation that is inconsistent with other methods.	Recalculate contingencies so that they are calculated as a percentage of the base cost estimates for AR6 and include WA only. Reject contingency costs calculated using unjustifiable bespoke methods.	• AEMO noted that it put off a project for which it had calculated a contingency percentage of 115% and decided to make an in-period submission for that project. • AEMO noted that AEMO calculated the contingency for one project using a 'bespoke' method, based on a previous update to that system, due to the uncertainty surrounding the project. • WEM Rule 2.22A.3: Funding proposed, and approval is tied, where practicable, to individual projects, or where not practicable, to specific functions, in AEMO's proposal.	**$5,188,795.37**

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
			• Extremely risky projects should not be funded. • With very uncertain projects, AEMO can wait till more details come to light and make an in-period submission. • Including some contingency in a cost estimate is good practice. • A probabilistic approach should be used to cost estimation for all major initiatives, and wherever possible otherwise.	
Allowance is included for risks that are considered 'unlikely' to happen and 'rare' in AEMO's EMV tool.	**Unlikely risk -** interface rigidity leading to delays as other system functionality is impacted because of an inability to change interface. Team spends more time developing interfaces. **Rare risk** – Certification does not happen so the team must remediate defects in either documentation or the solution, delaying project implementation.	Reject contingency for risks that are unlikely to happen or are considered rare.	• It does not make sense to make an allowance for a risk that you consider is 'unlikely' to occur, or a risk that is rated as less than 'unlikely' to occur. • Not all risks come to fruition in a project and not all projects use contingencies, so there should be left over contingency from within and across	**Unlikely: $79,417** **Rare: $30,000**

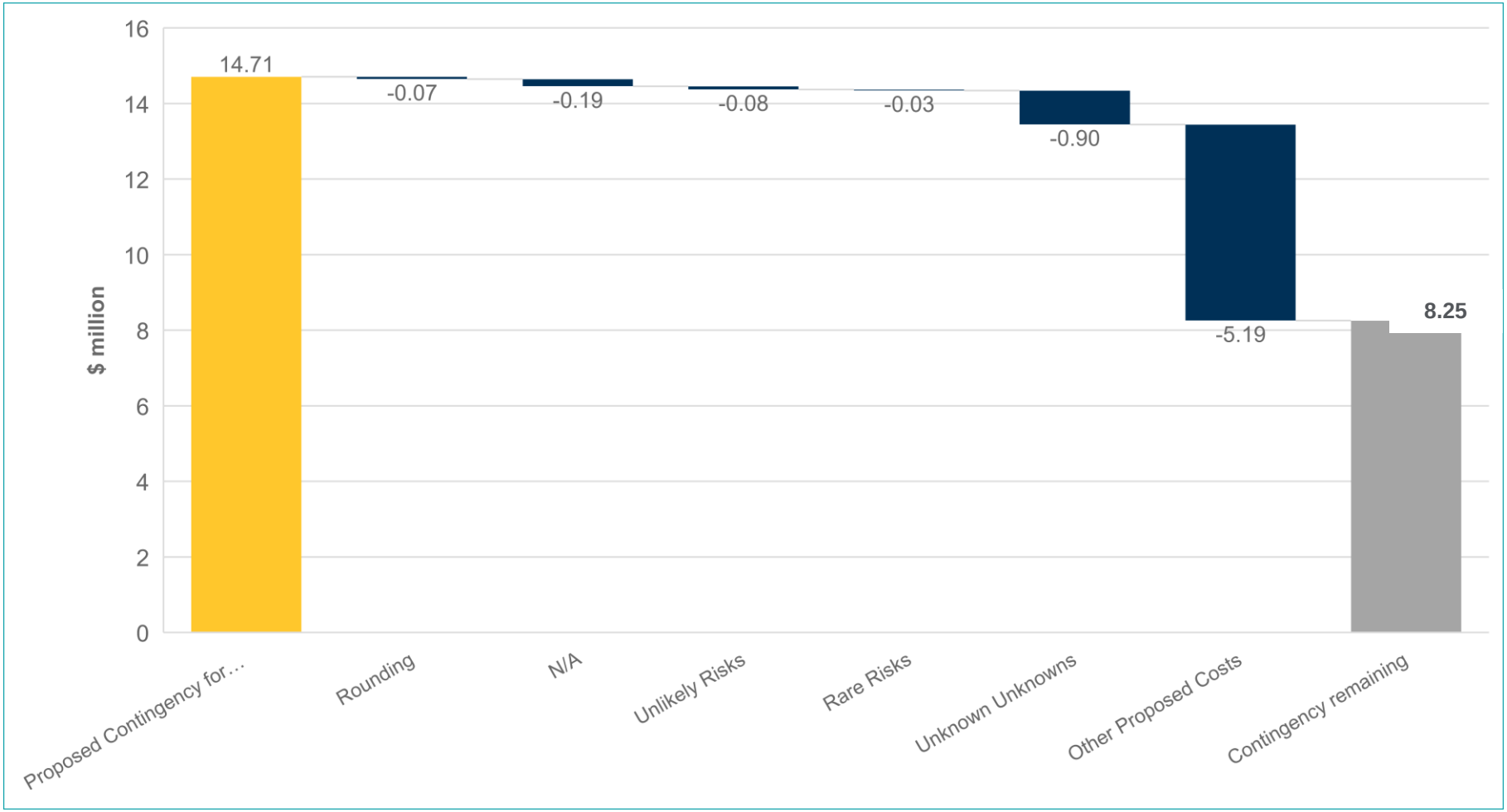
ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
			projects to cover risks if they arise. • If risks arise, they can also be addressed using the $10m overspend provision. • Prudency principle.	
Contingency cost calculations using the EMV tool include imprudent costs.	Total estimated forecast capital costs in the contingency calculators were greater than in AEMO's proposal, as they represented projects spanning both AR5 and AR6. Consequently, AEMO calculated some very large contingency percentages for projects that were almost complete due to carrying contingency costs forward from AR5 to AR6. Allowance was included for 'possible' risks in the EMV tool, which can be responded to very subjectively. Other risks could be mitigated by coordination between project managers, planning, and maintaining a dialogue with EPWA. Contingency costs were calculated for several projects using the base estimate for one project on which the timing for completion was dependent. Costs were included for more resourcing on projects that were already in-flight, in which project managers should have had a good understanding of the resources	Require AEMO to review and recalculate contingency costs using the EMV Tool. Remove funding for any risks that do not appear logical and that cannot be justified in the final determination.	• Any risk can be considered 'possible' and can be included to pad out costs. • There is inconsistency in the number and nature of risks identified by project managers (ranging from the identification of 2 to 9 risks in the EMV tools of the various projects). • Subjective assessments are always at risk of bias, so it is prudent to takes steps to limit that bias. • AEMO expressed a preference for overstating costs. • Contingency cost calculations should be robust and consistent.	• No revision has been made yet. The ERA requires that AEMO reworks its EMV contingency calculations to remove unjustifiable risks and resubmits the contingency cost calculations prior to the final determination.

