

Adjustment to 2022-2025 Allowable Revenue and Forecast Capital Expenditure

March 2024

AR6 second in-period submission





Important notice

Purpose

This document, and the supporting information provided with it, comprises AEMO's application under clause 2.22A.14(a) and (b) of the Wholesale Electricity Market (WEM) Rules for the Economic Regulation Authority to consider additional costs AEMO has incurred or will incur during its sixth Allowable Revenue period (1 July 2022 to 30 June 2025).

Note this in-period adjustment applies to the WEM only. While there are minor adjustments to Gas Services Information (GSI) operating costs resulting from some aspects of this proposal, AEMO can accommodate these within existing budgets and overrun allowances, therefore, no in-period GSI adjustment is required.

Values used in this proposal

All financial information in this document is presented in nominal dollars unless otherwise stated. Some tables may not sum precisely due to rounding.

Financial information in this proposal is based on project forecasts as of 22 December 2023 except Metering System Upgrade with project forecast on 29 February 2024 and the majority of operating expenditure based on AEMO's internal budget as of 12 February 2024.

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Summary

Overview

AEMO is about to enter the third and final year of its sixth allowable revenue period (AR6)¹. This in-period submission is for adjustments to AEMO's allowable revenue and forecast capital expenditure (capex) for 2024-25 only. Our proposed adjustments account for approved capex to deliver government-led reforms to the Wholesale Electricity Market (WEM), plus additional capital and operating costs that could not be quantified with reasonable accuracy when the AR6 expenditure forecasts were developed in 2021.

A huge amount has changed in the two-and-a-half years since we developed the original AR6 forecast². The WEM has shifted from a relatively small and simple market to one that provides security constrained economic dispatch, with more complex essential system services (ESS) requirements and ever-growing volumes of renewable capacity. Demand for AEMO's services has grown more rapidly than anticipated, with an 18% growth in the number of market participants and 14% growth in the number of facilities since 2021. Maximum and minimum electricity demand have varied significantly from 2021 assumptions, driven by economic and population growth, electrification, and rising volumes of distributed solar photovoltaic (PV) generation (increasing by more than 60% since 2021).

The economic landscape has changed. When the original AR6 submission was developed, Western Australia (WA) was just emerging from the COVID-19 pandemic, economic and labour market conditions were muted, and interest rates were low. In the two years since then, the scenario is very different, with AEMO, market participants and consumers all battling increasing cost pressures. Inflation has been around 6.2%³ rather than the 2.5% assumed in the AR6 determination, labour cost escalation is averaging 3.5% p.a. compared with our 2.0% p.a. assumption, and our interest rates are 6.1% against an assumption of 3.5%. These factors alone have increased AEMO's forecast 2024-25 costs by \$7.6 million.

Energy sector reforms have also continued at a faster pace than expected. At the time of the AR6 forecasting process, the full suite of activities under the WA Government's Energy Transformation Strategy (WEM Reform Program) had not been defined in detail. Formal decarbonisation targets had not yet been set. While we identified activities such as Distributed Energy Resources (DER) aggregation and the introduction of five-minute settlement (5MS) as potential projects, these initiatives were still too early in their development to allow a reasonable cost estimate that would satisfy the tests under the regulatory framework. The energy transition has since continued to progress rapidly, meaning that these and other new reform activities, as well as market-led evolution, have emerged during the AR6 period. In many cases we must commence work to accommodate these immediately.

Put simply, market participants, policy makers, consumers and AEMO are all doing more.

¹ The AR6 period runs from 1 July 2022 to 30 June 2025.

² The initial AR6 forecast was developed during the course of Q3 and Q4 2021 and submitted to the ERA in December 2021.

³ Australian Bureau of Statistics, Series 6401.0 Consumer Price Index, Australia, TABLE 8. CPI: Analytical Series, Weighted Average of Eight Capital Cities, June Quarter.



The environment we are operating in today has become more complex and grown more quickly than anyone anticipated, and far faster than the regulatory framework is designed to facilitate. This has a flow on effect on AEMO, and has led to this in-period adjustment.

We signalled the likely need for a second in-period adjustment to the Economic Regulation Authority (ERA) and market participants in April 2023, when we lodged our first in-period capex adjustment⁴. The thinking at the time was that this second adjustment would be largely a mechanistic change to enable AEMO to recover the approved capital costs (and associated financing and resourcing costs) incurred to deliver the WEM Reform Program. While we flagged that there may be some additional capex requirements for emerging projects such as DER aggregation, it was assumed that the revenue adjustment would be largely an outworking of the first in-period submission. Regrettably, this assumption has proven invalid.

The pace of change, economic factors, and the growing complexity of the market and power system over the past two years means that this in-period adjustment must accommodate substantial new government-led reform and associated energy transition activities. To set AEMO up for the future, we have adapted our operating model over the last two years, ensuring we have the right people in the right places with the right skills to deliver all the additional activities WA's energy transition brings.

To clarify, while this second in-period adjustment enables recovery of the WEM Reform Program capex already incurred, no further adjustments to the WEM Reform Program capital amounts are proposed. However, it does include an uplift in operating (predominantly labour) costs associated with supporting new reform activities and operating the new market and power system arrangements during this period of significant change.


The AR6 investments and the subsequent energy reforms are designed to help WA transition to a secure, reliable, decarbonised and ultimately more affordable power system. AEMO fully supports the WA Energy Transformation Strategy. We recognise that the reform activities being delivered today and new initiatives in the pipeline are key to achieving net zero emissions targets and a more sustainable energy supply. Reform undeniably involves upfront cost, but is crucial to deliver ongoing benefits to consumers as the WEM's energy mix changes. It is important to get reform right and it is important to keep going.

WA's energy transition, as in other jurisdictions, is highly complex and fast-moving and will continue to require expenditure to ensure the market delivers the right outcomes. As a not-for-profit business, AEMO is always focused on the best interests of energy consumers, and aims to provide services for the lowest practicably sustainable cost. We are conscious that changes to our costs (and resulting fees) during a regulatory period presents challenges for market participants. We appreciate energy consumers are facing cost pressures, and we have felt the impact of these same cost pressures when developing project forecasts.

We are also aware of the importance of facilitating the energy transition in an efficient and timely manner, so that participants and ultimately consumers can benefit from a decarbonised power system sooner. That is why our focus during the AR6 period has been to invest in the right systems and people, to bring the WA organisation up to a level that can support a growing market and a rapid but sustainable transition to renewables.

We have sought to keep our investments as low as reasonably practicable, and to sequence them over time to reduce delivery risks. Unfortunately, cost pressures, the timing of capex recovery, and the pace of the transition

⁴ A previous in-period capex-only adjustment was determined as required by the ERA in September 2023 to accommodate changes in capital expenditure forecasts for the WEM Reform Program. No adjustments to allowable revenue were made.



and associated reform means that the impact on market fees in the short term is significant. However, we expect that the AR6 period represents an exceptional level of investment, and will bring AEMO to a scale that should support WA through the next stage of energy sector evolutions at a more sustainable level of cost.

We understand that the cost of energy sector reform is substantial, and that a market fee adjustment mid-period is far from ideal for all parties. We are working hard to minimise the cost of our services and offset rising market and system operation costs to the extent we can. For example, we are undertaking activities that directly reduce costs such as our inaugural corporate bond issue in 2023, and by leveraging the existing capabilities of the national AEMO organisation. Where possible we apply lessons learnt from the National Energy Market (NEM) to the WEM, and vice versa. As AEMO's national cyber security obligations grow, the WEM benefits from a robust security program at a lower cost than if it was a standalone business, making certain that WA's power system, market systems and our customers' data remains safe.

We also continue to seek ways to provide greater transparency of our priorities and the associated costs to stakeholders. Following commencement of the new market arrangements in October 2023, we have been working with Energy Policy WA to identify the optimal sequence and timing of subsequent reform activities, and how to ensure costs and delivery are sustainable. We are also committed to working with the ERA and market participants to identify what changes can be made to the regulatory framework to enable more efficient delivery of reforms along with a more predictable pathway for market fees into the future.

Proposed adjustment

The ERA's AR6 determination, published on 31 May 2022, provided for AEMO to recover \$142.3 million in revenue across the three years of the AR6 period. The May 2022 determination, plus the subsequent September 2023 in-period capex adjustment approved by the ERA, estimated a total capex requirement of \$108.6 million.

AEMO has worked within these allowances to deliver the WEM Reform Program and operate the power system and market in the South West Interconnected System (SWIS) over the first two years of the AR6 period. However, the May 2022 revenue determination did not include AEMO's full suite of operating costs. For example, the AR6 determination did not incorporate the higher depreciation and borrowing costs resulting from WEM Reform Program capex, as these costs were not known at the time. These depreciation and borrowing expenses, along with higher interest rates, inflation, and additional energy transition requirements that have emerged during the period, lead to a revenue shortfall of \$59 million and a forecast capex requirement of \$39 million in 2024-25.

Table 1 summarises the revised allowable revenue and capex forecasts, along with a breakdown of the drivers for the adjustment. The adjustment drivers are discussed further in the following section.

Table 1 Summary of proposed adjustments to WEM allowable revenue and forecast capex, \$ million nominal

	WEM allowable revenue (opex)	WEM forecast capex
Approved AR6	142.3	108.2
1. Adjustment to recover WEM Reform Program depreciation and financing costs	13.2	-
2. Adjustment for external cost pressures (e.g. inflation, labour cost escalation)	7.6	-
3. Adjustment for critical AEMO enterprise-wide capability uplifts (e.g., cybersecurity, corporate systems)	4.9	-
4. Adjustment for new reform and energy transition activities (labour and capex projects)	33.5	39.0
Total proposed adjustment	59.2	39.0
Revised AR6	201.5	147.3*

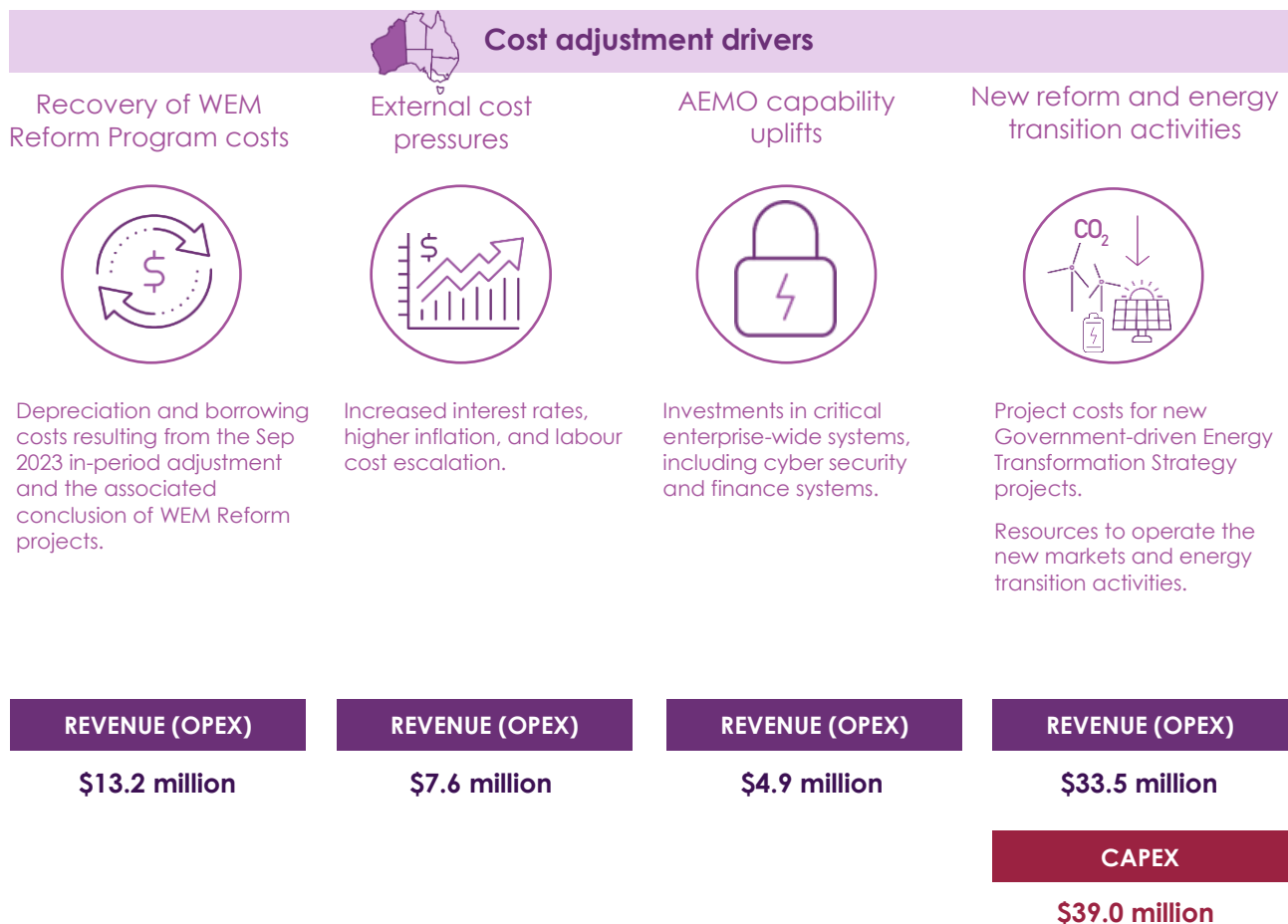
Note: The revenue and capex adjustments are greater than the overrun provisions in clauses 2.22A.12 and 2.22A.13 of the WEM Rules, which allows for revenue and capex adjustments (respectively) of up to \$10 million or 10% (whichever is lower). AEMO must therefore apply to the ERA for reassessment.

*The “revised AR6’ total does not sum due to rounding.

Adjustment drivers

There are four drivers of the proposed and capex adjustments. These are summarised in Table 1, and Figure 1.

Figure 1 WEM opex and capex adjustment drivers, \$ million nominal



Recovery of WEM Reform Program costs

The current revenue determination was set based on the WEM Reform Program capex forecast of \$91.2 million. This WEM Reform Program capex forecast was revised to \$128.6 million and subsequently approved by the ERA in September 2023. AEMO's revenue allowance must therefore be adjusted to recover this higher overall expenditure level.

Capital expenditure is recovered via depreciation and amortisation of assets over their economic lifespan, plus borrowing costs. As of 30 June 2024, only \$7.1 million of WEM Reform Program capital costs will have been reflected in market fees. The adjusted depreciation and borrowing costs (opex) over AR6 are \$9.7 million and \$3.5 million, respectively.

External cost pressures

Approximately \$7.6 million of the revenue adjustment is driven by external economic factors that impact AEMO's costs.

Since the original AR6 submission was prepared in 2021, Australia has experienced growth in prices, wages and interest rates at levels not seen for over a decade, driven by economic conditions and strong population growth following the end of the COVID-19 pandemic restrictions. Where possible, we have sought to, and will continue to seek to mitigate the impacts of these external costs. For example, to help manage rising finance costs, we successfully issued our inaugural Australian Medium-Term Note (Bond) on 30 November 2023 for \$300 million, at a fixed rate of 5.35%, lowering our average borrowing costs.

Table 2 summarises the external cost pressures that are impacting AEMO's AR6 opex forecast.

Table 2 Summary of external cost pressures, opex \$ million nominal

Factor	Description	Impact
Inflation	AR6 assumption 2.0%, actual 6.2% and financial year 2024-25 forecast of 3.5% p.a. CPI is applied to non-labour costs excluding IT & telecommunications.	1.6
Labour cost escalation	AR6 assumption 2.0% p.a., actual and forecast 3.5% p.a. Market driven escalation has resulted in a higher total employment cost for new starters than assumed in the AR6 forecast. Employees under the AEMO enterprise agreement also receive fixed increases for the next three years from Quarter 1, 2024 ⁵ .	2.7
Interest rates	AR6 assumption of 3.5%, forecast 6.1% ⁶ . A significant increase in financing costs, coupled with higher debt load from the WEM Reform program results in a higher interest expense over the AR6 period.	3.3
Total		7.6

AEMO capability uplifts

This driver covers the allocation of costs attributed to the WEM for uplifting critical systems and processes necessary for the provision of power system and market services. These include enterprise-wide finance system upgrades, IT service provision, and cyber security arrangements. Cyber security remains a primary focus for AEMO, as it does for all other Australian critical infrastructure owners and operators. A secure cyber environment is essential for the secure operation of the power system and the protection of customer data. As a national organisation, AEMO can leverage the capability of its enterprise systems to deliver a robust cyber security environment for WA operations, at a lower cost than if AEMO WA was a standalone business.

⁵ Labour costs are benchmarked periodically, where possible, to test that rates are reasonable and consistent with current market conditions.

⁶ AEMO's average cost of debt including fees and margins.

This cost driver also includes an adjustment to account for salary overtime costs, which were excluded from the AR6 revenue determination, but continue to be incurred by operational staff (mostly power system controllers).

Table 3 summarises the proposed revenue adjustments to accommodate AEMO capability uplifts.

Table 3 Summary of AEMO’s capability uplift adjustments, opex \$ million nominal

Item	Description	Impact
Salary overtime costs	The ERA had excluded overtime costs from AEMO’s allowable revenue as part of its AR6 determination. However, AEMO continues to incur overtime costs due to the nature of the work carried out by operational staff, primarily power system controllers.	1.0
ServiceNow revolution	The upgrade to the enterprise-wide IT system ServiceNow was a project implemented and delivered by AEMO’s corporate digital team in March 2024. The project harnessed an existing corporate system to deliver increased value within the AEMO business.	0.3
Uplift finance systems	Implementation of a new enterprise-wide finance system. This project is being delivered by AEMO’s corporate digital team, with the new system expected to be in place by financial year 2025-26. This investment is essential to ensure AEMO’s corporate systems are fit for purpose and will support more efficient and effective provision of corporate services within AEMO in the future.	1.9
Cyber security	AEMO has a central cyber security program that covers all aspects of cyber security AEMO-wide. The cyber security program is being delivered as planned, however a review of the treatment of this program’s costs in accordance with the Australian Accounting Standards has identified the vast majority of the cyber security program should be expensed rather than capitalised. This means cyber security expenditure impacts allowable revenue rather than forecast capex.	1.4
Revenue under recovery	The approved AR6 forecast included a ‘revenue adjustment for over/under recovery’ line item, which estimated over-recovery of \$0.3 million in 2022-23. This did not eventuate. The AEMO 2023 WA Financial Report (published 31 October 2023) shows an actual operating deficit for the WEM of (\$3.0 million) in 2022-23.	0.3
Total		4.9

New reform and energy transition activities

Energy sector reform is vital for WA’s journey towards decarbonisation. At AEMO we fully support the energy transition and are committed to delivering and resourcing it appropriately. New reform and energy transition activities account for around three-quarters of the total opex and capex adjustment proposed for 2024-25. We recognise that this is a substantial increase compared to the original forecasts and we have sought to achieve the lowest sustainable cost, leveraging our NEM capabilities where practicable.