ERA's concern	Example	ERA's action	Principles and rationale for ERA's actions	Cost rejected
	needed and included them in base estimates, rather contingency costs. 'Ball-park' costs were provided in the EMV calculator for some projects because the project manager considered that they were unable to cost the risks. Contingency was included for sunk costs (where AEMO expected that projects may not be valued by market participants). In some calculators, EMV was calculated prior to determining the impact and likelihood of the project, rather than the other way around, and cost impacts of risks were mistakenly entered into the EMV column. In one calculator labour rate increases were allowed for in contingency costs that were already allowed for in base cost estimates.		• Contingency cost calculations should be based on established, repeatable methods of assessing project risks and determining input quantities, resulting in high quality estimates that are comprehensive and as accurate as possible, and can be easily and clearly traced, replicated, and updated. • Including some contingency in a cost estimate is good practice. • Only costs which would be incurred by a prudent provider of the services provided by AEMO in performing its functions, acting efficiently, to achieve the lowest practicably sustainable cost of performing AEMO's functions, while effectively promoting the Wholesale Market Objectives, should be included	

Source: ERA analysis of AEMO data

Figure 11 below illustrates the ERA's Draft Determination on AEMO's proposed contingency costs for AR6.

Figure 11: ERA's draft determination on AEMO's proposed contingency costs



Source: ERA analysis of AEMO data

In its proposal for the final determination, AEMO submitted revised calculators. In summary, AEMO has ensured that:

- The sum of the impact values in the fixed calculators are now accurate to 1 decimal place.
- Contingency amounts are calculated based on the estimated costs to completion in AR6, rather than carrying contingency costs forward from AR5 to AR6.

Additionally, the contingency cost for the STEM Reform project has been recalculated using the fixed contingency calculator. However, the outstanding contingency amount from the bespoke method has simply been transferred to the base cost estimate

The contingency calculators remain problematic because:

- Unknown unknown quantities, rare risks and risks thought unlikely to occur are still included in the EMV calculations.
- Fixed calculators, describing general risks from the idea stage of a project, are recalculated in the planning and development phase of a project, when there is more certainty about the project. Mid-project, five per cent of the updated contingency cost is then carried forward to the EMV calculator to account for unknown unknown risks.
- The rating scale in figure B above has been adopted, as suggested by the ERA, however it ranges between 0.05 and 1, and not 0 and 1. Risks previously rated as N/A are now rated using the word ‘minor,’ but still valued at 0.05, despite the scoring selections indicating that there is no impact of the described risk.
- In some cases, there are inconsistencies between the risk titles, the description of the risks, and the statement of what would occur if a particular risk materialised, and some risks do not appear to be valid considerations for AEMO within the context of the WEM Rules. There is also some overlap between risks identified in the same project and some identified risks do not appear to reflect the progress of the project through the planning and delivery stage of development.
- The cost assumptions in the EMV calculators are global (rather than detailed) statements of costs and, in some cases are inconsistent with project costs summarised in the financial tracking sheets.
- In some instances, the values of the contingency percentages in the fixed calculators do not correspond to the values of the contingency percentages in the financial tracking sheets.

Accordingly, in its determination, the ERA rejects costings for unknown risks, risks that are described as having no impact, rare risks and risks that are considered unlikely to happen. Additionally, where risks overlap, only one risk was included, risks with explanations and/or cost assumptions that lack validity are rejected, and costs in the contingency calculator, which are lower than in the financial tracking spreadsheet, are selected.

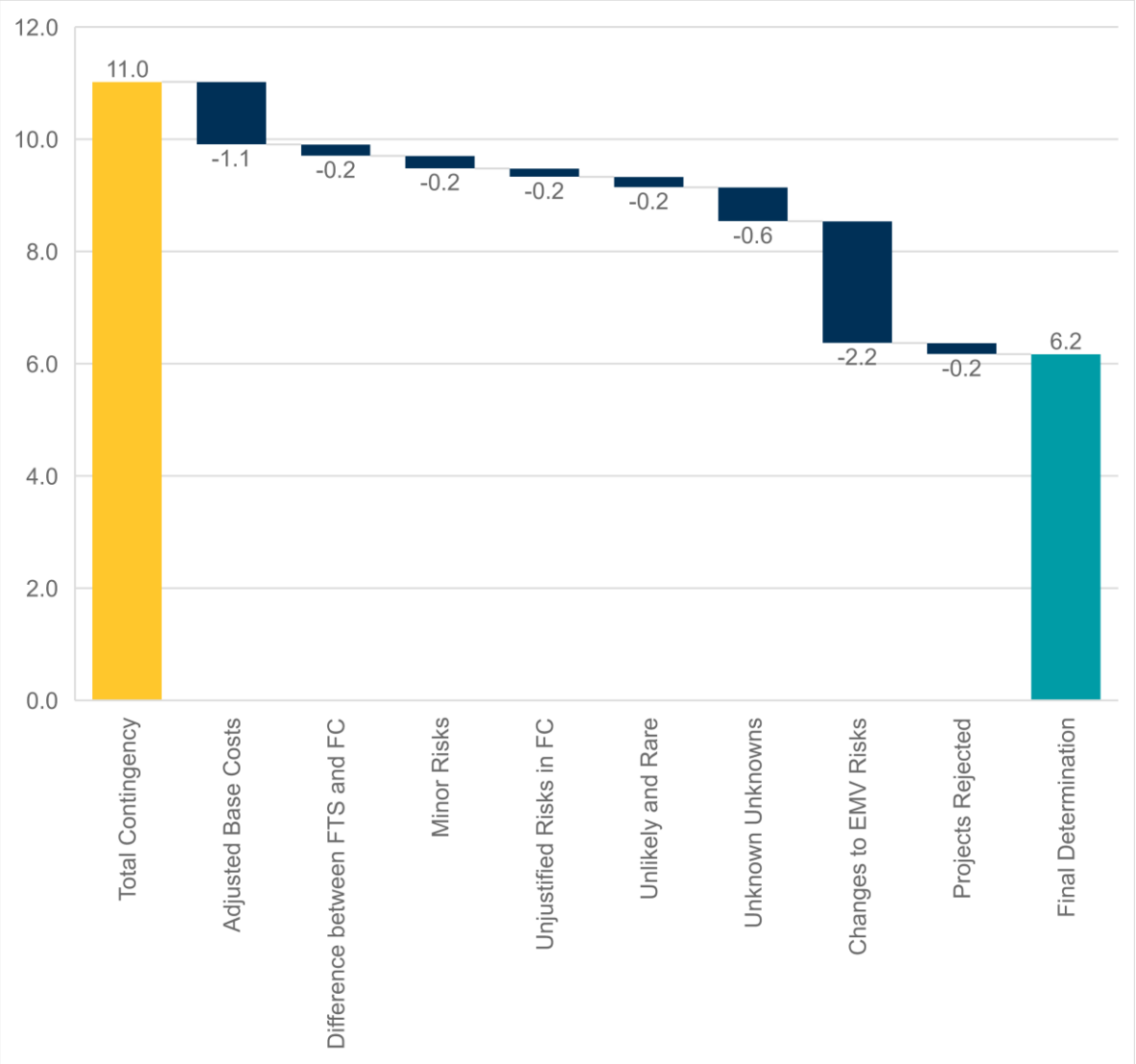
In relation to the internal labour (resourcing) cost assumptions, the identified costs are adjusted downward to reflect the 10 per cent difference between tier rates and actual labour rates, and to remove 4.2 per cent for public holidays.