AR6 represents a period of high capital intensity, as we help facilitate the WA Government’s Energy Transformation Strategy, which is the policy driving the state’s energy transition. Energy Transformation Strategy initiatives include ongoing work such as DER aggregation and the Reserve Capacity Mechanism (RCM) review, as well as new reform activities such as the Demand Side Response (DSR) Review⁷, Cost Allocation Review⁸ and WEM Investment Certainty (WIC) Review⁹. Some of these reforms are administrative; others require assets to be created or modified. All require input from AEMO’s subject matter experts.

The energy transition impacts both AEMO’s opex and capex. Our role is to deliver reform while securely operating the power system and market. This requires investment both in our systems and in our people. For example, one of the most significant capex items is to upgrade the AEMO metering system so that it can accommodate the uplift

⁷ Demand Side Response review, located at <https://www.wa.gov.au/government/document-collections/demand-side-response-review>

⁸ Cost Allocation Review, located at <https://www.wa.gov.au/government/document-collections/cost-allocation-review>

⁹ WEM Investment Certainty Review, located at <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-investment-certainty-wic-review-working-group>



in metering data as Western Power installs advanced meters across the SWIS. Upgrading to a fit-for-purpose metering system will enable AEMO to operate the market and power system using more timely, granular and accurate meter data, which will in turn drive better decision making and more equitable outcomes for market participants. Uplifting our meter data handling capability is also a prerequisite for new reform initiatives such as demand-side participation, DER aggregator participation, and five-minute settlement.

However, investing in the metering system is only part of the solution. The ability to handle more metering data means we can deliver more accurate settlement. To do this we need to conduct more analysis and therefore require more resources to support our growing customer base. Reform activities are therefore driving a need to better organise and resource our business, making sure we provide market participants the right level of support. This has led us to rethink our operating model, to develop sustainable ways of working that underpin labour opex requirements over AR6 and into the next allowable revenue period.

Further detail on the opex and capex adjustments required to facilitate the new reform and energy transition activities is provided in the following sections.

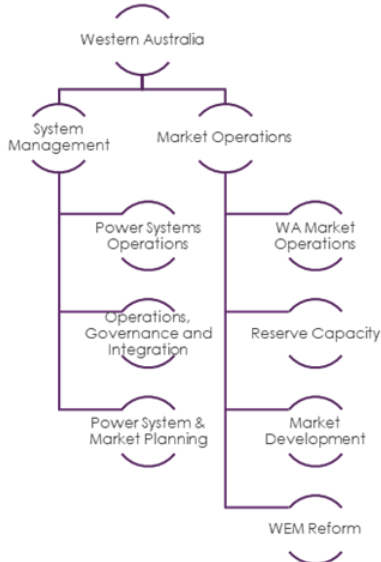
Opex adjustments

Labour accounts for the largest adjustment to opex. Since developing the original AR6 submission in 2021, we have gained a deeper understanding of the requirements of the reformed market and of planning and operating the changing power system. In July 2022, we revised our WA operating model to better support market participants, deliver future energy transition activities in a more timely and efficient manner, and to more effectively leverage the capability of the broader AEMO business. The revised operating model builds on the labour assumptions we developed in August-November 2021 to inform the AR6 proposal, overlaid with more recent information and practical experience. Figure 2 shows our revised operating model.

Figure 2 Operating model changes

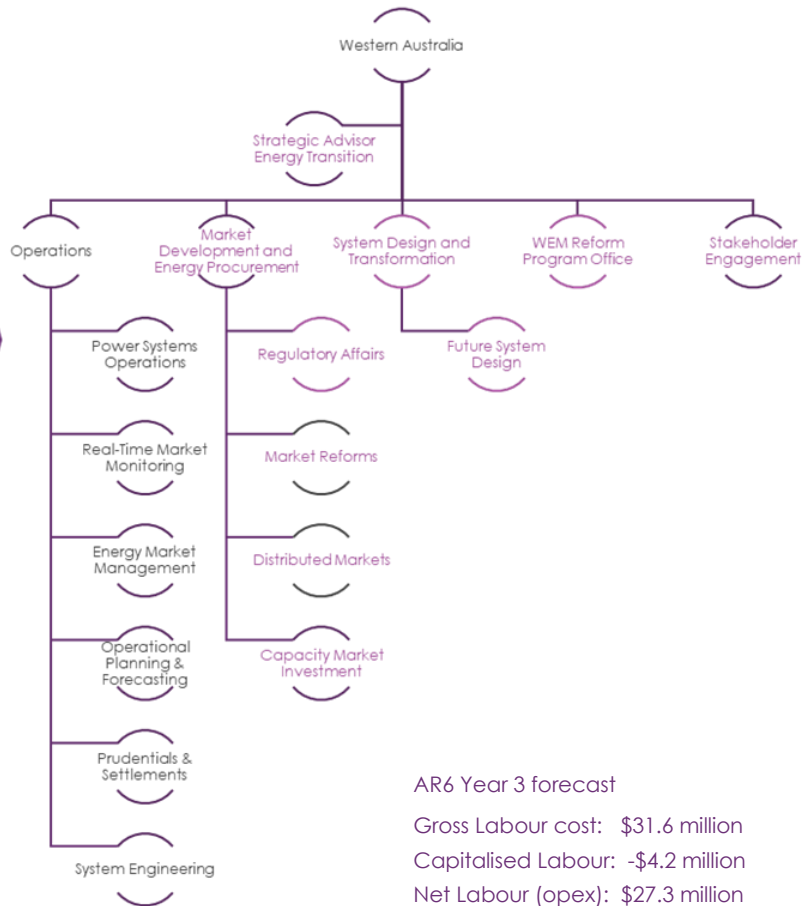
AEMO WA departments operating model

Operating model prior to AR6 period



ERA FD AR6 Year 1 (escl. to 2025\$)
 Gross Labour cost: \$31.4 million
 Capitalised Labour: -\$16.9 million
 Net Labour (opex): \$14.5 million
 AEMO WA department FTE 145.3

Current operating model (2024)



AR6 Year 3 forecast
 Gross Labour cost: \$31.6 million
 Capitalised Labour: -\$4.2 million
 Net Labour (opex): \$27.3 million
 AEMO WA department FTE 137.3

Notes:

1. Operating model changes were to the AEMO WA departments only. New departments created or materially changed are highlighted in purple. No material changes have been made to enterprise functions that support the WA business (e.g. Digital), whose costs are not shown here.
2. ERA final decision AR6 Year 1 using AR6 workforce plan confidential submission adjusted for ERA's final determination and escalated to 2025 dollars using 3.5% labour escalation compounded over three years.
3. AR6 Year 3 forecast is included as part of this in-period adjustment. Net labour is higher due to lower recovery of labour costs to capital projects.

As shown in Figure 2 above, gross labour costs for AR6 are comparable to the AR6 year 1 (2022-23) forecast, albeit with a different split of operational and capitalised labour. Revisions to accounting standards as well as the nature of the current reform program mean that a greater portion of labour resources are now forecast to be expensed in the year they are incurred, rather than capitalised as an asset is created. Additional labour to support new reform and energy transition activities, combined with labour cost escalation and a tightening of the labour market leads to a significant increase in labour opex (\$27 million).

The revised operating model was established to enable our business to meet new challenges and deliver a suite of new activities including:

- Government-led energy transition initiatives, many of which are operational activities or capital projects requiring significant input from AEMO operational staff and subject matter experts.

- The challenges of operating the SWIS with growing volumes of asynchronous generation increasing the scale of activities and tools required for real-time operations and planning.
- The deteriorating reliability and security outlook for the SWIS. This is requiring AEMO to conduct additional planning activities, which include procuring Supplementary Reserve Capacity (SRC) and Non-Co-optimised Essential System Services (NCESS) for the first time (and subsequently). We are also commencing development of an engineering-based 'Roadmap to Renewables' to identify and overcome the engineering barriers of operating the SWIS in an environment where the use of renewables and supporting technologies are rapidly expanding and at the same time constrained by the capacity of the network.
- A significant and sustained increase in communication requirements with external stakeholders, including media, associated with the acceleration of the energy transition, announced generation retirements, investment requirements and related matters.
- An expansion of general market management and support activities, including to enable participation in the RCM, SRC and NCESS, dispatch of new services and associated activities, including prudential supervision.
- The increase in the frequency of AEMO in-period funding proposals to support new and emerging energy reform projects with associated resourcing needs.

The new operating model is a step change for the organisation. It largely mirrors the structure of the AEMO business operating the NEM and east coast gas markets, facilitating simpler internal relationships to better access expertise across AEMO.

While there will almost certainly be further minor resourcing changes over the coming years, we consider the current structure and full time equivalent (FTE) count reasonably reflects a sustainable level necessary to deliver the activities associated with the energy transition. Our WA department headcount has remained relatively stable over the AR6 period so far and is expected to remain at around 137 FTE.

Table 4 summarises the proposed opex adjustments resulting from new reform and energy transition activities.

Table 4 Summary of adjustments driven by new reform and energy transition activities, opex \$ million nominal

Opex category	Expenditure
Labour	27.0
IT & telecommunications	0.2
Supplies and services (consulting costs)	6.3
Total	33.5

Capex adjustments

A capex adjustment of \$39 million is required to deliver new energy transition projects. Table 5 summarises the energy transition capital projects that have emerged or been confirmed for delivery (either in part or full) during 2024-25. Each of these capital projects are at a different stage of maturity. While the cost estimate has been developed on a reasonable basis, using the best information available at this time, it is likely that the actual cost will vary from the forecast. This is particularly the case where AEMO is awaiting, or has only recently received information on detailed design or clarity on WEM Rule requirements.

We appreciate uncertainty around costs makes it challenging for stakeholders and the ERA to assess this proposal. However, we have considered the trade-off between cost uncertainty and the value to market

participants of both fee certainty and timely delivery of reforms, and believe it is prudent for these costs to be included in this expenditure adjustment.

The regulatory framework has strict timing requirements, and its current application has limited flexibility to respond to the fast-paced energy transition that is happening in WA. Even with in-period adjustment processes, the pace of the energy transition in WA means it is difficult for AEMO to estimate the cost of all reform activities to the level of detail required by the ERA's *Guideline to inform the Australian Energy Market Operator's funding proposal* (ERA's Guideline)¹⁰. In preparing this submission, we have sought to comply with these guidelines as far as possible and have highlighted the reforms for which full details are not currently available due to the early stage of activities. These are signified by the 'low' confidence rating in Table 5.

Table 5 Summary of adjustments driven by new reform and energy transition activities, capex \$ million nominal

Project title	Project description	24-25 capex (\$ million)	Confidence in the forecast
DSR Review	Changes to AEMO processes and systems in response to Rule changes resulting from the DSR Review.	0.2	Low
WIC Review ¹¹	Changes to AEMO processes and systems in response to Rule changes resulting from the WIC Review.	0.4	Low
WEM DER Aggregator Participation	Changes to AEMO process and systems to enable DER orchestration and prepare for aggregators to participate in the WEM.	6.6	High
Metering System Upgrade and Cost Allocation Review ¹²	Upgrades to AEMO's metering systems to facilitate multiple reform projects including 5-minute settlement, Western Power's AMI rollout, and the flexible capacity product under RCM Reform. Implementation of outcomes of the Cost Allocation Review to occur in parallel to maximise AEMO resources.	15.0	Low
RCM Review	Extend the suite of product offerings under the RCM to provide incentive for flexible forms of generating capacity to connect.	16.8	Medium
Total		39.0	

We have considered whether there are other options to address the uncertainty in expenditure estimates prior to the ERA assessing a proposal. A further in-period submission is not considered practicable within the timeframes available. An alternative two-step approval process could be considered, seeking some funding initially and the remainder later in the year following more detailed planning. However, it is not clear how such an approach might be accommodated within the WEM Rules regulatory framework, or how practical a solution that would be. As AEMO only recovers its actual costs, the accuracy of the forecast has limited bearing on the final cost of a project, therefore delaying commencement of works to allow for a more accurate forecast would not necessarily result in a lower cost, a more prudent, or a more efficient outcome, and would most likely delay implementation.

Where there is the opportunity to deliver a program for a lower cost, implement a more efficient solution, or prudently defer expenditure, we will seek to do so. AEMO's program governance framework requires implementation options to be considered prior to the release of funding. Once underway, projects are overseen by a dedicated WA Reform Program Steering Committee, which manages the release of funds throughout the

¹⁰ ERA (2022), *Guideline to inform the Australian Energy Market Operator's funding proposal*, 28 October, located at <https://www.erawa.com.au/cproot/22925/2/-AR.6---Final-funding-proposal-guideline.PDF>

¹¹ Wholesale Electricity Market Investment Certainty Review, located at <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-investment-certainty-review>.

¹² Cost Allocation Review, located at <https://www.wa.gov.au/government/document-collections/cost-allocation-review>.



project. We also provide full transparency of actual expenditure via the annual regulatory expenditure reporting process with the ERA.

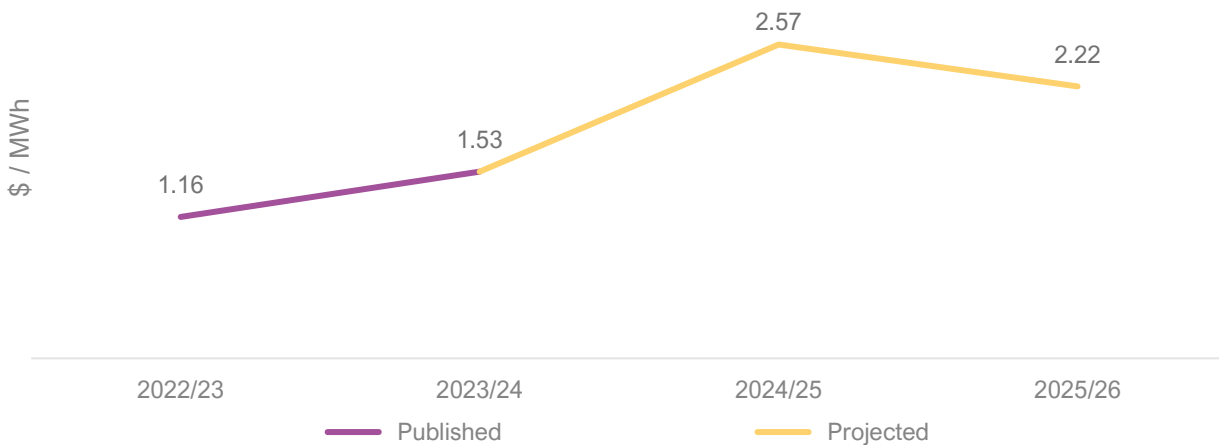
AEMO is committed to working with the ERA and market participants to navigate this inherent uncertainty as the regulator considers this proposal.

Projected impact on market fees

The impact of the revenue adjustment on market fees during the financial year 2024-25 is significant, at \$1.04 per megawatt-hour (MWh). Subject to the ERA's determination on this in-period submission, any revised market fees will take effect from 1 July 2024.

Figure 3 shows the projected effect of this in-period adjustment on market fees. The increase between the financial year 2023-24 and 2024-25 includes depreciation costs resulting from the WEM Reform Program (first in-period submission) with systems entering service on 1 October 2023 that could not be recovered under the WEM Rules until the financial year 2024-25. As such, this in-period submission includes an additional nine months of capex recovery in 2024-25 only, which explains the expected reduction in 2025-26¹³.

Figure 3 Projected effect on market fees



As there are no proposed adjustments to GSI allowable revenue or capex, there is no impact on GSI fees.

Limitations of the regulatory framework

We recognise that the proposed adjustments represent a significant increase in opex and capex compared to those identified in the initial AR6 submission, the costs of which are ultimately borne by market participants and consumers.

¹³ The values for 2024-25 and 2025-26 in Figure 3 reflect the projected impact of this submission. By including the value for 2025-26, AEMO seeks to illustrate the 'bubble' of additional capex from 2023-24 due to the new market going live part way through a financial year. However, 2025-26 will be the first year of the next regulatory cycle and the fees for that year will be subject to the ERA's determination under AEMO's 7th Allowable Revenue period – expected March 2025.



As outlined throughout this proposal, facilitating the energy transition represents the biggest driver of cost increases. This includes implementation of Government-led projects, as well as organisational changes to allow us to respond to reform (as well as general market evolution) in a timely and efficient manner.

AEMO understands that the pace of change in WA's energy sector will continue into the foreseeable future – a reality for most jurisdictions with economies that are rapidly decarbonising. We are working hard to respond at pace, while ensuring our funding proposal meets the ERA's expectations by demonstrating prudence and efficiency in accordance with the criteria outlined in the ERA's Guidelines. This has required us to develop two in-period adjustment proposals during the AR6 period.

In the absence of changes to the current regulatory framework or the ERA's Guidelines, we anticipate in-period adjustments will become a regular occurrence as the reform program, the market, and the power system evolves over the course of the coming allowable revenue periods.

While in-period processes can allow for a higher level of certainty on costs when compared to the standard three-yearly cycle, they come with drawbacks. In-period processes provide inadequate certainty over market fee increases, which impacts pricing and costs for both market participants and customers. Furthermore, managing uncertainty cannot be fully mitigated with in-period submissions, noting that design certainty and implementation timing are often externally driven inputs.

The current application of the regulatory framework is incompatible with the pace of change. Under its current application of the WEM Rules, the ERA is not able to approve a revenue amount or capex forecast with sufficient flexibility to accommodate significant changes in costs, specifications and project timings. Unfortunately, these types of changes are commonplace during periods of rapid industry transformation and associated fast-paced policy development such as we have experienced over recent years and expect into the future.

We are keen to collaborate with the ERA and Energy Policy WA on how best to manage periods of fast-paced reform while demonstrating value for market participants and consumers. This collaboration may involve consideration of amendments to the WEM and GSI Rules and the ERA's Guidelines, coupled with enhanced transparency with respect to the costs of delivering key projects within AEMO's Regulatory Reporting Guideline¹⁴.

In the interim, AEMO looks forward to working with the ERA, Energy Policy WA, industry, and consumers on the funding requests presented in this in-period submission. We welcome all feedback and enquiries.

¹⁴ AEMO Regulatory Reporting Guideline, ERA 2022, located at: <https://www.erawa.com.au/cproot/22887/2/D251941-AR.6---Final-regulatory-reporting-guideline.pdf>



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1 Introduction

Every three years, AEMO must submit its allowable revenue and forecast expenditure proposal to the ERA for review and approval¹⁵. We are currently in our sixth allowable revenue period, known as AR6. The ERA published its AR6 final determination on 31 May 2022¹⁶, providing for AEMO to recover \$142.3 million in opex across the three years of the AR6 period. The ERA’s determination also included \$61.5 million in capex, which is recovered as depreciation over the useful life of the underlying assets.