For contingencies calculated from base cost estimates allocated from national projects, the ERA has only included a contingency amount reflecting WA’s proportion of the base cost estimate.

The ERA rejects $4.7 million from the overall revised project contingencies of $11.0 million proposed for projects comprising capital expenditure in AR6. Further details are provided in section 6.1.6.

The ERA's final determination on AEMO's proposed contingency costs is illustrated in Figure 12.

Figure 12: ERA's final determination on AEMO's proposed contingency costs ($m)



Note: FTS is an abbreviation for financial tracking sheet. FC is an abbreviation for fixed calculator. Final determination figure in the chart varies due to rounding.

Appendix 12 Submissions received in response to ERA issues paper and draft determination

Stakeholder feedback on ERA's issues paper

The ERA received six submissions in response to its issues paper from Alinta Energy, the AEC, Bluewaters Power, Collgar Wind Farm, Perth Energy and Synergy. Feedback from these submissions is presented against relevant topics in the main body of the report and a summary of any remaining points is provided in Table 58 below.[290]

Table 58: Summary of stakeholder feedback in response to ERA issues paper

Stakeholder	Feedback
Substantiation of AEMO's proposal	
Alinta Energy (Alinta)[291]	Alinta was concerned that AEMO has not substantiated why the significantly higher expenditure is necessary to complete the WEM Reforms or why AEMO's proposal represents the lowest practicably sustainable cost of implementation. Alinta Energy considered that AEMO's proposal does not substantiate why significant investment in business-as-usual activities or FTEs is necessary, as there is no indication of what risks the additional capex, power system modelling or growth in systems would avoid, or the benefits they would offer. Alinta suggested that no shareholder board would approve such a significant increase based on such a vague business case and that customers should not be asked to do so either.
Bluewaters[292]	Bluewaters considered that AEMO has not provided sufficient information at the individual project level in its AR6 submission to allow market participants or the ERA to determine that the forecast expenditure is consistent with the requirements of "clause 2.22A.11(b) of the WEM Rules or section 26(1) of the ERA Act (pp.2)."
Perth Energy[293]	Perth Energy questioned whether AEMO could provide an indication of the benefit of running Western Power's systems in-house and moving more systems onto the cloud. Perth Energy considers that this and other upgrades (such as DER access and management and plans to increase market visibility) need to provide tangible economic benefit rather than just being nice to have, and that AEMO should be able to demonstrate where the customer benefits arise from these investments. Whilst Perth Energy commended AEMO on its efforts in publishing its reasoning for its costs and addressing issues raised by market participants, Perth Energy considered the emphasis now needs to be on providing the most economical and secure supplies of energy to customers. Perth Energy recommended that the costs and benefits of market changes and initiatives proposed by AEMO, and the WA Government for AR6 and beyond, need to be identified more clearly.
Labour Costs	

290 Ibid.

291 Alinta Energy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper,* (online).

292 Bluewaters, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper*, (online).

293 Perth Energy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper*, (online).

Stakeholder	Feedback
Collgar[294]	Collgar noted that it understands that AEMO has a substantial reform program to undertake and that it supports this program and recognises it is essential that AEMO is adequately resourced for reform implementation. However, Collgar considered that AEMO must also be subject to the same fiscal constraints faced by market participants. Collgar noted, for example, that it has 14 staff, "only one of whom is dedicated to undertaking market operation and trading activities, ensuring regulatory compliance, participating in reform and other working groups, preparing submissions, implementing the WEM and other reform and supporting staff with regulator matters (pp. 1)."
Perth Energy	Perth Energy considered that the main drivers of the proposed AEMO expenditure are the new WEM and DER Roadmap, which will profoundly affect its operations, and 5-minute settlement, which is not directly included in AR6, and that AEMO has no option other than to make sure it has the staff and resources to implement these projects within the required timeframe. Perth Energy noted that about a third of the proposed capital expenditure has been nominated to provide IT life cycle upgrades, cyber security enhancements and improved operational capabilities and that some of the proposed upgrades are end of life replacement, expansion for new services or capabilities for new obligations. Perth Energy questioned whether, given that this portion of work is replacement of Western Power systems, there is a similar reduction in Western Power expenditure because Western Power would have been responsible for system life extension prior to the move of the system to AEMO.
DER Roadmap	
Perth Energy	Perth Energy was concerned that spreading the cost of implementing DER aggregation participation might not be fair if it is spread across the wholesale market instead of directed to Synergy's customers, unless residential customers are made contestable customers.
Market fees	
Australian Energy Council[295]	The AEC considered that funding reform via market fees makes it difficult for AEMO to minimise market fees and can disproportionately penalise existing market participants, as fees are charged on a $/MWh basis. The AEC expressed concern that this would exacerbate the cross-subsidies that initially caused the problem. The AEC explained that, as market fees are charged on $/MWh basis, rooftop solar PV owners have little exposure to the additional charges, while generators and loads without rooftop solar PV are penalised for an issue they did not cause and cannot control. The AEC encouraged the ERA to review cost recovery from market participants for AEMO and address it with Energy Policy WA. The AEC suggested that the ERA should consider whether it is in the long-term interests of consumers for the WEM rules to include service standard mechanisms applicable to AEMO in the performance of its WEM functions, for which it seeks to recover costs from market participants, as market fees. The AEC considered that it is reasonable for market participants who are paying for AEMO's services to obtain visibility of its service standard performance.
Collgar	Collgar noted that increases to coordinator and regulator fees will add to the market fees borne my market participants. Collgar considered that regulator fees have increased beyond CPI or the wage-price increase, and that there is limited oversight

294 Collgar Wind Farm, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper*, (online)

295 Australian Energy Council, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper*, (online)

Stakeholder	Feedback
	of co-ordinator fees to ensure they are efficient and don't include additional costs transferred from the consolidated funds, thereby adding further cost pressure for market participants. Collgar considered that it is critical that consideration is given to market fees and other WEM related costs in developing and implementing market power mitigation regimes so that market participants can recover their efficient, mandatory regulatory costs.
Synergy[296]	Synergy noted that it expects the ERA and Coordinator of Energy to provide fee estimates reflecting the individual cost of for each entity to ensure the transfer of rule development functions from the ERA to the Coordinator of Energy does not increase the overall WEM fees.
ERA testing	
Australian Energy Council	The AEC considered that the ERA needs to satisfy itself that the proposed contingency amount in AR6 is accurate and justifiable, and that AEMO is not incentivised to over forecast contingency.
Perth Energy	Perth Energy concluded that it is appropriate that the ERA assesses AEMO's proposed expenditures in detail.
Synergy	Whilst noting that market reform comes at a cost, Synergy stressed the need to make certain AEMO's revised costs are supported by robust evidence and recommended the ERA require AEMO to provide sufficient evidence that the revised forecast is prudent, efficient, and deliverable. Synergy considered that the revised WEM Reform capex forecast suggests AEMO will spend a similar amount in the next 18 months as it did over the AR5 period and recommended the ERA scrutinise whether this is deliverable, given the other projects proposed for the AR6 period. Additionally, Synergy recommended the ERA focus on: • the prudence of the IT program of works, given competing priorities, • that there is no double recovery through cost allocation between the NEM and WEM, • the basis for the cyber security costs and whether they are efficient, • the impact of depreciation on WEM fees, • increasing labour costs not directly associated with market operation, and • achieving a reasonable transition path for market fee increases through AR6and beyond. Synergy recommended the ERA consider requiring AEMO to publish a transparent regulated revenue model for AR6 prior to the draft determination, equivalent to that provided by Western Power supporting its fifth access arrangement proposal, as it would be consistent with the requirement for transparent decision making.