The environment in which AEMO is operating has changed significantly since we prepared our AR6 proposal in December 2021. WA’s energy transition has also progressed substantially in this period. Figure 4 outlines some of the key external changes and their implications on our business, and links them to the cost driver categories used throughout this submission.

Figure 4 Changing external and energy transition environment in the SWIS, 2021 to today

Context	Detail	Implications for AEMO
<p>Social and macroeconomic</p>  <ul style="list-style-type: none"> Stronger economic and population growth following relaxation of COVID restrictions. Commitments to net zero by the Western Australian and Australian Governments Heightened media and public interest in energy and decarbonisation. Higher cost environment. <p>Submission cost driver: External cost pressures</p>	<p>Electricity demand has grown more rapidly than previously forecast, driven by electrification, economic and population growth, as well as growth in cooling load.</p> <ul style="list-style-type: none"> In 2021, AEMO forecast peak demand of 3,953 MW for 2023-24. In 2023, AEMO updated its peak demand forecast for 2023-24 to 4,253 MW and demand of this level has been realised. <p>New facilities and participants have entered the WEM to help meet growing demand.</p> <ul style="list-style-type: none"> Since 2021, the WEM has seen an 18% increase in participants and a 14% increase in facilities (including NCESS and SRC procurements). <p>Growing interest in and media reporting on AEMO information and publications.</p> <p>Inflation, wage growth and interest rates have all risen well above recent historical averages over 2023.</p>	<p>Additional planning and operational effort and complexity over both operational and longer-term horizons. Higher risk operating environment during high demand periods.</p> <p>Interventions increasing to maintain reliability in operational timeframes and into medium term.</p> <ul style="list-style-type: none"> No periods of Low Reserve Conditions (LRC) in 2021, compared to 21 days of forecast LRC during summer 2023-24 (to date), of which 12 resulted in actual LRC. Two SRC and two peak demand NCESS procurements over 2022 and 2024, compared to none between 2008 and 2021. No SRC procurement or activation events in 2021, compared with 14 activation events in 2023-24 so far. The top eight record demand events occurred over of 2023-24, almost eight years after the last peak in 2016. <p>Uplift in stakeholder engagement activities, with participants and other stakeholders.</p> <p>AEMO, like all businesses, faces higher costs.</p>
<p>Environment and climate</p>  <ul style="list-style-type: none"> Continued strong uptake of distributed rooftop solar. 	<p>Rooftop PV installations in the SWIS have grown by around 63% over the last three years, to an estimated 2,600 MW today.</p> <p>The first large scale battery storage system was commissioned in the WEM during 2023.</p> <p>AEMO’s current tools and knowledge were developed for a power system operating with predominantly synchronous machines. With the uptake of variable renewable energy and supporting inverter-based technology, along</p>	<p>Additional planning and operational effort and complexity. Higher risk operating environment during both high and low renewables periods.</p> <p>For example, in June 2023, LRC conditions were experienced during periods of high demand and low renewables output.</p> <p>AEMO interventions are increasing to manage period of low operational demand on the SWIS:</p>

¹⁵ Clause 2.22A.2 of the WEM Rules and clause 107 of the GSI Rules.

¹⁶ ERA (2022), 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, p. vii. See <https://www.erawa.com.au/electricity/wholesale-electricity-market/price-setting/allowable-revenue-and-forecast-capital-expenditure-determinations>.

Context	Detail	Implications for AEMO
<ul style="list-style-type: none"> Growing contribution to supply from variable renewable sources and storage. <p>Submission cost driver: New reform and energy transition activities</p>	<p>with the retirement of coal-fired generation, the power system is undergoing substantial physical change.</p>	<ul style="list-style-type: none"> AEMO procured NCESS for minimum demand for 2023-24. On very low demand days in spring in 2022 and 2023, AEMO needed to displace small amounts of renewable generation with synchronous generation to maintain system security. The prevalence of this is expected to grow over time. <p>AEMO is building on its NEM Engineering Roadmap to develop a SWIS Roadmap to Renewables to systematically identify and solve the engineering barriers to operating the SWIS at very high levels of renewables, and to deliver the full benefits of low-cost low-emissions energy to consumers.</p> <p>AEMO is also uplifting its planning capabilities for system reliability and security.</p>
<p>Cyber security</p>  <ul style="list-style-type: none"> The cyber threat landscape has escalated. <p>Submission cost driver: AEMO capability uplifts</p>	<p>Cyber risks for critical infrastructure are growing¹. Additional requirements on critical infrastructure operators.</p> <p>In 2022, Security of Critical Infrastructure legislation was enacted.</p>	<p>Increasing cyber risks, resulting in increased cost and complexity of AEMO's cyber security preparations and response across operational and supporting business processes.</p> <p>Due to its role as the system and market operator, AEMO is increasingly playing a central role in cyber security across the energy sector, increasing stakeholder engagement requirements.</p>
<p>Sector reform</p>  <ul style="list-style-type: none"> Reforms to the WEM are progressing rapidly. <p>Submission cost drivers: Recovery of WEM Reform Program costs + New reform and energy transition activities</p>	<p>In 2021, the WA Government outlined stage two of its Energy Transformation Strategy. Since then, substantial work has progressed on:</p> <ul style="list-style-type: none"> Existing initiatives including the DER Roadmap and Foundation Regulatory Frameworks in the WEM. New initiatives, including the RCM Review, the Energy and Governance Legislation project (Project Eagle), the Cost Allocation Review and the WIC Review. 	<p>These reforms include changes to the WEM which AEMO considers are high priority to ensure the market sends appropriate signals for the investment required for a secure, reliable, low cost and low-emissions electricity supply in the SWIS, which should over time reduce the interventions AEMO has been required to use in recent years and deliver benefits to energy consumers.</p> <p>Sustained activity for AEMO to support Energy Policy WA in both the development and implementation of WEM reforms, and incremental uplifts of activities to meet new requirements (e.g., long-term modelling).</p>
<p>Other factors</p>  <p>Submission cost drivers: AEMO capability uplifts</p>	<p>Changes to AEMO's external environment and internal operating environment</p> <ul style="list-style-type: none"> External changes include updates to accounting policies have affected the classification of certain costs incurred by AEMO as opex rather than capex. AEMO's internal operating environment has increased in scale and complexity in recent years necessitating upgrades to some of AEMO's internal corporate systems. 	<p>The updates to accounting policies have required AEMO to reclassify the costs of some projects that have already been subject to the ERA's determination in the AR6 period.</p> <p>A number of AEMO's corporate systems have been in place for over 15 years in some cases, and are no longer fit for purpose.</p>

Note: (1) International Energy Agency, *Electricity Grids and Secure Energy Transitions*, 2023.

1.1 Managing uncertainty during the AR6 period

The allowable revenue framework is intended to promote prudent and efficient investment in the WEM and SWIS. It is designed to provide transparency of AEMO's forecast and actual expenditure, and allow the ERA, market participants and stakeholders to review and challenge AEMO's activities.

Where AEMO's allowable revenue (opex) or capex is forecast to exceed that determined by the ERA for the relevant period by the lower of 10% of the allowable revenue or \$10 million, AEMO is required under clause 2.22A.12 and 2.22A.13 of the WEM Rules to apply to the ERA for an in-period adjustment.

In April 2023, AEMO submitted an in-period capex adjustment under clause 2.22A.13 of the WEM Rules. We proposed this adjustment predominately to account for an expected increase in the costs of implementing the WEM Reform Program. Subsequently, the ERA approved a \$46.8 million increase in the capex forecast, taking our total approved forecast capex for AR6 to \$108.3 million.

As part of our first in-period adjustment, we noted that a second in-period submission would be needed for both capex and opex. This second adjustment would be required to allow AEMO to deliver a range of new Government-driven projects, which we could not include in our original AR6 forecast or the first in-period adjustment due to insufficient information being available to adhere to the ERA's Guideline¹⁷. These projects included the Metering System Upgrade project¹⁸, DER Aggregator Participation, Cost Allocation Review, WIC Review, DSR Review¹⁹, and major amendments to energy sector legislation under Project Eagle²⁰. Additionally, we have been continuing to deliver on several other significant reforms, including the implementation of aspects of the WA Government's DER Roadmap and fundamental changes to the RCM. These work programs are central to facilitating the energy transition in Western Australia²¹.

While the new market arrangements went live on 1 October 2023, it has become apparent to AEMO and the broader energy industry that energy sector reform is set to continue as Western Australia decarbonises its energy supplies and economy. The power system also continues to evolve and increase in complexity as asynchronous generation capacity increases and demand patterns shift. The environment in which we operate the power system is changing rapidly.

Energy sector reform is being undertaken at a pace not traditionally contemplated by the three-year allowable revenue process. This has led us to make this (and a prior) in-period adjustment proposal. Even with in-period adjustment processes, the pace of the energy transition in WA means it is difficult to estimate the cost of all reform activities to the level of detail required by the ERA's Guideline. In some cases, design of new market arrangements has not yet concluded, in other cases the design has recently concluded and we are undertaking planning to inform cost estimates. In preparing this submission, we have sought to comply with these guidelines as far as

¹⁷ ERA (2022), *Guideline to inform the Australian Energy Market Operator's funding proposal*, 28 October, located at <https://www.erawa.com.au/cproot/22925/2/-AR.6---Final-funding-proposal-guideline.PDF>

¹⁸ Metering system upgrades are required to support multiple other reform initiatives, including five-minute settlement; Western Power's AMI rollout; and the new flexible capacity product under the RCM Review.

¹⁹ Demand Side Response Review, located at <https://www.wa.gov.au/government/document-collections/demand-side-response-review>.

²⁰ Energy Policy WA (2022), *Energy and Governance Legislation Reforms, Project Eagle, Information Paper*, December, located at <https://www.wa.gov.au/system/files/2023-01/Project%20Eagle%20Information%20Paper.pdf>.

²¹ Energy Transformation Strategy, located at <https://www.wa.gov.au/organisation/energy-policy-wa/energy-transformation-strategy>.

possible and have highlighted the reforms for which full details are not currently available due to the early stage of the activities.

We have considered whether there are other options to address forecasting uncertainty prior to the ERA assessing a proposal. A further in-period submission is not considered practical for the reasons discussed in section 4. An alternative two-step process could be considered, seeking initial funding with the remaining funding provided following more detailed planning. However, it is not clear how such an approach might be accommodated within the WEM Rules framework as it is unlikely to offer much practical benefit over a further in-period submission, and the time to prepare and consider a further expenditure adjustment proposal would likely delay implementation of important reforms. The two-step process is also unlikely to reduce the costs of the reform which AEMO recovers, noting that AEMO can only recover its actual costs, even if these are lower than the approved costs of an activity.

We are committed to working alongside the ERA to navigate this inherent uncertainty as the ERA considers this proposal.

2 WEM allowable revenue

This section presents the proposed adjustment to forecast allowable revenue for the financial year 2024-25 under clause 2.22A.14(a) of the WEM Rules. Allowable revenue is essentially the opex component of AEMO's forecast, with minor adjustments to account for historical under/over recovery of revenue from the previous period.

Opex is separated into the following cost categories²²:

- **Labour** – salaries, superannuation, leave provisions, payroll tax and work cover.
- **Accommodation** – rent/lease, utilities and associated facilities management costs.
- **Information technology (IT) and telecommunications** – IT service support, software support contracts, telecommunications, IT leased assets and cloud costs.
- **Supplies and services** – consulting/contracting costs, audit costs, training and conferences, travel, general office costs, memberships, bank fees, tax and statutory charges, corporate services, insurance, licences and system security charges.
- **Borrowing costs** – borrowing expenses, foreign exchange gains/losses and bank interest.
- **Depreciation and amortisation (D&A)** – D&A of assets used to provide WEM services, including software and licences, hardware, furniture and fittings.

AEMO seeks an upwards adjustment to WEM allowable revenue for the final year of the AR6 period, as summarised in Table 6 by cost category. These adjustments are required to commence recovery of WEM Reform capital costs via D&A, and for operating costs for the financial year 2024-25, which are higher than forecast, including opex to commence delivery of a suite of Government-driven energy transition projects.

Table 6 Proposed adjustment to 2023-25 WEM opex by cost category, \$ million nominal

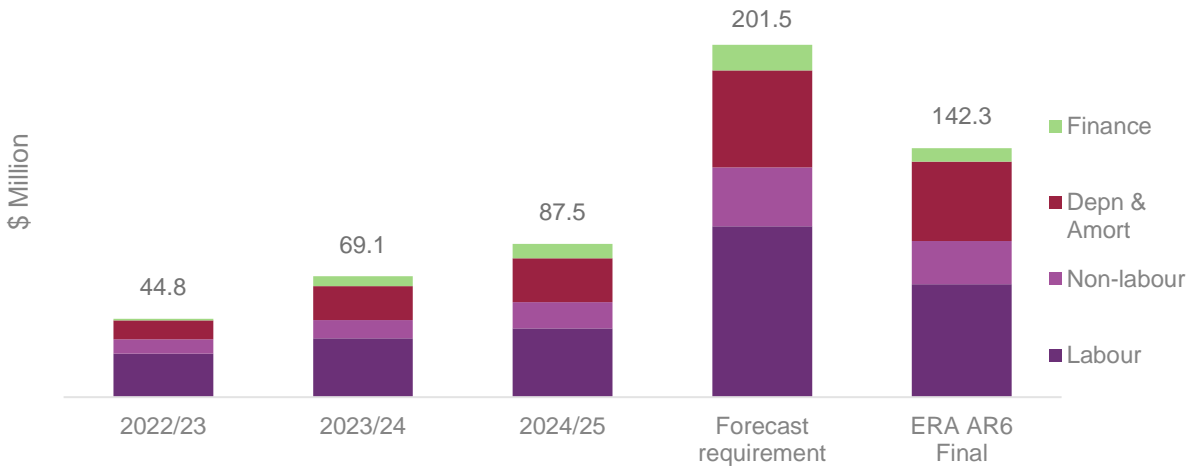
Cost category	Approved 2024-25 allowable revenue	Proposed adjustment	Revised 2024-25 allowable revenue
Labour	64.6	33.2	97.8
Accommodation	5.2	1.2	6.4
IT and telecommunications	9.0	1.0	10.0
Supplies and services	10.7	6.5	17.2
Borrowing costs	7.6	7.2	14.8
D&A	45.5	9.8	55.3
Adjustment for over/under recovery	-0.3	0.3	0.0
Total operating costs*	142.3	59.2	201.5

*Includes non-capitalised project costs, which are a subset of overall opex, and discussed in Appendix 1.

²² The cost categories listed here are as per Table 7 of the ERA (2022), *Australian Energy Market Operator's allowable revenue and forecast capital expenditure proposal for the period 1 July 2022 to 30 June 2025, Final Determination*, and are consistent with historical opex categories. AEMO has retained these categories in this submission to enable a comparison with the AR6 determination. The more granular operating cost categorisation contemplated in Table PG.6 of the ERA (2022), *Guideline to inform the Australian Energy Market Operator's funding proposal*, 28 October, is included in the confidential financial models provided to the ERA as part of this in-period adjustment.

The proposed allowable revenue adjustment for financial year 2024-25 is greater than \$10 million and therefore cannot be accommodated within the overrun provisions in the WEM Rules²³. As shown in Figure 5, AEMO’s operational costs will exceed the approved forecasts in the ERA’s AR6 determination.

Figure 5 Comparison of actual/forecast AR6 revenue with AEMO’s forecast and the ERA’s determination



To date, we have operated within the overall AR6 allowable revenue envelope. However, given the higher than anticipated operating costs and the pipeline of energy transition work over the remainder of the AR6 period, we estimate costs will exceed recoverable revenue (including overrun allowances) by around January 2025.

A significant portion of the operating cost increase is in D&A and borrowing (\$17.0 million), with the primary contributor being higher capital spend on WEM Reform consistent with the revised capex approved by the ERA in 2023. Labour costs are also significantly higher than anticipated (\$33.2 million). This is largely due to new reform and associated energy transition activities. It is also due in part to accounting for the WEM Reform program costs, as some project management costs we originally assumed to be capitalised as part of WEM Reform have instead been expensed as they were not directly associated with asset creation²⁴. The labour cost increase has also been impacted by external economic factors driving higher than forecast wage growth. Energy transition projects also drive an increase in supplies and services costs (\$6.5 million), which includes consultancy fees and external labour requirements.

The drivers of the higher allowable revenue requirement are discussed in the following sections.

2.1 Opex drivers

The proposed allowable revenue adjustments are driven by a combination of external and internal factors, which impact several operating cost categories. For example, the need to facilitate WA’s energy transition requires adjustments to internal labour assumptions, supplies and services (including contractors and consultancy fees),





²³ Clauses 2.22A.12 and 2.22A.13 of the WEM Rules, located at <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-rules>.

²⁴ For example, feasibility studies, early stages of planning, and project management activities.

and IT licences. This is in addition to the consequential adjustments to depreciation and borrowing costs as reform projects are delivered.

The following sections therefore discuss the proposed revenue adjustment for financial year 2024-25 by cost driver rather than by operating cost category. The revised cost build-up by cost category is provided in the financial models issued to the ERA with this submission. Table 7 summarises the revenue adjustment drivers and operating cost categories being adjusted.

Table 7 Revenue adjustment drivers and opex category adjustments

Driver	Description	Impacted cost category during the AR6 period	Adjustment (\$m)
Recovery of WEM Reform Program costs 	Changes in depreciation and borrowing opex allowance resulting from the September 2023 in-period adjustment, the conclusion of WEM Reform projects, and minor adjustments to the accounting treatment of some project-related capex.	Borrowing costs Depreciation and amortisation	13.2
External cost pressures 	External factors that have varied from the original AR6 forecast, such as inflation, wage price index changes, and interest rates.	Labour IT & telecommunications Supplies and services Borrowing costs	7.6
AEMO capability uplifts 	Changes to support ongoing operational needs including upgrades to critical cyber security and enterprise systems.	Labour IT & telecommunications Accommodation Supplies and services Borrowing costs Depreciation and amortisation	4.9
New reform and energy transition activities 	The continuing need to resource and facilitate WA's energy transition and the associated Government-driven energy sector reform agenda. This includes project-related opex from capital programs such as metering system upgrades and wholly opex projects such as Project Eagle. It also includes related activities undertaken by AEMO to facilitate the energy transition such as the WEM and SWIS Power System Modelling project.	Labour IT & telecommunications Supplies and services	33.5
Total			59.2

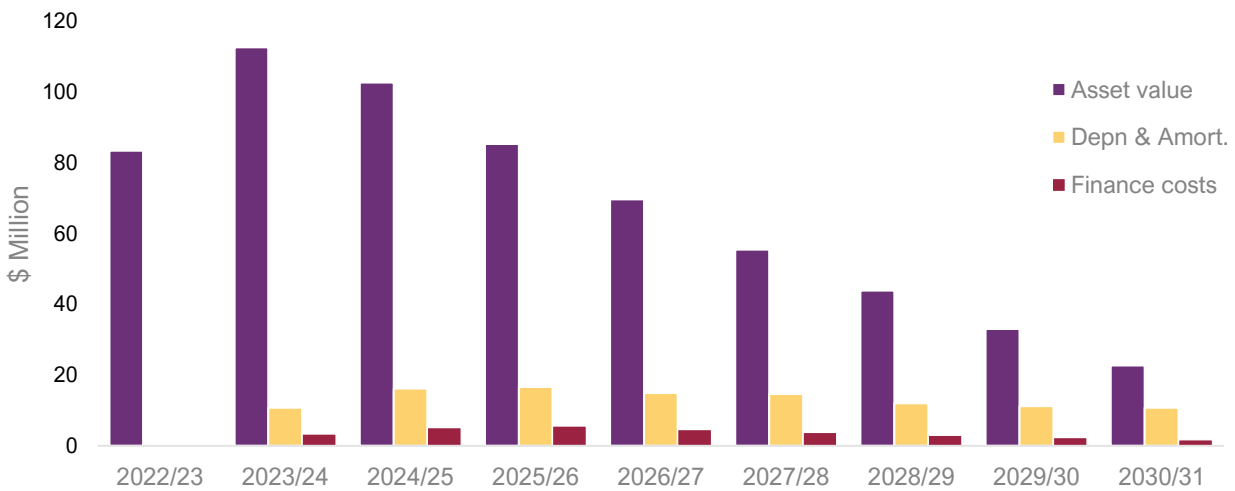
2.1.1 Opex driver: Recovery of WEM Reform Program costs

A major driver of the allowable revenue adjustment is the recovery of WEM Reform project capex and associated borrowing costs. Capitalising projects defers the recovery of expenditure until the assets enter service and spreads recovery over their economic lifespan. Many of the WEM Reform assets were not placed in service until financial years 2022-23 and 2023-24. This means that as of 30 June 2024, despite forecasting expenditure of \$128.6 million, only \$7.1 million of WEM Reform capital costs will have been reflected in market fees.

The final year of the AR6 period will be the first full financial year after all the reformed market assets went live, signifying the first year the full WEM Reform costs start to be reflected in market fees. The current revenue allowance for the financial year 2024-25 reflects the May 2022 AR6 final determination, which was based on the original \$91.2 million capex forecast for WEM Reform. The ERA’s September 2023 in-period determination adjusted the WEM Reform capex forecast upwards to \$128.6 million. This second in-period submission is required to make the consequential revenue and fee adjustments to reflect actual capex.

Figure 6 shows the recovery profile of WEM Reform costs via D&A and borrowing costs over the life of assets capitalised in financial year 2023-24.

Figure 6 Recovery of capex approved as part of the first in-period submission via allowable revenue



Note: The economic life of WEM Reform assets varies, ranging from five years to 10 years depending on the system. Figure 6 assumes a blended average asset life of seven years.

The adjustments to depreciation and borrowing costs over AR6 are \$9.7 million and \$3.5 million, respectively.

2.1.2 Opex driver: External cost pressures

Approximately \$7.6 million of the revenue adjustment is driven by external economic factors that impact AEMO’s costs. For example, inflation estimates built into the AR6 forecast assumed the Consumer Price Index (CPI) to be 2.5%. In practice CPI has been tracking at around 6.2%²⁵, impacting costs by around \$1.6 million. Interest rates and wage growth have also exceeded AEMO’s forecasts in the original AR6 submission.

AEMO seeks to minimise the impact of external cost drivers on its costs. For example, as a not-for-profit AEMO relies on debt funding to finance investment in non-current assets. In 2023, AEMO undertook its first corporate bond issuance, leveraging its credit rating to access debt funding at lower cost than bank commercial lending rates.

Table 8 summarises the external factors affecting AEMO’s revenue requirement and its impact on market fees in 2024-25.

²⁵ Australian Bureau of Statistics, Series 6401.0 Consumer Price Index, Australia, TABLE 8. CPI: Analytical Series, Weighted Average of Eight Capital Cities, June Quarter.

Table 8 Summary of external cost pressures, \$ million nominal

Factor	Description	Impact
CPI	AR6 assumption 2.0%, actual 6.2% and financial year 2024-25 forecast of 3.5% p.a. CPI is applied to non-labour costs excluding IT & telecommunications.	1.6
Labour cost escalation	AR6 assumption 2.0% p.a., actual and forecast 3.5% p.a. Market driven escalation has resulted in a higher total employment cost for new starters than assumed in the AR6 forecast. Employees under the AEMO enterprise agreement also receive fixed increases for the next three years from Quarter 1, 2024 ²⁶ .	2.7
Interest rates	AR6 assumption of 3.5%, forecast 6.1% ²⁷ . A significant increase in financing costs, coupled with higher debt load from the WEM Reform program results in a higher interest expense over the AR6 period.	3.3
Total		7.6

2.1.3 Opex driver: AEMO capability uplifts

The need to uplift the capability of some of AEMO's key systems and processes over the AR6 period accounts for around \$4.9 million of the revenue adjustment for financial year 2024-25. This driver covers costs related to the ongoing operation of the business, such as upgrades to critical systems and accounting adjustments for items such as cloud services and software licences.

Cyber security remains a primary focus for AEMO, as it does for all other Australian critical infrastructure owners. A secure cyber environment is essential for the secure operation of the power system and the protection of customer data. As a national organisation, AEMO is able to leverage the capability of its enterprise systems to deliver a robust cyber security environment, and provide other corporate systems, for our WA operations at a lower cost than if AEMO WA was a standalone business.

Clause 2.22A.14(a) of the WEM Rules outlines three criteria, (a) to (c) below, for the types of revenue adjustments that can be considered by the ERA in-period. These three criteria, plus an additional fourth item (d) are outlined in Table PG.2 of the ERA's Guideline:

- a) Costs previously rejected by the ERA.
- b) New costs for new project/function.
- c) Costs that could not be estimated with reasonable confidence during the funding proposal for the current review period.
- d) Other (please specify).

Table 9 summarises the proposed revenue adjustments to accommodate AEMO capability uplifts.

Table 9 Summary of AEMO's capability uplift adjustments, opex \$ million nominal

Item	Description	Impact
Salary overtime costs	The ERA had excluded overtime costs from AEMO's allowable revenue as part of its AR6 determination. However, AEMO continues to incur overtime costs due to the nature of the work carried out by operational staff, primarily power system controllers.	1.0
ServiceNow revolution	An upgrade to the enterprise-wide IT system ServiceNow. This was an enterprise project implemented and delivered by AEMO's corporate digital team in March 2024, harnessing an existing corporate system to deliver increased value within the AEMO business.	0.3
Uplift finance systems	Implementation of a new enterprise-wide finance system. This project is being delivered by AEMO's corporate digital team, with the new system expected to be in place by	1.9

²⁶ Labour costs are benchmarked periodically where possible to test that rates are reasonable and consistent with current market conditions.

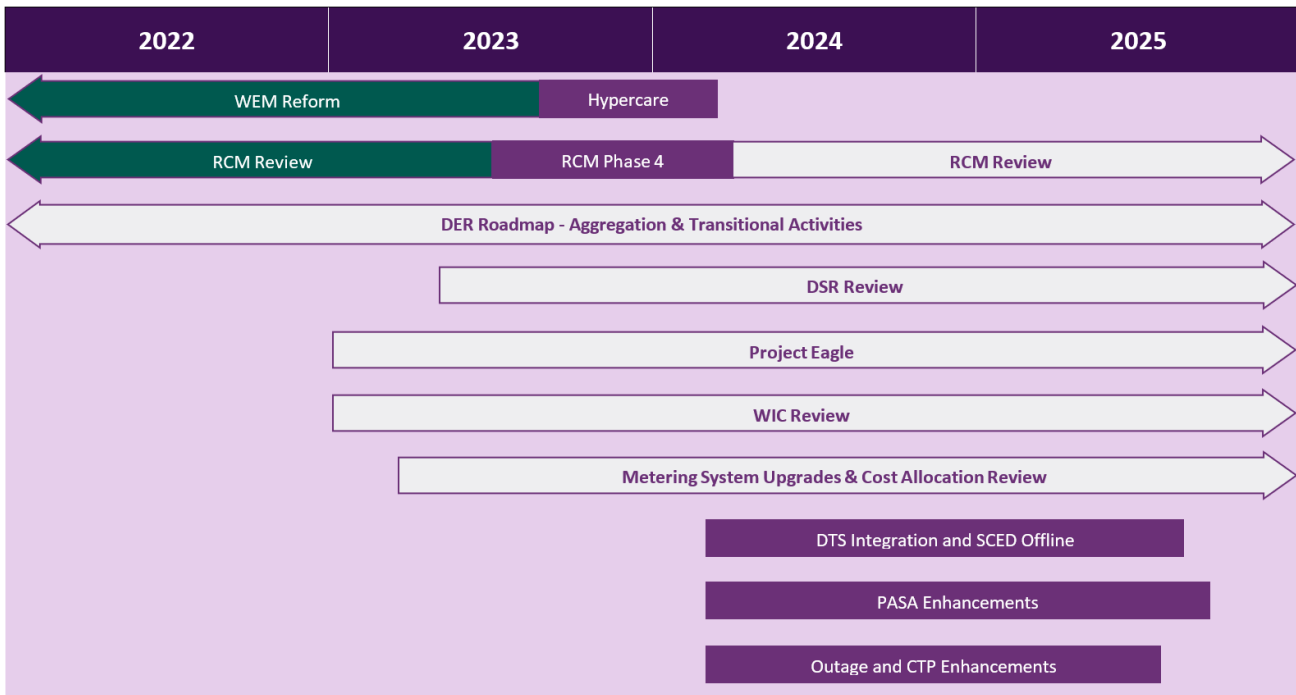
²⁷ AEMO's average cost of debt including fees and margins.

Item	Description	Impact
	financial year 2025-26. This investment is essential to ensure AEMO's corporate systems are fit for purpose, and will support more efficient and effective provision of corporate services within AEMO in the future.	
Cyber security	AEMO has a central cyber security program that covers all aspects of cyber security AEMO-wide. The cyber security program is being delivered as planned, however a review of the treatment of this program's costs in accordance with the Australian Accounting Standards has identified that the vast majority of the cyber security program should be expensed rather than capitalised. This means cyber security expenditure impacts allowable revenue rather than forecast capex.	1.4
Revenue under recovery	The approved AR6 forecast included a 'revenue adjustment for over/under recovery' line item, which estimated over-recovery of \$0.3 million in 2022-23. This did not eventuate. The AEMO 2023 WA Financial Report (published 31 October 2023) shows an actual operating deficit for the WEM of (\$3.0 million) in 2022-23.	0.3
Total		4.9

2.1.4 Opex driver: New reform and energy transition activities

WA's transition towards a net-zero economy is one of the biggest drivers of AEMO's operating costs. The WA Government's Energy Transformation Strategy, which is the policy driving the energy transition, includes a series of wide-ranging energy reforms that require substantial investment in AEMO's and market participants' systems and processes, as well as the rules and regulations that govern the WEM. Many of these reforms are administrative; others require assets to be created or modified. Almost all require input from AEMO's subject matter experts. Figure 7 summarises the ongoing program of Government-driven energy transition activities.

Figure 7 Overview of Government-driven energy transition activities



Legend:

- █ Complete
- █ Ongoing
- █ Ongoing WEM Reform / Foundation Regulatory Frameworks

The WEM Reform projects highlighted in purple in Figure 7 are being delivered under previously approved funding, while the projects shaded in white are either new or have moved into a new phase and are not fully funded. Some of the Government-driven projects in Figure 7 result in asset creation and are therefore capital projects. However, all these capital projects have an opex component for regulatory development, feasibility studies and early planning activities, which cannot be capitalised under the Australian Accounting Standards (AAS). These early project activities are typically delivered by internal labour resources.

Other initiatives, such as AEMO's WEM and SWIS Power System Modelling project (Appendix 4), and Project Eagle (Appendix 5) are entirely opex and require input and coordination from subject matter experts across the business, as well as project management within AEMO and coordination with other market development activities.

In light of the new and ongoing energy transition work, we commenced a detailed review of our WA department operating model. The aim of the April 2022 review was to set the business up to deliver the WEM Reform program, operate the market and power system under the new WEM arrangements, and support reform and new energy transition activities into the future in a sustainable way.

The operating model review built on the labour assumptions we developed during August-November 2021 to inform the AR6 proposal, and overlaid them with new information on the emerging operational requirements of the new market and the pipeline of energy transition activities. We identified a number of factors that necessitated an uplift in internal resources:

- Government-driven energy transition work.
- The challenges of operating the SWIS with growing volumes of asynchronous generation increasing the scale of activities and tools required for real-time operations and planning.
- The deteriorating reliability and security outlook for the SWIS, necessitating additional planning activities and the use of SRC and NCESS procurements for the first time (and subsequently).
- Commencing development of a SWIS Engineering Roadmap to identify and overcome the engineering barriers of operating the SWIS in an environment where the use of renewables and supporting technologies are rapidly expanding.
- A significant and sustained increase in communication requirements with external stakeholders, including media, associated with the acceleration of the energy transition, announced generation retirements, investment requirements and related matters.
- An expansion of general market management and support activities, including to enable participation in the RCM, SRC and NCESS, dispatch of new services, and associated activities, including prudential supervision.
- An increase in the frequency of AEMO in-period funding proposals to support new and emerging energy reform projects with associated resourcing needs.

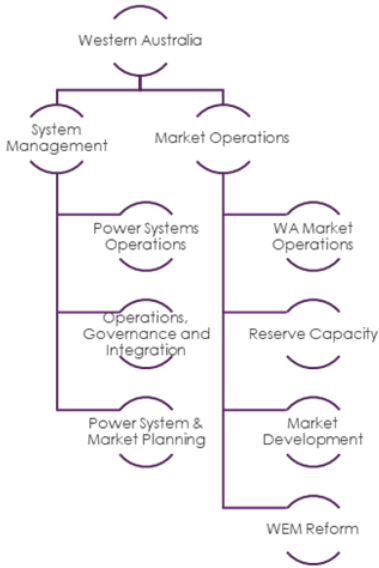
Following the commencement of the new operating model in July 2022, further smaller changes were made over 2022 and 2023 to improve the alignment of AEMO resources with emerging needs. The revised operating model reflects modern organisational design principles developed to improve role clarity and accountability across all areas of the organisation, reduce complexity of work, simplify and improve communications both within the WA functions and the broader AEMO business, and improve leadership capability and growth without losing technical competencies and skills.

Figure 8 summarises the changes to the AEMO WA department’s operating model since it submitted its AR6 proposal in December 2021.

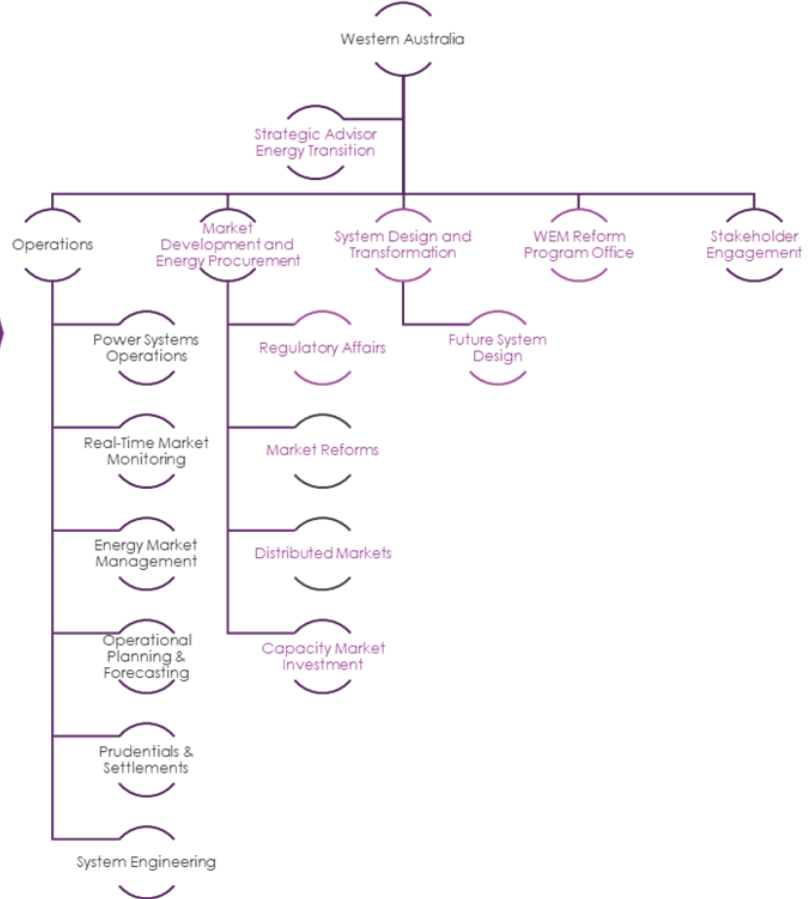
Figure 8 AEMO WA department operating model changes

AEMO WA departments operating model

Operating model prior to AR6 period



Current operating model (2024)



ERA FD AR6 Year 1 (escl. to 2025\$)

Gross Labour cost: \$31.4 million

Capitalised Labour: -\$16.9 million

Net Labour (opex): \$14.5 million

AEMO WA department FTE 145.3

AR6 Year 3 forecast

Gross Labour cost: \$31.6 million

Capitalised Labour: -\$4.2 million

Net Labour (opex): \$27.3 million

AEMO WA department FTE 137.3

Notes:

1. Operating model changes in June/July 2022 were to the AEMO WA departments only. New departments created or materially changed are highlighted in purple. No material changes have been made to enterprise functions that support the WA business (e.g. Digital), whose costs are not shown here.
2. ERA FD AR6 Year 1 using AR6 Workforce plan confidential submission adjusted for ERA’s final determination and escalated to 2025 dollars using 3.5% labour escalation compounded over three years.
3. AR6 Year 3 forecast is included as part of this in-period adjustment. Net Labour higher due to lower recovery of labour costs to capital projects.

A move away from the traditional split of System Management and Market Operations was key to the structural changes, creating instead an end-to-end Operations function. This new function reflected the more tightly

integrated market and system operations systems implemented in WEM Reform and the opportunity to better staff shift-based operations across the broader team.