Source: Stakeholder feedback (online)

[296] Synergy, 2022, Submission to *Australian energy Market Operator's Allowable Revenue and Forecast Capital Expenditure Proposal for the Period 1 July 2022 to 30 June 2025 – Issues paper*, (online).

Stakeholder feedback on ERA's draft determination

The ERA received seven submissions in response to the draft determination from Alinta Energy, the Australian Energy Council, Bluewaters Power, Collgar Wind Farm, Energy Policy WA, Synergy, and Western Power.

Feedback from these submissions are presented in the main body of the report against the relevant topics with a summary of each submission provided in the table below.

Table 59: Summary of stakeholder feedback in response to ERA's draft decision

Stakeholder	Feedback
Alinta Energy (Alinta)	Alinta supports the ERA's amendments in its draft decision however remains concerned that customers will be exposed to a 70 per cent increase in market fees. Alinta stated that fundamental changes in AEMO's processes and cost-benefit analyses is needed to avoid the high costs of the current and future expenditure periods.
Australian Energy Council (AEC)	The Australian Energy Council supports: • the ERA approving $135.9 million in allowable revenue and $52.0 million in forecast capital expenditure. • the ERA not approving $7.4 million in proposed labour costs. • the ERA rejecting the costs for the market visibility and DER data access and management projects. • the critical decisions and cost implications of in-house development of multiple systems by AEMO be shared with industry. The AEC advocates for the ERA to publish its financial reporting guidelines (required by sections 2.22A.8 and 9 of the WEM Rules) to share this information prior to AEMO publishing their financial report on 31 October 2022. • deferring projects with uncertain costs or outcomes to in-period proposals but that AEMO continually refine these potential costs and update the industry. The AEC stated that AEMO needs to disclose how the contingency balance will be spent if the AR6 contingency is not fully used and that this information be provided to the industry prior to their AR6 proposal and not be sought retrospectively. The AEC suggests that the ERA consider including service standard benchmarks and key performance indicators to assess how AEMO provides services in the electricity and gas markets in WA.
Bluewaters Power (Bluewaters)	Bluewaters: • supports the ERA rejecting costs that do not meet the WEM Rules requirements such as the $7.4 million in proposed labour costs. • views large amounts of AEMO's forecast capital expenditure and allowable revenue do not meet the requirements of the WEM Rules.[297] • questioned the appropriateness of the disproportionate allocation of costs to incumbent participants rather than being allocated based on causer-pays. • stated that the upward trajectory of market fees is a serious and unsustainable concern and questioned whether this provides value-for-money for WEM participants and electricity customers.
Collgar Wind Farm	Collgar agrees that AEMO has not justified some of its expenditures and that the ERA make additional cuts if appropriate.

[297] Wholesale Electricity Market Rules (WA), 12 April 2022, Rule 2.22A.5(b), (online)

Stakeholder	Feedback
	Collgar stated that: • a substantial part of AEMO's labour costs is not justified and that AEMO is well staffed in comparison to other organisations in the sector. • AEMO provide more transparency on decisions to inhouse custom IT systems and whether all staff supporting IT capital projects will be needed in the operational phase. • ERA's regulatory process for WEM reform projects is undermined as the ERA must consider whether the project is needed to continue with the selected delivery path of the Electricity Transformation Strategy rather than whether the investment is prudent and efficient. • it does not support funding IT systems for market start that will be obsolete within three years due to five-minute settlement commencing. • a user or causer pays approach be applied to recovering DER costs rather than the existing generation and load approach. Collgar agrees with the ERA to not approve costs for AEMO's trial for the distribution services market. • the ERA approve funding for AEMO to participate in the Reserve Capacity Mechanism and Costs Allocation reviews as it will have a minimal affect on the budget and that AEMO's input is needed. • the ERA work with AEMO to align the digital roadmap delivery and expenditure with the regulatory framework. • It does not support substantial contingencies in AR6 as the funds can be used for unapproved projects.
Energy Policy WA	Energy Policy WA (EPWA) stated that it is not appropriate for it to comment on specific parts of the ERA's draft determination. EPWA highlighted that: • AEMO's input is required to complete the implementation of Stage 1 of the Energy Transformation Strategy (ETS) and progressing Stage 2 of the ETS. • AEMO will provides its experience, knowledge, skills and information to ensure the success of the reforms and reviews, the design, implementation and changes to the rules and other changes where needed. • AEMO needs to be adequately funded to undertake its roles for the long term benefit of consumers in implementing the ETS.
Synergy	Synergy supports the ERA's draft determination and stated that it is an appropriate balance between the establishment of the new market and the evolution of the WEM against the costs for Market Participants. Synergy raised the following concerns: • There are issues with AEMO's investment planning and forecasting processes with greater transparency and independent oversight needed. • AEMO has no incentive to seek efficiencies or cost savings on behalf of the market. • The contingency amounts are higher that what is reasonable for similar projects and programs of work done by commercial organisations. • Synergy stated that greater transparency of AEMO's project planning, expenditure forecasting and financial management will assist the market understand the implications of market fees and the costs that AEMO is incurring. This can be addressed via the new financial reporting and guideline requirements and that the industry be consulted as the financial reporting and guideline regime is drafted.
Western Power	Western Power is dependent on AEMO to deliver its projects for the new WEM, in particular the WEM procedures and technical specifications. The ERA's final