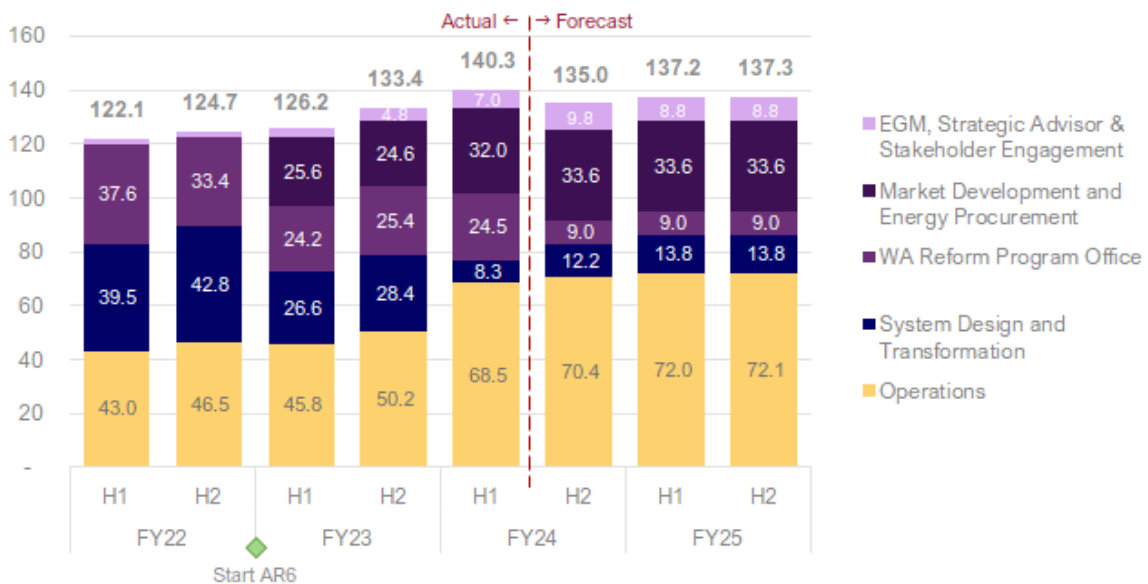
AEMO recognised a need to support ongoing changes to the market and the power system through both development and delivery. As well as the growing importance of longer-term planning and stakeholder engagement, non-operational functions were then segregated into the areas listed below, working alongside the Operations team outlined above:

- System Design and Transformation.
- Market Development and Energy Procurement.
- WA Reform Program Office.
- Stakeholder Engagement.

A Strategic Advisor Energy Transition role has also been established to provide technical leadership across the AEMO WA department. The current functions and the Strategic Advisor role are discussed in further detail below.

The improved structure aims to better meet AEMO’s core obligations and continue to support the delivery of WA’s energy transition – minimising the need for new resources by reconfiguring and optimising the use of existing capabilities. Importantly, during these structural changes, AEMO’s WA department headcount has remained relatively stable and is expected to average ~137 FTE over the AR6 period. Figure 9 shows the FTE by function over time using the structure introduced in Figure 8.

Figure 9 AEMO WA department FTE by function FY22 to FY25



The improved structure aims to better meet AEMO’s core obligations and continued support and delivery of WA’s energy transition by reconfiguring and optimising the use of existing capabilities and minimising new resources.

Operations

The Operations team manages all aspects of real-time operation of both the SWIS power system and energy market. In addition, the Operations team:

- Operates the Short-Term Energy Market and the Gas Bulletin Board.
- Undertakes short- and medium-term operational planning and forecasting and expertise to support longer-term planning for system security and reliability.
- Performs registration, market settlement and prudential supervision activities.
- Supports system operations undertaking activities including generator performance standards and constraint management, as well as supporting effective monitoring and decision-making in real-time operations.
- Supports market participants in their interaction with the WEM and AEMO's systems.
- Reviews and reports both internally and externally on market and system outcomes.
- Reviews operational incidents, reporting and tracking actions as applicable.

System Design and Transformation

The System Design and Transformation function focuses on the future of the SWIS. The team is responsible for the delivery of the WEM Electricity Statement of Opportunities (ESOO) and WA Gas Statement of Opportunities (GSOO), the development and coordination of the SWIS Engineering Roadmap, AEMO's input into periodic Whole of System Plans and longer-term strategic priorities, including enhancements to planning and connections processes undertaken in conjunction with Energy Policy WA and Western Power. Given the responsibility for key publications, the team has a primary focus on engaging with external stakeholders, including market participants, potential investors, government representatives and Western Power.

The System Design and Transformation works closely with industry peers and technical teams across the AEMO WA departments and in the NEM to monitor market, technological and engineering changes in the energy sector and identify how AEMO or the WEM and SWIS may need to adapt to those changes into the future.

Market Development and Energy Procurement

The Market Development and Energy Procurement function has been established to support sectoral reform development and planning, regulatory and WEM Rule changes, and delivery of some market development and energy transformation projects, including the DER Program.

Market Development and Energy Procurement is also responsible for regulatory procurement activities under the RCM (including SRC) and NCESS. This includes processes associated with:

- Certifying and assigning Certified Reserve Capacity (CRC) and Capacity Credits, and monitoring of certain capacity obligations such as testing and Reserve Capacity security.
- Administration of SRC and NCESS procurement processes including triggering of the processes and requests for tender, evaluation of proposals (including due diligence), contract negotiation and execution, and monitoring of conditions precedent and project delivery.

Finally, the Market Development and Energy Procurement team also coordinates AEMO's allowable revenue processes. The pace of change in the energy sector is necessitating more frequent and more complex in-period submissions, with a subsequent need for improved coordination and additional resources²⁸.

During the operating model review, AEMO found that the ongoing pipeline of reform activities driven by the WA Government's Energy Transformation Strategy had invalidated an assumption it made (in 2021) that internal resourcing requirements would fall away after the implementation of the new real-time co-optimised market arrangements. AEMO identified that many of the ongoing sectoral reforms will be supported by internal AEMO resources and are either solely opex projects (for example, Project Eagle), or a combination of capex and opex.

Reform will be ongoing into the foreseeable future as Western Australia transitions to net zero by 2050. By appropriately resourcing AEMO to support the WA Government and market participants during the transition, AEMO can build the capability of its internal expertise and ultimately deliver better outcomes for market participants while reducing the use of more costly external resources.

WA Reform Program Office

A major shift in labour costs assumptions relates to the WA Reform Program Office and the accounting treatment of some of the associated internal labour costs. The AR6 proposal was developed under the assumption that the majority of WEM Reform work would be delivered by internal resources and that the costs for these internal resources would be capitalised as part of the WEM Reform project. Where internal labour costs are capitalised as part of a project, they are recovered via depreciation and amortisation over the life of the assets created and therefore do not immediately impact the internal labour revenue requirement (thus not feature in the opex forecast).

The WA Reform Program Office was not included in the AR6 labour opex forecast, as it was assumed these labour costs would be incorporated in WEM Reform capex. In practice, a significantly greater proportion of the WEM Reform work was either delivered by external contractors or involved work by internal resources that could not be capitalised under AAS. Similarly, the WA DER program of work was originally assumed to be almost entirely capex; however, a significant portion of the WA DER program's internal labour costs were expensed.

Given the need for internal resources to deliver energy transition projects, the WA Reform Program Office has been incorporated into the AEMO WA department's operational structure on an ongoing basis, and therefore, also the operating cost model. The WA Reform Program Office is responsible for project managing delivery of the remaining WEM Reform initiatives and post-implementation activities. It also has an enduring function that will provide project management expertise and governance, and oversee delivery of changes to AEMO's operational technology assets (and associated processes) for the pipeline of energy transition projects (such as Metering System Upgrades and the RCM Review).

WA Stakeholder Engagement and Communications

Navigating the complex suite of challenges that comprise the energy transition requires robust collaboration between AEMO, government, industry, market bodies and communities. While the transition is characterised by changes in government policy, technological innovation, and energy costs; consumer preferences and the expectations of consumers and other stakeholders are also changing and increasing. For this reason, effective,

²⁸ AEMO estimates that over 500 days of effort by AEMO employees and contractors has been required to prepare this in-period submission.

trusted and independent stakeholder engagement and communications remains a core and increasingly important pillar of AEMO's work.

As the transition accelerates and the industry, government and other sectors strengthen their decarbonisation and electrification ambitions, AEMO's engagement with several areas of the WA Government as well as the Commonwealth Government (and their respective agencies) has increased significantly across a range of operational, regulatory, planning and policy issues. AEMO is also engaging with an increased range of future new investors as well as existing market participants to facilitate the significant and sustained new investment that is required for the WEM in the SWIS (as outlined in AEMO's WEM ES00 and WA GS00).

Media engagement by AEMO and interest in the business has also increased significantly. This has especially been the case in relation to the management of power system security and reliability issues through the energy transition, and in other key areas of AEMO's responsibility, such as its gas and electricity outlook publications.

The WA Stakeholder Engagement and Communications function is responsible for internal and external engagement and coordination with market participants, the broader energy industry and governments, as well as other media activities. A key role of this function is to facilitate, coordinate and lead trusted, independent advice and engagement between AEMO and its external stakeholders. The WA Stakeholder Engagement and Communications function was not included in the December 2021 AEMO WA department's labour cost estimates, as this service was a central enterprise function, with some resources also directly supporting the key DER and WEM Reform Programs. Operating model changes over 2022 and 2023 consolidated WA Stakeholder Engagement and Communications staff into a central WA team to provide the scale necessary to manage the increasingly complex external stakeholder landscape, with most labour costs brought directly into the WA cost model.

Strategic Advisor Energy Transition

The Strategic Advisor Energy Transition is a specialist role, effective 1 January 2024, providing power system management advice and input into WA's transition to greater volumes of renewable and asynchronous generation capacity. This role provides technical expertise to support decision-making and evolution of the energy sector, leveraging knowledge and capability across AEMO and its research partners. The Strategic Advisor Energy Transition also provides expert input into new reform and energy transition activities across the AEMO WA department's operational, future system design and market development work, and supports the development of the technical engineering skills required to plan and operate the SWIS today and into the future.

Additional factors affecting opex

While the overall operating cost impact of reform and the energy transition relates mostly to the internal resources necessary to facilitate it, there is also an external labour component. Initiatives such as Project Eagle, WEM and SWIS Power System Modelling and the DSR Review will require some support from external experts and consultants to deliver the projects within the very tight timeframes set by the WA Government to respond to WA's accelerating energy transition. Where these external labour costs do not contribute directly to asset creation, they feature in the revenue allowance for the year in which they are incurred.

Table 10 summarises the proposed opex adjustments resulting from new reform and energy transition activities.

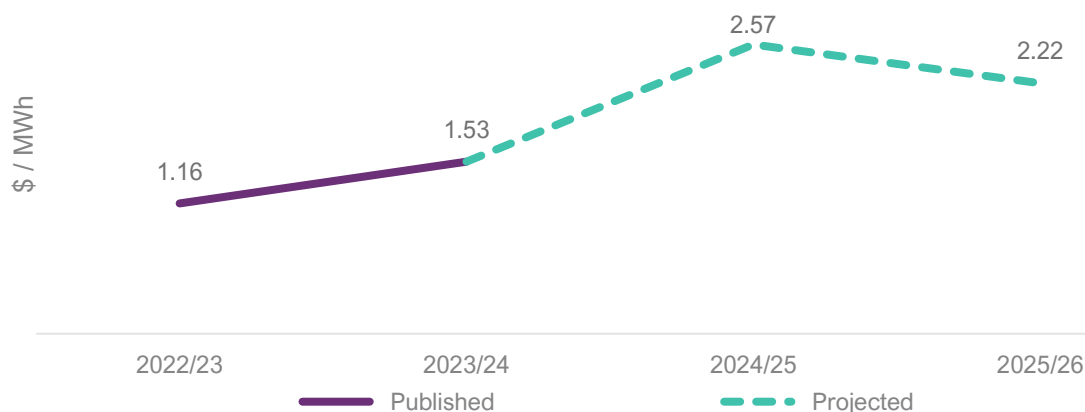
Table 10 Summary of adjustments driven by new reform and energy transition activities, opex \$ million nominal

Opex category	Expenditure
Labour	27.0
IT & telecommunications	0.2
Supplies and services (consulting costs)	6.3
Total	33.5

2.2 Effect on market fees

AEMO is a not-for-profit company that recovers the costs of performing its functions under the WEM Rules from market participants through market fees. While the specific arrangements for market fee recovery are outlined under Chapter 9 of the WEM Rules, market participants are charged market fees based on the absolute value of their metered schedule (MWhs injected and/or withdrawn).

We must ensure our operating and capital expenditure budget for its WA WEM functions are consistent with the allowable revenue and forecast capex determined by the ERA. This means that, following an ERA determination on this in-period submission, we will adjust market fees accordingly. Based on the additional allowable revenue requested in this submission, we calculate that market fees will increase by approximately \$1.04 per MWh in 2024-25, as shown in Figure 10.²⁹ We appreciate this is a significant increase.

Figure 10 Projected effect on WEM Market Fees

Subject to the timing of the ERA's determination, AEMO will seek to pass through this increase from 1 July 2024.

The increase between financial year 2023-24 and 2024-25 in Figure 10 includes depreciation costs resulting from the WEM Reform market systems (first in-period submission) entering service on 1 October 2023 that could not be recovered under the WEM Rules until the financial year 2024-25. As such, this in-period submission includes approximately nine months of additional capex recovery in 2024-25, which does not continue in financial year 2025-26.

²⁹ The values for 2024-25 and 2025-26 in Figure 10 reflect the projected impact of this submission. By including the value for 2025-26, AEMO seeks to illustrate the 'bubble' of additional capex from 2023-24 due to the new market going live part way through a financial year. However, 2025-26 will be the first year of the next regulatory cycle and the fees for that year will be subject to the ERA's determination under AEMO's 7th Allowable Revenue period – expected March 2025.

We are aware of the potential impact of market fee increases on market participants, and ultimately energy consumers, and we strive to deliver our functions in a timely and efficient manner. We recognise that our costs may be passed on to end consumers, which is why we aim to invest in our systems and resources for the lowest practicably sustainable cost. Despite our efforts, we recognise that the anticipated market fee increase outlined in this submission is substantial. We acknowledge the industry's interest in scrutinising our costs and understanding the value we bring in delivering new projects and expanded functions. We facilitate various industry and consumer forums in which we aim to demonstrate progress in our work program and WA's energy transition goals, along with newsletters and other materials for information sharing. We welcome the opportunity for one-on-one discussion and encourages market participants to reach out if they wish to engage in direct conversations.

3 WEM capex

3.1 Overview

The proposed WEM capex adjustments apply for the financial year 2024-25 only. While some of the projects described in this section will have cost components in the AR7 period (2025-26 to 2027-28), forecast costs for AR7 will be reassessed and substantiated in the AR7 proposal due in October 2024.

Clause 2.22A.14(b) of the WEM Rules outline three criteria, (a) to (c) below, for the types of capex that can be included in an in-period adjustment. These three criteria, plus an additional fourth item (d), are outlined in Table PG.2 of the ERA's Guideline.

- a) Costs previously rejected by the ERA.
- b) New costs for new projects/functions.
- c) Costs that could not be estimated with reasonable confidence during the funding proposal for the current review period.
- d) Other (please specify).

As per table PG.2 of the ERA's Guideline, Table 11 summarises AEMO's proposed capex adjustments mapped against the WEM Rules criteria and the relevant market to which it applies.

Table 11 Capex projects mapped against criteria for in-period funding, per ERA's Guideline

Project code	Project title	Market (WEM/GSI)	Project description	ERA criteria (a to d)	24-25 capex (\$ million)
P3127	DSR Review	WEM	Changes to AEMO processes and systems in response to Rule changes resulting from the DSR Review.	b	0.2
P3128	WIC Review	WEM	Changes to AEMO processes and systems in response to Rule changes resulting from the WIC Review.	b	0.4
P3099	WEM DER Aggregator Participation	WEM	Changes to AEMO process and systems to enable DER orchestration and prepare for aggregators to participate in the WEM.	c	6.6
P3108	Metering System Upgrade and Cost Allocation Review	WEM	Upgrades to AEMO's metering systems to facilitate multiple reform projects including Western Power's AMI rollout, the flexible capacity product under RCM Reform, DER Aggregator Participation, and in the future, 5-minute settlement. Implementation of outcomes of the Cost Allocation Review to occur in parallel to maximise AEMO resources.	c	15.0
P3082	RCM Review	WEM	Extend the suite of product offerings under the RCM to provide incentive for flexible forms of generating capacity to connect.	c	16.8
Total					39.0

Non-capitalised project costs

Some capital projects have an opex component for early regulatory, feasibility and planning works. These early project costs relate to initial planning for the creation of tangible or intangible assets and are therefore not capitalised. They are instead treated as opex and recovered in the year they are incurred through market fees. Project related opex may include internal and external labour costs (including consultant fees) associated with these early phases of the project.

The opex component of any project is captured in the relevant opex line item in the allowable revenue forecast, as highlighted in Section 3. Per the ERA's Guideline, a summary of non-capitalised project costs associated with AEMO's capital program is provided in Appendix 1.

3.2 Capex drivers

New reform and energy transition activities are the main driver of the capex adjustment for financial year 2024-25. Energy reform is proceeding at an unprecedented pace, with several new major capital projects being introduced during the AR6 period that require a significant uplift in forecast expenditure. For some projects, AEMO awaits information on detailed design before it can undertake a planning process to inform robust costs, while in other cases the planning processes are not yet complete, with design certainty being fairly recent.

While this is an undesirable situation in which to seek funding, we consider that waiting for design certainty to inform costs would not meet the timing requirements for this submission and would have the effect of delaying important market reforms. While there is no deadline under the WEM Rules for in-period capex submissions, most of AEMO's capex projects include opex components. Opex (revenue) adjustments have a mandated timing requirement of 31 March. Further, we consider insufficient time exists for a further in-period capex submission, noting that we have recently commenced our AR7 forecasting process for submission in October 2024, and do not have sufficient resources to run a parallel third in-period proposal.

The Government-driven energy transition projects that form AEMO's capex proposal are listed in Table 11 above. These projects involve changes to AEMO's systems or processes and result in creation of an asset. AEMO is delivering these projects in collaboration with Energy Policy WA and other energy sector participants (including Western Power and Market Participants) as required under its WEM functions.

Further information on each project is provided in the following sections.

3.3 Capex driver: New reform and energy transition activities

3.3.1 WEM DER Aggregator Participation

Project description and scope

The purpose of the DER Aggregator Participation project is to support the next phase of the WA Government-driven DER Roadmap program of work³⁰.

³⁰ Distributed Energy Resources Roadmap, located at <https://www.wa.gov.au/government/distributed-energy-resources-roadmap>.

The DER Roadmap identifies the opportunities and the required actions to address the near-term challenges that are presented by DER in managing the power system and provide options for consumers to participate in providing services to the WEM while reducing their costs. The associated program of work will:

- Pilot ways to overcome technical, regulatory and market barriers to integrating DER into the grid and DER aggregations into the market.
- Progress changes to technical settings, with the aim of providing support to the grid and greater visibility of the power system.
- Provide customers with clear information to make informed choices about their electricity use and DER investment, ensuring that customers remain protected as new business models emerge.