Stakeholder	Feedback
	determination may affect AEMO's work program that would consequently affect Western Power's project delivery.

Source: Stakeholder feedback (online)

Appendix 13 AR6 program

The table below details AEMO's revised proposal and the ERA's final determination on the WEM capital expenditure programs.

Table 60: AR6 capital expenditure, final determination ($ million)

Project	AEMO revised proposal			ERA final determination			Variance
	Base	Contingency	**Total**	Base	Contingency	**Total**	Total
Constraint Management	0.05	-	**0.05**	0.05	-	**0.05**	-
WEM Dispatch Engine	1.55	0.78	**2.34**	1.55	0.32	**1.88**	(0.46)
WEMDE User Interface	2.10	0.70	**2.80**	2.12	0.50	**2.61**	(0.19)
RTMS	0.07	-	**0.07**	0.07	-	**0.07**	-
DTS Integration & SCED Offline Tools	1.51	0.36	**1.87**	1.24	0.30	**1.54**	(0.34)
Total – SCED	**5.29**	**1.84**	**7.13**	**5.03**	**1.12**	**6.15**	**(0.98)**
Settlements Enhancements	-	-	**-**	-	-	**-**	-
Settlements Reform	3.84	-	**3.84**	3.72	-	**3.72**	(0.12)
Total – Settlements	**3.84**	**-**	**3.84**	**3.72**	**-**	**3.72**	**(0.12)**
Outage Management Reform	0.38	0.26	**0.64**	0.35	0.21	**0.56**	(0.08)
Commissioning Tests Reform	1.02	0.27	**1.29**	0.89	0.13	**1.03**	(0.26)
MT PASA Reform	0.77	0.34	**1.10**	0.65	0.18	**0.84**	(0.27)
Forecast Integration	0.31	0.22	**0.53**	0.28	0.08	**0.36**	(0.17)
System Operation Planning Tools Reform	0.76	0.12	**0.88**	0.64	0.05	**0.69**	(0.19)
ST PASA	1.24	0.31	**1.56**	1.05	0.17	**1.22**	(0.34)
Total – System Planning	**4.47**	**1.53**	**6.00**	**3.86**	**0.83**	**4.69**	**(1.30)**
RCM Reform	6.21	-	**6.21**	5.83	-	**5.83**	(0.37)
STEM Reform	0.99	0.16	**1.15**	0.82	0.12	**0.94**	(0.22)
Total – Legacy Markets	**7.20**	**0.16**	**7.36**	**6.65**	**0.12**	**6.77**	**(0.59)**
Generator Performance Standards	-	-	**-**	-	-	**-**	-
Registrations Reform	0.99	0.50	**1.49**	0.93	0.31	**1.24**	(0.25)
Total – Registrations	**0.99**	**0.50**	**1.49**	**0.93**	**0.31**	**1.24**	**(0.25)**