The high levels of existing DER in the small, isolated power system in the SWIS are significant and AEMO is taking various actions currently to manage associated operational risks. These actions include procuring a minimum demand NCESS for 2023-24 to help manage period of low operational demand on the power system and ensuring adequate contingency reserve raise service to cover not only the loss of the largest large-scale supply risk, but also the loss of a portion of the distributed solar photovoltaic fleet in response to a system disturbance.

Effective aggregation of DER is a strategic priority for AEMO. Doing so is essential to maximise the value of customer's investments in DER, reduce operational risk, minimise AEMO intervention in the market to maintain security and reliability, and minimise the investment in large-scale energy sources. Combined, these benefits should reduce the overall cost of electricity supply in the SWIS and maximise use of zero-emissions power generated by DER.

Our role under the DER Roadmap as the Distribution Market Operator (DMO) is to implement systems and WEM arrangements to enable DER aggregators to participate directly in the wholesale market. Our obligations also include supporting related regulatory changes and coordination with Western Power, Synergy and other market participants³¹.

The DER program has been facilitating delivery of key elements of the DER Roadmap since 2020. Significant progress has been made, including establishing a DER Register and the successful Project Symphony DER orchestration pilot.

As highlighted in AEMO's 2020 AR5 in-period adjustment, the balance of the major DER Roadmap initiatives will be completed during and beyond the AR6 period. Several of the activities are dependent on the recently completed Project Symphony initiative and the progress of underpinning technical and regulatory actions developed by the WA Government and the Distribution System Operator (DSO).

The DER Aggregator Participation project will deliver the next phase of DER Roadmap activities. This includes completing DER Roadmap Actions 26-30 to enable the registration and participation of DER aggregators in the WEM over the AR6 and AR7 Periods. Delivering these actions will require active engagement with the DSO and DER aggregators to define the most appropriate technical solutions, including how best to integrate systems. This work is informed by, and is consistent with, the DER orchestration roles and responsibilities as defined by Energy

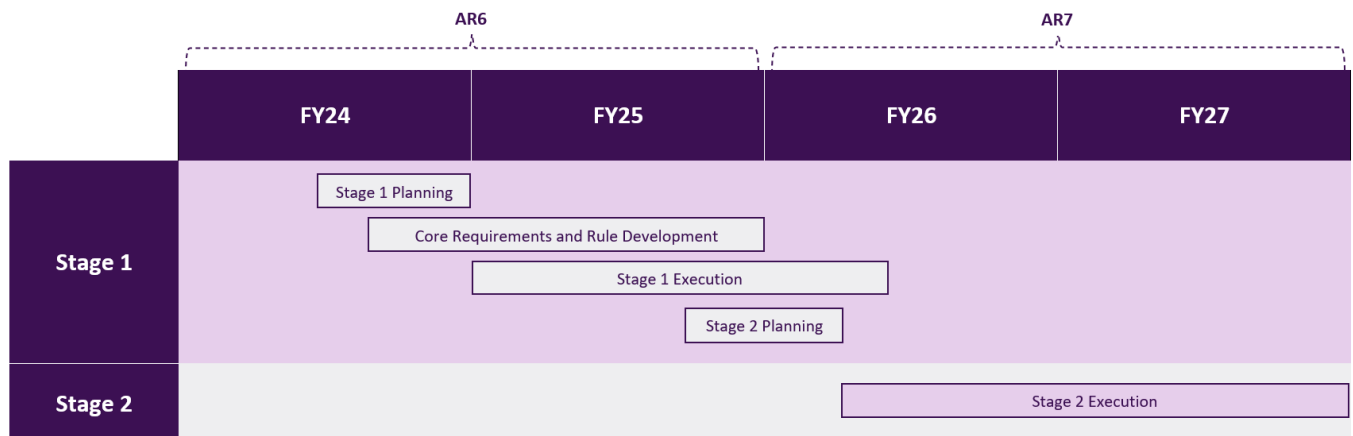
³¹ AEMO (2023), *Adjustment to 2022-2025 Forecast Capital Expenditure*, April, p. 9 and Appendix A1, located at <https://www.erawa.com.au/cproot/23228/2/Attachment-1-AEMO-Adjustment-to-2022-2025-Forecast-Capital-Expenditure-proposal.pdf>.

Policy WA³² and subsequent policy work undertaken during 2023, which we have been engaged in through our DER program.

The WEM DER Aggregator Participation project (previously referred to as DER Participation Implementation project) was noted in AEMO’s AR6 submission as an expected project for the period³³. The AR6 final determination included \$1.5 million of capex to allow AEMO to commence planning, but capex for the full scope of planning and implementation work was not included in the original submission as there was insufficient detail available regarding requirements.

Early planning activities commenced during 2023, and we have engaged with Energy Policy WA to clarify and confirm the scope and timing of the project, subsequent to Project Symphony’s recommendations, and the extensive work plans developed under Energy Policy WA’s DER Roadmap Coordination Committee. The project will be delivered over two stages (see Figure 11).

Figure 11 DER Aggregator Participation project stages and timing



Stage 1 of the project will establish AEMO’s role as the DMO to support Action 27a of the DER Roadmap³⁴ and Energy Policy WA’s Roles and Responsibilities paper³⁵. As the DMO, we will interface with the DSO and aggregators to enhance visibility of virtual power plants while planning for future implementation in the WEM. Stage 1 will see planning and development of the core requirements for DER aggregation, including development of WEM Rules and associated procedures, guidelines and technical specifications. Stage 1 also includes:

- Planning and implementation of data exchange solutions to ensure aggregators and the DSO can integrate with AEMO’s systems.

³² Energy Policy WA (2022), *DER Roadmap: DER Orchestration Roles & Responsibilities Information Paper*, May 2022, set-out the foundational policy positions on DER orchestration roles and responsibilities, as endorsed by the Minister for Energy. Located at <https://www.wa.gov.au/system/files/2022-07/DER%20Orchestration%20Roles%20and%20Responsibilities%20information%20Paper.pdf>.

³³ AEMO (2021), *Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, December, p. 80, located at <https://www.erawa.com.au/cproot/22361/2/AEMO-proposal.PDF>.

³⁴ Energy Policy WA (2022), *Distributed Energy Resources Roadmap: Two-Year Progress Report*, April, located at https://www.wa.gov.au/system/files/2022-06/Distributed-Energy-Resources-Roadmap_second-year-update-WEB.pdf.

³⁵ Energy Policy WA (2022), *DER Roadmap: DER Orchestration Roles & Responsibilities Information Paper*, May, located at <https://www.wa.gov.au/system/files/2022-07/DER%20Orchestration%20Roles%20and%20Responsibilities%20information%20Paper.pdf>.

- Incorporating foundational changes that would support the registration of DER aggregators, and data exchanges, such as evolution of the DER register.
- Enabling participation of DER aggregations in the RCM, including technology classes and CRC application categories and assessment as per the new WEM Rules to enable award of capacity credits in Stage 2.
- Planning and design for execution of Stage 2.

Stage 2 of the project will implement further participation arrangements for DER aggregators, currently understood to require adjustments to facility classes in the WEM Rules. However, the actual regulatory and technical implementation requirements are not clear at this time and will depend on rule development to be led by Energy Policy WA during 2024.

Staging this project in step with policy and regulatory clarity represents the lowest costs approach to planning and execution. This in-period adjustment is for Stage 1 planning and execution and Stage 2 planning only. AEMO estimates a \$6.6 million forecast capex adjustment for financial year 2024-25 is required to complete Stage 1 planning and execution, and to commence planning for Stage 2 (see Table 12).

Table 12 P3099 DER Aggregator Participation AR6 forecast capex, \$ million nominal

Activity	2022-23	2023-24	2024-25	Total AR6	In-period adjustment
Stage 1 planning	-	0.5	-	0.5	0.5
Stage 1 execution and Stage 2 planning	-	-	6.1	6.1	6.1
Contingency	-	-	0.0	0.0	0.0
Total	-	0.5	6.1	6.6	6.6

Stage 2 implementation is expected to be delivered mostly during the first two years of the AR7 period (financial years 2025-26 to 2026-27). As the full scope of Stage 2 implementation is not yet known, no cost estimate has been provided. The outcomes of Stage 1 and the planning activities for Stage 2 will inform Stage 2 execution requirements, which will be included in the AR7 revenue proposal. It is important to note that the execution of Stage 2 of this project is dependent on the completion of the Metering Systems Upgrade project, as outlined under section 3.3.2. Should this project be delayed, AEMO expects Stage 2 to be similarly delayed.

The expected benefits of DER Aggregator Participation were captured in a comprehensive cost-benefit assessment developed through Project Symphony, which is expected to be released publicly in coming months. In the absence of effective DER aggregation, additional costs would be incurred by the market to invest in infrastructure, systems and processes to manage the risks to power system security from variable, uncontrolled DER. Additional capacity will also be required to ensure reliability, as has been demonstrated under recent NCESS procurements. Harnessing more of the potential of these assets will contribute to a lower-cost energy supply into the future and deliver added value for customers that have invested in these assets.

Related function under the WEM Rules

The WEM Rules specify that DER Roadmap actions are “[a]ny activities undertaken by AEMO to implement the DER Roadmap that have been endorsed by the Minister for Energy as WEM and Constrained Network Access

Reform from 31 December 2019³⁶. The general function of facilitating and implementing decisions by the Minister and Coordinator is conferred onto AEMO under clause 2.1A.2 (II), with AEMO holding relevant functions to perform these activities under clauses 2.1A.2 (a), (d), and (m) of the WEM Rules.

Risks, dependencies, and contingency

The DER Aggregator Participation project relates to the WEM only. For the activities outlined in this submission, there are no shared costs with the broader AEMO business or NEM participants.

The timeline and scope of the DER Aggregator Participation project is dependent on the following external factors:

- Western Power's implementation plans, as the DSO.
- Rule changes and rule change implementation plans, led by Energy Policy WA.
- The implementation of Metering Systems Upgrade project (Stage 2).

Any material shift in the timing or scope of these external factors may impact AEMO's deliverables. To accommodate this and other risks associated with the DER Aggregator Participation project, a contingency (of \$0.89 million for financial year 2025-26) has been calculated for the project but is not included in this in-period adjustment as the risk, if it arises, would do so in the AR7 period.

Why costs cannot be deferred to AR7

The WA Government has advised that WEM participation of aggregated DER is intended to commence by the end of 2027³⁷. This timeline is an extension of the timing for the delivery of DER Roadmap Action 30³⁸, which is set at 1 October 2025. The 2027 target date acknowledges that more complex changes will be required to support the provision of market services from DER aggregations. However, this also drives the delivery timeframes of the DER Aggregator Participation project's first stage, which must commence during 2024 to deliver foundational DMO capabilities in support of the DER Roadmap's timelines.

As noted above, there was insufficient information available at the time to support the inclusion of the full scope of planning and implementation work that needed to be undertaken in AR6 in the original AR6 submission. AEMO is now seeking funding as part of this in-period submission, noting it has further clarity on costs, with expenditure to be incurred within the AR6 period. The cumulative expected costs of this submission cannot be accommodated within the \$10 million overrun allowance provided in the WEM Rules. A forecast capex adjustment is therefore necessary for AEMO to be able to conduct this work.

³⁶ See the definition of 'DER Roadmap Actions' in Chapter 11 of the WEM Rules, located at <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-rules>.

³⁷ Energy Policy WA (2022), *DER Roadmap: DER Orchestration Roles & Responsibilities Information Paper*, May, p.7, located at <https://www.wa.gov.au/system/files/2022-07/DER%20Orchestration%20Roles%20and%20Responsibilities%20information%20Paper.pdf>.

³⁸ The current version of DER Roadmap Action Item 30 is "On 1 October 2025, DSO and DMO commencement with DER coordinated to provide services to the network and wholesale market and compensated appropriately". Located at https://www.wa.gov.au/system/files/2022-06/Distributed-Energy-Resources-Roadmap_second-year-update-WEB.pdf.

3.3.2 Metering System Upgrade and Cost Allocation Review

Project description and scope

To accommodate several Government-driven energy reform initiatives, significant upgrades are required to AEMO's metering system to enable the receipt, storage, and communication of substantial quantities of additional metering data. These data requirements are driven from two main needs. First, a significant increase in the number of meters our system must accommodate, and second, changes in the level of granularity – from current 30-minute intervals to five-minute intervals. In the absence of upgrades to our metering system, projects with direct dependencies will need to be delayed or otherwise proceed with limitations or cost inefficiencies. The Metering Upgrade Project is a necessary pre-condition to harness the benefits of other reforms.

A software solution is expected to be at the heart of delivering metering system upgrades. This could be achieved through extensive amendments to AEMO's existing system, but it is more likely to require either an off-the-shelf product with large volumes of configuration, or a bespoke product that is built from scratch. Under all scenarios, we expect high labour costs due to complex integration needs with other AEMO systems and the requirement to upgrade AEMO's interface with Western Power, both of which are expected to be labour intensive.

The project planning phase is scheduled to be completed in September 2024, after which we will have fully scoped the system requirements and built a detailed forecast of costs and timings. The planning phase will also include implementation of the Cost Allocation Review outcomes, as the changes will largely affect the same systems and therefore co-implementation is expected to deliver a more cost-efficient outcome. Subject to the outcomes of the planning phase, we expect to commence the execution phase in October 2024 for both projects, with completion expected in December 2025 for Metering System Upgrades and June 2025 for the Cost Allocation Review.

The timing of the allowable revenue adjustment process relative to the planning work means that the detailed costs and timing for executing the system changes are not available to include in this in-period submission. We regret this outcome and acknowledge that seeking funding for these projects following a detailed planning exercise would be the preferred approach. Unfortunately, the planning phase could not be completed prior to this in-period adjustment submission. This is because our primary focus in 2023 was the delivery of the WEM Reform Program and the following three-month hypercare period, during which time key resources were not available to undertake the planning phase for such a significant project. There have also been limitations with the timing of policy initiatives that depend on the Metering Systems Upgrade project, with WEM Rules being either in draft form at the time of writing (five-minute settlement, Cost Allocation Review), or only recently having been gazetted (RCM flexible capacity product).

In the absence of more granular and accurate information, we have estimated project timeframes and costs using publicly available documents to establish the scope for dependent projects, and in-house materials and expertise to establish system requirements. These include:

- Advice from internal subject matter experts and AEMO's catalogue of system process maps to identify systems impacted and provide a high-level assessment of the quantum and type of system changes.
- A high-level system and process impact assessment undertaken from the initial consideration of WEM 5MS in 2021.

- Draft Amending Rules for 5MS.
- Gazetted WEM Rules for the RCM Review.
- Documents outlining the policy intent of the Cost Allocation Review outcomes.

Note that further information on dependent projects is provided in the next section.

This in-period capex adjustment seeks \$15.0 million in funding to cover the estimated costs of implementing the new Metering System Upgrades and Cost Allocation Review outcomes during the final year of AR6, as outlined in Table 13. These estimates represent the best forecast able to be developed at the time of making this in-period submission.

Table 13 P3108 Metering System Upgrade and Cost Allocation Review, AR6 forecast capex, \$ million nominal

	2022-23	2023-24	2024-25	Total AR6	In-period adjustment
Execution	-	-	13.1	13.1	13.1
Contingency	-	-	1.9	1.9	1.9
Total			15.0	15.0	15.0

The high uncertainty is currently reflected in a contingency of 43% over the life of the project. However, we have chosen at this early stage to allocate the majority of contingency to the second year of the project, which falls outside of the AR6 period. The proposed adjustment allows us to complete the planning process and develop a more granular forecast, before seeking the remainder of the project funding required under AR7. We consider this appropriately balances the risk of over-recovery of costs in 2024-25, with the need to commence the project now to ensure dependent projects are not affected. Notwithstanding, it should be noted that the low level (\$1.9m) of contingency requested as part of this submission poses a financial risk to AEMO. Should the project require greater expenditure than forecast, we will be required to use the overspend provisions under the WEM Rules (to the extent available) to continue the project, or otherwise risk project delay.

While we acknowledge the present challenges in predicting costs, our project planning to date seeks to produce efficient outcomes by staging the project within the wider WA Reform program to maximise the use of internal resources and minimise costs. For example, if the project could not commence until AR7, it is likely we would need to draw on external labour at higher cost, as relevant subject matter experts are scheduled to be occupied on competing projects at that time (e.g. implementation of core elements of the WIC Review, RCM Review and DSR review).

Project dependencies and Cost Allocation Review

Five-Minute Settlement

The five-minute settlement project (known as 5MS) remains part of the WA Government's Energy Transformation Strategy.

Currently, charges for electricity are calculated (settled) in 30-minute intervals. The 5MS project seeks to reduce settlement intervals to five minutes, in alignment with system dispatch. Two Information Papers³⁹ released by Energy Policy WA in late December 2019 detail the proposed changes to the WEM Rules and outline the suite of benefits expected to materialise from the project. These include:

- Improved price signals for more efficient generation and use of electricity.
- More efficient investment in capacity and demand response technologies to balance supply and demand.
- Improved bidding incentives.
- Support investment in technology (e.g., batteries), which can back-up variable generation sources (e.g., wind, solar).
- Rewards for customers who respond to demand peaks.

The 5MS project is likely to be key for enabling additional future value from other projects, including DER Aggregator Participation and aspects of the implementation of the flexible capacity product (see relevant sections below).

WEM Rules to give effect to 5MS have been drafted and were subject to public consultation in August 2023⁴⁰. We await the gazettal of the rule changes, which we expect will include a 5MS commencement date.

We do not expect to be able to prepare a reliable estimate of system costs for 5MS until September 2024. We will prepare this 5MS estimate alongside the planning phase for the Metering Systems Upgrade and Cost Allocation Review project.

The Metering System Upgrade Project represents the greatest cost associated with the 5MS project and is a critical dependency. We expect the cost to implement 5MS once the metering system has been upgraded will be small in comparison. Failing to commence the Metering System Upgrade project in FY25 would push out the timing of 5MS implementation, with consequential delays on dependent projects.

Western Power's AMI rollout and reduction in notional wholesale meter

Currently, AEMO's systems receive data from approximately 60,000 meters at 30-minute intervals. Western Power's rollout of AMI is scheduled to be complete in 2027, at which time approximately 1.2 million meters across the SWIS will be five-minute interval capable, including both contestable and non-contestable customers.