Project	AEMO revised proposal			ERA final determination			Variance
Integration & Market Trial	3.86	0.93	**4.79**	3.22	0.68	**3.89**	(0.90)
Compliance Reporting	1.99	0.53	**2.53**	1.66	0.41	**2.07**	(0.46)
Hypercare & Support	1.34	0.26	**1.60**	1.12	0.21	**1.32**	(0.28)
Digital Platform	6.23	1.30	**7.53**	5.38	0.63	**6.02**	(1.52)
Total – Integrations	**13.43**	**3.02**	**16.45**	**11.38**	**1.92**	**13.30**	**(3.15)**
WEM Reform Core	7.32	0.76	**8.08**	7.48	0.24	**7.72**	(0.36)
Market & Regulatory Design	0.33	0.05	**0.38**	0.33	0.03	**0.36**	(0.02)
Technical & Process Design	0.06	-	**0.06**	0.06	-	**0.06**	-
Total – Design, planning & management	**7.71**	**0.81**	**8.52**	**7.87**	**0.27**	**8.14**	**(0.38)**
Total – WEM Reform[298]	**42.93**	**7.85**	**50.78**	**39.43**	**4.57**	**44.00**	**(6.78)**
Project Symphony	1.86	0.86	**2.71**	1.67	0.11	**1.78**	(0.94)
Technology Integration	0.51	0.16	**0.67**	0.49	0.06	**0.55**	(0.12)
DER Participation	0.69	0.18	**0.86**	0.59	0.12	**0.71**	(0.15)
DER Participation Implementation	1.81	-	**1.81**	1.50	-	**1.50**	(0.31)
EVs in DER Register	0.41	0.06	**0.47**	0.34	0.04	**0.38**	(0.09)
Total – DER	**5.27**	**1.25**	**6.52**	**4.59**	**0.33**	**4.92**	**(1.60)**
Total – Facilitating the Energy Transformation Strategy[299]	**48.20**	**9.10**	**57.30**	**44.03**	**4.90**	**48.92**	**(8.38)**
WAMS	0.19	0.02	**0.20**	-	-	**-**	(0.20)
Transient Stability Tool	0.19	0.03	**0.22**	0.16	0.02	**0.19**	(0.04)
Operations Simulator	0.82	0.08	**0.90**	0.78	0.07	**0.85**	(0.05)
Capability Uplift	**1.20**	**0.13**	**1.33**	**0.95**	**0.09**	**1.03**	**(0.30)**
Lifecycle EDP	1.36	0.30	**1.66**	1.15	0.23	**1.38**	(0.28)
Lifecycle Integration	0.89	0.15	**1.04**	0.74	0.11	**0.85**	(0.19)

[298] WEM reform is comprised of the following programs: design, planning and management; integrations; registrations; legacy markets; system planning; settlements; and SCED.

[299] Facilitating the Energy Transformation Strategy capital expenditure is comprised of the WEM reform and DER programs.

Project	AEMO revised proposal			ERA final determination			Variance
Lifecycle Legacy Market Systems	1.49	0.22	**1.71**	1.26	0.07	**1.34**	(0.37)
Lifecycle Perth Computer Room	1.84	0.23	**2.07**	1.77	0.16	**1.93**	(0.14)
ITRON Upgrade	0.38	0.04	**0.42**	0.32	0.02	**0.34**	(0.07)
Certificate Authority	0.23	0.02	**0.25**	0.23	0.02	**0.25**	-
Total – Lifecycle	**6.18**	**0.96**	**7.14**	**5.47**	**0.61**	**6.09**	**(1.05)**
WEM Rule Change (Large)	0.33	-	**0.33**	0.26	-	**0.26**	(0.07)
Total – WEM Rules Changes	**0.33**	**-**	**0.33**	**0.26**	**-**	**0.26**	**(0.07)**
Total – WA Technology[300]	**7.71**	**1.09**	**8.80**	**6.68**	**0.70**	**7.38**	**(1.42)**
EMS Upgrade	1.28	0.15	**1.42**	1.25	0.12	**1.37**	(0.05)
Cyber	2.67	0.43	**3.10**	2.27	0.31	**2.58**	(0.53)
Operational Forecasting	0.92	0.24	**1.17**	0.80	0.21	**1.02**	(0.15)
Infrastructure (Norwest Data Centre)	0.22	0.03	**0.25**	0.21	0.02	**0.24**	(0.01)
Total – Enterprise Systems	**5.09**	**0.85**	**5.94**	**4.53**	**0.67**	**5.20**	**(0.74)**
Total – Sustaining Capital Expenditure[301]	**12.80**	**1.94**	**14.74**	**11.21**	**1.37**	**12.58**	**(2.16)**
Total – WEM Capital Expenditure[302]	**61.00**	**11.04**	**72.04**	**55.24**	**6.27**	**61.50**	**(10.54)**

300 WA technology is comprised of WEM rule changes, lifecycle and capability uplift projects.

301 Sustaining capital expenditure is comprised of WA technology and enterprise system programs.

302 WEM capital expenditure is comprised of sustaining capital expenditure and expenditure to facilitate the Energy Transformation Strategy.