Non-contestable meters include more than 1 million residential households and more than 85,000 small businesses⁴¹. These customers are supplied by Synergy, with the meters being 'invisible' to AEMO's systems. When settling the market, AEMO currently deducts the metered schedule for all contestable customers from the

³⁹ Energy Transformation Taskforce (2019), *Foundation settings for market settlement, Information paper*, September, located at <https://www.wa.gov.au/system/files/2019-10/Foundation%20settings%20for%20market%20settlement%20-%20Information%20paper%208%20Oct%201.pdf> and also Energy Transformation Taskforce (2019), *Implementation of five-minute settlement, uplift payments and Essential System Services settlement*, 1 December, located at <https://www.wa.gov.au/system/files/2019-12/Information%20paper%20-%20Market%20Settlement%20-%20Implementation%20of%20five-minute%20settlement%20C%20uplift%20payments%20and%20ESS%20settlement%20-%20December%202019.pdf>.

⁴⁰ Five-Minute Settlement: Exposure Draft Proposed Wholesale Electricity Market (WEM) Amending Rules, located at https://www.wa.gov.au/system/files/2023-07/five-minute_settlement_project-wem_amending_rulese_exposure_draft.pdf

⁴¹ Economic Regulation Authority *Annual Data Report 2022/23 Energy Retailers*, pages 4-5, located at <https://www.erawa.com.au/cproot/23827/2/Final-for-publication-Retailers-Annual-data-report-202223.pdf>

total demand in the relevant interval, with the balance being assigned to Synergy as the assumed consumption of its non-contestable customer base. This balance applied to Synergy is coined the 'notional wholesale meter'.

In an Information Paper⁴² published in January 2024 in relation to the DSR Review, Energy Policy WA advised that a project to gradually reduce the notional wholesale meter is to be progressed 'in due course'. Based on the timeframes associated with Western Power's rollout of AMI, which is likely to conclude in mid-2027⁴³, we expect to implement a project to effect changes to the notional wholesale meter in 2028. The changes will increase the accuracy and effectiveness of settlement in the WEM, improving alignment with best practice cost recovery principles that will flow through to improved accuracy of market fee allocation.

The AMI project requires a substantial uplift in the data capacity of AEMO's metering systems. It will also require system capability improvements to allow it to interface with Western Power's systems to receive large volumes of data, as well as being able to effectively communicate with other WEM systems. Without this capability in AEMO systems, the AMI rollout can still proceed, however, we will be unable to reduce the notional wholesale meter to deliver the outcomes identified above.

Flexible capacity product

As an outcome of the RCM Review, we will be implementing a new flexible capacity product to the RCM (alongside the existing peak capacity product) to incentivise investment in flexible capacity that can start, ramp, and stop quickly.

The increasing penetration of PV systems (both behind-the-meter customer systems and market participating generation) and higher electricity demand overall, means that the slope of the evening system ramp is increasing. Not all generation can respond quickly enough to meet the system demand needs during the ramp period. In short, the flexible capacity product aims to ensure that there is sufficient capacity of the type needed at that time.

We expect that the flexible capacity product will also reduce the need to rely on NCESS contracts to meet ramping requirements. Externally contracted services such as NCESS are relatively more expensive to procure, with costs flowing through to the market, and ultimately consumers.

The product will require AEMO to set a flexible reserve capacity target sufficient to meet the largest operational ramp expected on any day in the capacity year, expressed as a MW capacity over a defined period. We will then procure flexible capacity required to meet the target, a similar design concept to the current peak capacity product. Notwithstanding, facilities applying for certification of reserve capacity for the flexible product will have additional requirements to demonstrate, including:

- The maximum ramp rate it can deliver.
- The total MW quantity it can ramp over the defined period.
- The maximum MW quantity it can deliver at the end of the defined period.
- Any energy or availability limitations affecting its ability to provide energy at the peak (after being dispatched for the ramp).

⁴² Energy Policy WA (2024), *Review of the Participation of Demand Side Response in the Wholesale Electricity Market*, January, p.21, located at <https://www.wa.gov.au/system/files/2024-03/review-of-the-participation-of-demand-side-response-in-the-wholesale-electricity-market.pdf>

⁴³ Western Power *Installing advanced meters across WA*, located at <https://www.westernpower.com.au/resources-education/our-network-the-grid/grid-technology/advanced-metering-infrastructure/#:~:text=Installing%20advanced%20meters%20across%20WA,-We're%20now&text=By%20mid%2D2027%20we%20will,%2C%20Bunbury%2C%20Geraldton%20and%20Kalgoorlie>

- Any capability differences throughout the day, or with temperature changes.
- Low or zero minimum generation level.
- Operational capabilities, such as short start and minimum run, stop and restart times.

Because many of the requirements outlined above are represented over short timeframes, five-minute granularity of data is required to enable the participation of flexible capacity holders and verify compliance with their obligations. Without five-minute granularity, it may be possible for us to undertake a lower level of system changes and then use manual workarounds with Western Power's cooperation to undertake the appropriate verification. While there has been insufficient time since the rules were complete for us to fully explore this option, the highly manual nature of the work will require additional staff, increasing the ongoing costs. As with most options requiring substantial manual intervention, this process would also come with additional risk of human error, and may therefore increase the risk of non-compliance. Finally, implementing the flexible capacity product without the Metering System Upgrade will still require changes to our systems, which may become redundant if 5MS is implemented in the future.

Further information on the RCM Review, including cost impacts, is provided in section 3.3.3.

DER Aggregator Participation

Increasing the quantity of interval meters under Western Power's AMI rollout will also enable households and businesses to participate in the WEM through aggregator arrangements. Our DER Aggregator Participation project (described in section 3.3.1) is implementing the next phase of the DER Roadmap to enable the registration and participation of DER aggregators. With approximately one in three households in the SWIS hosting a rooftop PV system, we expect the current and future potential contribution to aggregated DER to be significant. In the shorter term, we estimate that activities under the DER Roadmap could deliver around 90MW of aggregated and orchestrated DER by 2027-28, that's around 20,000 customers participating through contracts with the aggregator.

The primary benefit for consumers of aggregation is reduced energy costs (or offsets to energy costs), while the benefits for the system are numerous, with DER aggregation potentially providing a range of services to the market that drive down costs and support system security and reliability.

Visibility of customer meters at a five-minute granularity is required to support market systems, specifically the dispatch requirements needed to facilitate market participation under the DER Aggregator Participation project. There is no identified workaround solution similar to that described for the flexible reserve capacity product above. This is because the volume of meters at a five-minute frequency far exceeds the capacity for any manual intervention.

Cost Allocation Review

The Cost Allocation Review⁴⁴ is a WA Government-driven initiative that has reviewed the allocation of market fees and essential system services in the WEM with the intent to align these, where possible, with a causer-pays approach. Energy Policy WA released an Information Paper⁴⁵ detailing the final design elements in June 2023, with

⁴⁴ Cost Allocation Review, located at <https://www.wa.gov.au/government/document-collections/cost-allocation-review>.

⁴⁵ Energy Policy WA (2023), *Cost Allocation Review Information Paper*, 15 June, located at https://www.wa.gov.au/system/files/2023-06/cost_allocation_review-information-paper-final.pdf.

draft Amending Rules⁴⁶ provided for consultation in November 2023. These draft Amending Rules are built upon the Exposure Draft - Five-Minute Settlement Wholesale Electricity Market Amending Rules⁴⁷ released in August 2023.

The changes will:

- Implement a new 'WEM Deviation Method' to allocate the costs of regulation services proportionally to relevant market participants, based on variations from their dispatch target during each interval. In addition to improved alignment with the causer-pays principle, the change provides a financial incentive to improve forecasting and potentially reduce the size of the overall service.
- Modify the Runway Method in allocating contingency reserve lower costs for loads. The changes better align costs with the causer-pays principle and incentivise the connection of smaller loads, which reduces cost exposure to the facility.
- For Contingency Reserve Raise, amend the application of the runway method for facilities comprised of multiple units that each have a separate connection point. Where these facilities are identified at lower risk (i.e. not at risk of simultaneous outage), the runway method will be applied to each separate unit, rather than the aggregate. This change improves the alignment of cost with risk.

These changes are designed to improve market signals for investment and operation of facilities to minimise adverse impacts on power system security and reliability and therefore lower overall costs for consumers in the SWIS.

At the time of writing, we await the final WEM Rules to implement the above changes. The draft rules are presently insufficient to undertake a detailed assessment of system changes required to inform cost impacts. In the absence of a detailed assessment, the cost estimates in Table 13 above have been estimated based on our understanding of the policy intent based on publicly available documents.

We intend to implement the above changes alongside the Metering System Upgrade project to improve cost efficiency. This is because the systems affected are likely to heavily correlate with the Metering Systems Upgrade project, minimising the need for multiple changes to the same systems. Importantly, the timeframes allow for key internal personnel with specialised knowledge to work on the project. This minimises costs and timeframes for implementation while leading to higher-quality outcomes.

If the project were to be delayed, the required internal personnel will be occupied on other projects. In this circumstance, it is likely we would need to rely on external labour, which comes with some risk. The energy sector is experiencing a skills shortage, and the type of skills required for projects such as these is particularly hard to source. Where we can procure external expertise, it is often at significantly greater cost and does not completely alleviate existing workloads (for example, external resources still require support from constrained SMEs), and can increase timeframes required to implement. AEMO expects that if it cannot commence the project on the proposed schedule the impact could delay this project and the dependent projects further into the AR7 period.

⁴⁶ Energy Policy WA (2023), *Cost Allocation Review: Exposure Draft, Proposed Wholesale Electricity Market (WEM) Amending Rules*, located at https://www.wa.gov.au/system/files/2023-10/cost_allocation_review-wem_amending_rules_exposure_draft.pdf.

⁴⁷ Energy Policy WA (2023) *Five Minute Settlement: Exposure Draft*, located at https://www.wa.gov.au/system/files/2023-07/five-minute_settlement_project-wem_amending_rulese_exposure_draft.pdf

Related function under the WEM Rules

The Metering System Upgrade and Cost Allocation Review projects support the delivery of the WA Government's Energy Transformation Strategy and is therefore being undertaken in accordance with AEMO's WEM functions, as outlined in clause 2.1A.2 (II), with AEMO holding relevant functions to perform these activities under clauses 2.1A.2 (a), (d), and (m) of the WEM Rules.

AEMO is conferred the function of settling the market under clause 2.1A.2(b) of the WEM Rules, and its obligations in regard to settlement are specified in Chapters 4, 5 and 6 (Settlement Data), Chapter 7 (Settlement and Monitoring Data) and Chapter 9 (the settlement process)⁴⁸. There are additional settlement obligations in the transitional arrangements set out in Chapter 1.

Risks, dependencies, and contingency

The Metering System Upgrade and Cost Allocation Review projects are being implemented in the WEM only. There are no shared costs with the broader AEMO business or NEM participants.

The timeline and scope of the Metering Systems Upgrade and Cost Allocation Review projects are dependent on the following external factors:

- The outcomes of the detailed planning phase, scheduled for end September 2024.
- Timing of completion and final form of the Amending Rules, led by Energy Policy WA.
- Western Power's implementation plan (including timing) for its AMI rollout.
- Market participants' system requirements.

We have included a contingency of 43% for this project due to the high level of uncertainty that exists in the absence of detailed project planning. However, we have allocated the majority of the contingency to the second year of the project to enable us to complete detailed planning before seeking additional funding in our AR7 submission. Our approach to contingency recognises that seeking a higher value for 2024-25 is unlikely to be acceptable to the ERA and market participants at this time, however, the minimal approach to contingency is not without risk. If detailed planning demonstrates that funding is insufficient to carry out the required work in 2024-25, we will need to consider the potential to use overspend provisions to avoid project delays.

Why costs cannot be deferred to AR7

As outlined in this section, the Metering System Upgrade project is a dependency for multiple other projects, all of which are driven by government policy changes to deliver benefits to energy consumers. The project needs to be commenced now if AEMO is to be confident in meeting the timeframes for the dependent projects and avoid delays to realising the benefits of those projects.

The cumulative expected costs of this submission cannot be accommodated within the \$10 million overrun allowance provided in the WEM Rules. A forecast capex adjustment is therefore necessary for AEMO to be able to conduct this work.

⁴⁸ Settlement calculations are necessary to the viability of the Reserve Capacity Mechanism, STEM, Real-Time Energy Market, essential system services and are necessary for outage compensation.

3.3.3 RCM Review

Project description and scope

In the transition to a low-emissions energy system, the SWIS is experiencing a rapid change in the demand profile of the system and electricity supply sources to meet that demand (due to, for example, increasing levels of intermittent and distributed generation). These changes are challenging the suitability of existing market mechanisms designed to meet reliability standards for end-consumers under the WEM Rules.

The RCM Review was a WA Government, Energy Transformation Strategy-driven initiative, instigated under clause 2.2D.1 of the WEM Rules, and included the Coordinator of Energy's inaugural review of the Planning Criterion under clause 4.5.15 of the WEM Rules⁴⁹. The RCM Review project is now largely complete, with an extensive set of WEM Rules to give effect to the outcomes being gazetted in December 2023⁵⁰.

The purpose of the RCM Review was to assess the characteristics of the capacity needed in future years and undertake appropriate amendments to the RCM to ensure it remains fit for purpose. Naturally, this is a simplification of the project, with many related changes required to ensure the RCM continues to operate effectively and fairly, for example, by implementing amendments to cost recovery mechanisms.

AEMO considers implementation of the RCM Review to be a very high priority. The outcomes of the RCM review seek to better value the contribution to reliability of different energy sources, including recognising the value that flexible capacity sources provide in the context of a power system transitioning to higher levels of variable, weather-dependant supply sources. Effective market signals via the RCM will reduce the need for AEMO to undertake relatively more expensive SRC and NCESS processes, ultimately reducing costs for consumers and helping to meet society's expectations for a reliable electricity supply to provide the backbone of our economy.

The outcomes of the RCM Review are significant and require many changes to AEMO's systems and processes, with funding implications across both AR6 and AR7 periods. While the changes, and therefore costs, are substantial, the RCM Review outcomes are essential for ensuring consumers continue to experience high levels of system reliability during the energy transition. The RCM Review outcomes are also expected to reduce reliance on expensive market stop-gap mechanisms such as the Supplementary Reserve Capacity Mechanism and NCESS contracts.

A high-level summary of the systems and processes requiring amendments to give effect to the outcomes of the RCM Review are provided in Table 14, separated by funding cycle. AEMO notes that information provided for the AR7 period is indicative only, pending the completion of detailed planning.

Table 14 Summary of systems and processes impacted by the RCM Review and timing of funding

System or process amendment	AR6 period	AR7 period
CRC application process	✓	✗
WEM ESOO data	✓	✗
CRC assessment process	✓	Possible

⁴⁹ Reserve Capacity Mechanism Review, located at <https://www.wa.gov.au/government/document-collections/reserve-capacity-mechanism-review>.

⁵⁰ Energy Policy WA (2023), *Exposure Draft - Wholesale Electricity Market (WEM) Amending Rules, Reserve Capacity Mechanism Review Outcomes*, located at https://www.wa.gov.au/system/files/2023-09/reserve_capacity_review_wem_amending_rules_exposure_draft.pdf.

System or process amendment	AR6 period	AR7 period
Flexible and peak capacity pricing	✓	Possible
Commercial operation amendments (engineering report requirements)	✗	✓
Demand Side Participation (DSP) testing	✗	✓
DSP settlement	✗	✓
Registration for new flexible capacity	✓	Possible
New Individual Reserve Capacity Requirement calculations	✓	✓
New forecasting and Projected Assessment of System Adequacy (PASA) requirements	✓	Possible
Reserve Capacity Obligation Quantity and outages	✗	✓
Dispatch - flexible capacity product	✗	✓
Reserve capacity testing	✗	✓
Flexible capacity credit allocations	✓	Possible
Settlement - peak and flexible capacity	✗	✓
Relevant Level Method	✓	Possible
DSP certification	✓	✗
Capability classes and Network Access Quantity	✓	✗
Indicative Facility Class assessment timeline	✓	✗

The system and process changes identified for inclusion within AR6 in Figure 14 allow for AEMO to commence or complete the implementation of several outcomes of the RCM Review. These changes will:

- Enable the 2024 Reserve Capacity Cycle, including the new method for assigning capacity to DSPs; applying the Reserve Capacity Price to individual components of a facility; the introduction of capability classes; and changes to the forecasting models for the ESOO to determine the Availability Duration Gap.
- Enable the certification of Non-Scheduled Facilities and Non-Intermittent Generation systems through a revised Relevant Level Method.
- Identify the new Peak IRCR Intervals for use in the Relevant Level Method and the new Peak IRCR, scheduled to commence in 2026.
- Enable certification and assignment of Flexible Capacity Credits.
- Enable Market Participants to provide AEMO with sufficient information to enable settlement of Peak and Flexible Capacity Credits that have been bilaterally traded.

Importantly, the funding requested in this submission will establish the foundations required to implement the flexible capacity product, being a critical outcome of the RCM Review. Further information on the importance of the flexible capacity product and its relationship to the Metering Systems Upgrade project was discussed in section 3.3.2. The RCM Review consultation paper outlines Energy Policy WA's intent for the flexible capacity product to be implemented in 2025, for the 2027 Reserve Capacity Cycle⁵¹. We supports the intent to deliver this reform as quickly as possible, having regard to the reliability outlook for the SWIS and the increasing volatility on

⁵¹ Energy Policy WA (2023), *Reserve Capacity Mechanism Review Information Paper (Stage 1) and Consultation Paper (Stage 2)*, 3 May, located at [epwa_reserve_capacity_mechanism_review_information_and_consultation_paper.pdf](http://www.wa.gov.au/epwa_reserve_capacity_mechanism_review_information_and_consultation_paper.pdf) (www.wa.gov.au)

the power system commensurate with the increased reliance on weather-dependent generation (including solar PV)⁵².

As the Amending Rules have only recently been gazetted, we have not completed the detailed elaboration exercise necessary to inform robust estimations of resourcing requirements and delivery timelines for most of the initiatives. The exception is for those initiatives needed to enable the rule changes to apply from 1 January 2024 for the 2024 Reserve Capacity cycle, which we have prioritised and elaborated to the extent we can.

We expect to complete planning to implement the remainder of the reforms under the RCM Review by June 2024. As the outputs of this planning process are not available to include in this submission, we have developed a preliminary forecast of \$16.8 million for the RCM Review, which is based on a scoping exercise undertaken in December 2023. This represents the best estimate possible at this time (see Table 15).

Table 15 P3082 RCM Review, AR6 forecast capex, \$million nominal

Activity	2022-23	2023-24	2024-25	Total AR6	In-period adjustment
Planning	-	-	-	-	-
Implementation	-	4.5	9.5	14.0	14.0
Contingency	-	-	2.8	2.8	2.8
Total		4.5	12.3	16.8	16.8

The potential for significant RCM reform requirements was signalled in AEMO's AR6 submission⁵³ and subsequently identified in its AR6 first in-period submission as a project that would require funding as part of a future in-period submission⁵⁴. No costs for feasibility studies, planning or implementation were included in the AR6 forecast or determination.

Related function under the WEM Rules

AEMO is conferred the function of operating the RCM under clause 2.1A.2(a) of the WEM Rules, and its settlement obligations are specified in Chapter 4, including obligations with regard to transitional arrangements set-out in Chapter 1. The RCM Review project is therefore being undertaken in accordance with AEMO's functions under clause 2.1A.2 IA(iii) and (II), with AEMO holding relevant functions to perform these activities under clauses 2.1A.2 (a), (d), and (m) of the WEM Rules.

Risks, dependencies, and contingency

The RCM Review is for the WEM only and there are no shared costs with the broader AEMO business or NEM participants.

⁵² See for example, AEMO (2023), *Wholesale Electricity Market Electricity Statement of Opportunities*, August, located at [2023-wholesale-electricity-market-electricity-statement-of-opportunities-wem-esoo.pdf \(aemo.com.au\)](https://www.aemo.com.au/wholesale-electricity-market-electricity-statement-of-opportunities-wem-esoo.pdf) and various presentations to AEMO's WA Electricity Consultative Forum, at <https://aemo.com.au/consultations/industry-forums-and-working-groups/list-of-industry-forums-and-working-groups/wa-electricity-consultative-forum-waecf>.

⁵³ AEMO (2021), *Allowable Revenue and Forecast Capital Expenditure 2022-23 to 2024-25*, December, p.81, located at <https://www.erawa.com.au/cproot/22361/2/AEMO-proposal.PDF>.

⁵⁴ AEMO (2023), *Adjustment to 2022-2025 Forecast Capital Expenditure*, April, p.9 and Appendix A1, located at <https://www.erawa.com.au/cproot/23228/2/Attachment-1-AEMO-Adjustment-to-2022-2025-Forecast-Capital-Expenditure-proposal.pdf>.

The timeline and scope of the RCM Review project is dependent on the following external factors:

The operation of the flexible capacity product is dependent on the implementation of increased granularity of interval meter data as enabled by the Metering System Upgrade project⁵⁵. Implementation without this project may be possible, but is likely to be at a significantly higher additional cost, with larger ongoing resources required to maintain manual processes until five-minute interval data can be introduced within AEMOs systems. If this eventuates, the resourcing implications could also affect the timing of other projects.

The timeline and scope of the RCM Review project is dependent on the following external factors:

- The timing of Rule change implementation plans, led by Energy Policy WA.
- Market participants' requirements.
- Any subsequent Government policy or related WEM Rule changes, for example, as part of the DSR Review or WIC Review, which are also considering amendments to the RCM.

Any material shift in the timing or scope of these external factors is likely to impact AEMO's deliverables. To accommodate this and other risks associated with the RCM Review project, we have included a contingency of 17% (\$2.8m) within the capex forecast.

Why costs cannot be deferred to AR7

The WA Government has indicated the flexible capacity product is a priority and expects this to apply for the Reserve Capacity Cycle commencing in 2025, for implementation in the 2027 capacity cycle. As a result, planning and implementation must commence during the AR6 period, with the bulk of implementation work undertaken during the financial year 2024-25.

The AR6 capex forecast did not include provisions for the flexible capacity product, as the initiative had not been determined at the time. The cumulative expected costs of this submission cannot be accommodated within the \$10 million overrun allowance provided in the WEM Rules. A forecast capex adjustment is therefore necessary for AEMO to be able to conduct this work.

3.3.4 Demand Side Response Review and WEM Investment Certainty Review

The DSR Review and the WIC Review are two Government-driven initiatives that are currently in progress, without certainty on policy outcomes or draft Amending Rules. However, both are scheduled to incur costs within the AR6 period, including elements that are expected for delivery.

These reviews complement the RCM Review in ensuring effective market signals and opportunities for energy supply sources, including DSR, to participate in the WEM – supporting a secure, reliable and lower-emissions electricity supply in the SWIS and reducing electricity costs through improved competition and access to the most efficient energy sources.

These projects are further examples of the challenges of the fast-paced energy transition in the context of the allowable revenue process, where AEMO must seek funding for projects within its regulatory period without certainty on policy design. Without funding to support such projects, we will be unable to implement within the

⁵⁵ For clarity, five-minute granularity is not required at the time that flexible capacity is certified, but rather at the time the product is operational in the market.

timeframes determined by the WA Government, and delays to implementation could have implications for the pace of the energy transition as well as the security, reliability and cost of services in the WEM.

While AEMO expects some level of delivery will be required for both projects within the AR6 period, only funding for planning and feasibility is being sought at this time. AEMO is hopeful it can manage risk within the overrun allowance provisions during the AR6 period and will revert back to ERA as part of its AR7 submission.

An overview of the DSR Review and WIC Review projects is provided in the following sections.

Demand-side Response Review

Project description and scope

A review of the WEM Rules in respect of the participation of DSR is currently being conducted by the Coordinator of Energy, in consultation with the Market Advisory Committee (MAC)⁵⁶. As the SWIS transitions to a low emissions energy system, characterised by increasing levels of intermittent and distributed generation, DSR offers the potential for additional flexibility / firming services needed to support the energy transition. While adequate incentives are necessary to ensure DSR's participation in the market (with costs that must be borne by the market and ultimately, consumers), the services provided by DSR can provide a lower cost opportunity when compared to new facilities or the procurement of additional temporary services under SRC or NCESS contracts.

At present, the direct participation of loads in the WEM is limited to DSP's providing load curtailment or interruptible load services to support frequency control. However, as the energy system evolves, it is anticipated that new technologies will emerge that offer higher levels of load control and flexibility. The focus of the DSR Review is therefore to identify rule amendments required to ensure that loads will receive adequate incentives to participate in a wider range of market services and be appropriately compensated for providing them.

Energy Policy WA published a Scope of Work⁵⁷ for the review in the latter half of 2022, which included the timings of intended reforms. A Consultation Paper⁵⁸ was subsequently published in September 2023 with design proposals and recommendations. Based on the information and timings provided in these documents, and from discussions with Energy Policy WA, we expect we will incur costs within the AR6 period to undertake planning and implement at least some of the outcomes of the review.

We are clear on the overall policy intent of the DSR Review and are cognisant that Energy Policy WA has released an Information Paper on the proposal. However, Amending Rules (or a draft of such rules) which are necessary to inform system design requirements are not yet available. At the time of writing, we do not have sufficient insight into the detail of the rule changes required to support secondary metering for facilities, and therefore, how settlement and other market processes (such as the calculation of loss factors, and dispatch) will be impacted. For this reason, we are seeking an in-period adjustment for the feasibility and planning stages of the DSR Review project only.

⁵⁶ Demand Side Response Review, located at <https://www.wa.gov.au/government/document-collections/demand-side-response-review>.

⁵⁷ Energy Policy WA (2022), *Scope of Work for the Review of the Participation of Demand Side Response in the Wholesale Electricity Market*, located at <https://www.wa.gov.au/system/files/2023-03/DSR%20Review%20-%20Scope%20of%20Work.pdf>.

⁵⁸ Energy Policy WA (2023), *Review of the Participation of Demand Side Response in the Wholesale Electricity Market*, located at *Consultation Paper*, 21 September, located at https://www.wa.gov.au/system/files/2023-10/dsr_review_consultation_paper_0.pdf.

We note that in line with AAS, costs for undertaking feasibility studies cannot be capitalised. Consequently, such costs are not included in this capex adjustment. We will undertake feasibility studies through a combination of internal labour and consultants, with the cost of these resources forming part of the opex requirement for the business (see Appendix 1).

The proposed capex adjustment for the DSR Review project is summarised in Table 16.

Table 16 P3127 DSR Review AR6 forecast capex, \$ million nominal

Activity	2022-23	2023-24	2024-25	Total AR6	In-period adjustment
Planning	-	-	0.17	0.17	0.17
Contingency	-	-	0.02	0.02	0.02
Total			0.19	0.19	0.19

Related function under the WEM Rules

The WEM Rules confer the function of ensuring the SWIS operates in a secure a reliable manner onto AEMO, under clause 2.1A.1A. The DSR Review project, which is a WA Government-driven initiative, will implement arrangements to support this function. Delivery of the DSR Review project is being undertaken in accordance with AEMO's functions under clause 2.1A.2 (IA) (iii) and (iv), and clause 2.1A.2 (II), with AEMO holding relevant functions to perform these activities under clauses 2.1A.2 (a), (d), and (m) of the WEM Rules.

Risks, dependencies, and contingency

The DSR Review project is for the WEM only. There are no shared costs with the broader AEMO business or NEM participants.

The timeline and scope of the DSR Review project is dependent on the following external factors:

- Confirmation of the outcomes of the DSR Review, led by Energy Policy WA.
- The timing and final form of any WEM Rule changes, led by Energy Policy WA.
- Market participants' requirements.

Any shift in the timing or scope of these external factors may impact AEMO's deliverables. To accommodate this and other risks associated with the planning phase of the DSR Review project, we have included a contingency of 10% (\$0.02m) within the capex forecast.

Why costs cannot be deferred to AR7

The outcomes and timelines for DSR Review initiatives are yet to be confirmed, and this has made it difficult to cost this project. However, based on published documents and discussions with Energy Policy WA, we expect that at a minimum, we will incur planning and feasibility costs during the AR6 period.

The AR6 capex forecast did not include provision for the DSR Review, which is a new project. The cumulative expected costs of this submission cannot be accommodated within the \$10 million overrun allowance provided in the WEM Rules. A forecast capex adjustment is therefore necessary for us to be able to conduct this work.

WEM Investment Certainty Review

Project description and scope

On 9 May 2023, the WA Government announced a package of further WEM reforms to address (among other things) issues recognised in the RCM Review, such as the need to enhance investment certainty for renewables and storage in the SWIS⁵⁹. The WIC Working Group was subsequently established by the MAC to undertake the review over 2023 and 2024 under clause 2.2D.1 of the WEM Rules. The WIC Working Group is considering⁶⁰:

- Changing the reserve capacity price curve to send a sharper signal for investment when demand for new capacity is stronger.
- Introducing a 10-year reserve capacity price guarantee for new technologies, such as long-duration storage.
- Introducing a wholesale 'energy price guarantee' for renewable generators, to top-up energy revenues. Renewable generators will be required to firm up their capacity, for example, by signing bilateral contracts with storage facilities.
- Introducing emission thresholds into the WEM Rules for existing and new technologies in the WEM so that overtime, only resources with emissions below these thresholds receive reserve capacity credits / revenues.

These initiatives encourage investment in the technologies required to sustain the future electricity system, thereby helping to ensure system reliability outcomes for consumers can be retained. Importantly, these initiatives focus on ensuring adequate total energy supplies to meet customer needs, noting the role that energy-limited resources such as battery storage systems are expected to play in meeting demand in the SWIS. The changes also allow for the reduction in greenhouse gas emissions in accordance with the WA Government's emissions reduction targets.

At the time of preparing this submission, the WIC Working Group has met on six occasions, with draft policy options being formed for several of the above initiatives. However, a consultation paper is not yet available to advise of the WA Government's preferred approach, nor an Information Paper available to provide policy certainty and details of the preferred approach. However, Energy Policy WA has advised of its preference to implement the 10-year reserve capacity price guarantee in early 2025, as well as changes to the peak reserve capacity price curve as early as 2024. The draft timeframes discussed for many of the other elements indicate that AEMO will need to undertake, at a minimum, planning activities within AR6.

We understand that WEM Rules changes will be submitted for the Minister for Energy's approval in August 2024, with rules commencement expected from September 2024⁶¹. Following this, we will implement the required WEM Rules changes in accordance with the timeframes established. Based on the scope of work and priorities for the WIC Review, we expect that almost all outcomes will require amendments to the RCM, and where possible we will seek to undertake changes in parallel with RCM Review initiatives to minimise implementation costs.

⁵⁹ See Media Statement of Hon. Bill Johnston, located at <https://www.wa.gov.au/government/media-statements/McGowan-Labor-Government/Green-energy-demand-to-transform-electricity-grid-20230509> and also SWIS Demand Assessment, located at <https://www.wa.gov.au/government/document-collections/swis-demand-assessment#:~:text=Introducing%20emission%20thresholds%20for%20existing,receive%20reserve%20capacity%20credits%2Fvenues>.

⁶⁰ WIC Review Working Group, located at <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-investment-certainty-wic-review-working-group#working-group-members>.

⁶¹ Energy Policy WA (2023), *Scope of Work for the WEM Investment Certainty Review*, p. 9, located at https://www.wa.gov.au/system/files/2023-07/scope_of_works.pdf.

As draft Amending Rules are not yet available to assess the impact to AEMO systems and other assets, no suitable delivery or solution options can be recommended at this time. For this reason, we are seeking an in-period capex adjustment for the planning stages only.

The proposed capex adjustment for the WIC Review project is summarised in Table 17.

Table 17 P3128 WIC Review AR6 forecast capex, \$ million nominal

Activity	2022-23	2023-24	2024-25	Total AR6	In-period adjustment
Planning	-	-	0.35	0.35	0.35
Contingency	-	-	0.06	0.06	0.06
Total			0.41	0.41	0.41

The above costs are provided as an estimate. It is assumed that by August 2024 the rules will be in a mature enough state to enable AEMO to elaborate requirements. As the new rules are introduced, the cost estimate for this project will be re-estimated and modified, with updated values potentially provided within AR7.

Related function under the WEM Rules

The WEM Rules confer the function of ensuring the SWIS operates in a secure and reliable manner onto AEMO, under clause 2.1A.1A, and for operating the RCM under clause 2.1A.2 (a). The WIC Review project is a WA Government-driven initiative; it will implement new RCM arrangements for improved investment certainty outcomes that help improve reliability in the SWIS. Delivery of the WIC Review project is being undertaken in accordance with AEMO's functions under clause 2.1A.2 (IA) (iii) and (iv), and clause 2.1A.2 (II), with AEMO holding relevant functions to perform these activities under clauses 2.1A.2 (a), (d), and (m) of the WEM Rules.

Risks, dependencies, and contingency

The WIC Review project is for the WEM only and there are no shared costs with the broader AEMO business or NEM participants.

The timeline and scope of the WIC Review project is dependent on the following external factors:

- The recommendations of the review, including the detailed policy design, as led by Energy Policy WA
- The timing and final form of WEM Rule changes, led by Energy Policy WA.
- Market participants' requirements.

Any shift in the timing or scope of these external factors may impact AEMO's deliverables. To accommodate this and other risks associated with the planning phase of the WIC Review project, we have included a contingency of 10% (\$0.06 million) within the capex forecast.

Why costs cannot be deferred to AR7

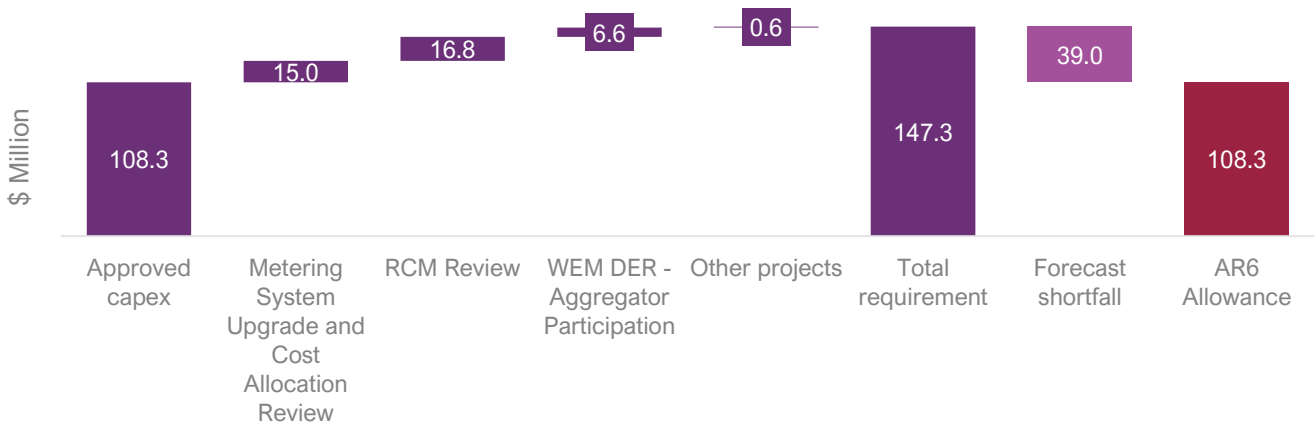
While the outcomes and timelines of the WIC Review have not been mandated at the time of writing, rule changes are scheduled for commencement from September 2024. We understand we will be required to undertake, at a minimum, the planning work for multiple WIC initiatives, as well as implementation of at least two initiatives.

The AR6 capex forecast did not include provision for the WIC Review, which is a new project. The cumulative expected costs of this submission cannot be accommodated within the \$10 million overrun allowance provided in the WEM Rules. A forecast capex adjustment is therefore necessary for AEMO to be able to conduct this work. We expect to submit an additional funding request for proposals under the WIC Review as part of the AR7 submission, or future in-period submissions within AR7 (dependent on timing).

3.4 Revised WEM capex forecast

Figure 12 summarises the revised capex forecast for 2024-25 as a result of implementing the reform and energy transition projects. It can be seen that an adjustment of \$39.0 million will be required to enable AEMO to undertake the activities necessary to fulfil its WEM Rules obligations, and to uplift its system capability (and mitigate its risk) during the energy transition.

Figure 12 Capital expenditure and forecast for AR6 period



The estimated forecast costs presented in this AR6 adjustment for the delivery of the WEM capex projects reflects our view of the lowest practicably sustainable cost of delivery, given the information available at the time of writing. As detailed project planning progresses, we will make the appropriate adjustments for consideration as part of the AR7 process.

4 Final words

AEMO recognises that the proposed adjustments present a significant increase in operational and capital expenditure from those identified in our original AR6 submission, the costs of which are ultimately borne by market participants and consumers.

WA's energy transition highly complex and fast-moving and will continue to require expenditure to ensure the market delivers the right outcomes. As a not-for-profit business, AEMO is always focused on the best interests of energy consumers and aims to provide services for the lowest practicably sustainable cost. We are conscious that changes to our costs (and resulting fees) during a regulatory period presents challenges for market participants and contribute to cost pressures being faced by WA households and businesses.

We are also aware of the importance of facilitating the energy transition in an efficient and timely manner, so that participants and ultimately consumers can benefit from a decarbonised power system sooner. That is why our aim during the AR6 period has been to invest in the right systems and people, to bring the WA organisation up to a level that can support a growing market and rapid, but sustainable, transition to renewables.

We have sought to keep our investments as low as reasonably practicable, and to sequence them over time to reduce delivery risks. Where there is the opportunity to deliver a program for a lower cost, implement a more efficient solution, or prudently defer expenditure, we will seek to do so. AEMO's program governance framework requires implementation options to be considered prior to the release of funding. Once underway, projects are overseen by executive-level steering committees, which manage the release of funds throughout the project. We also provide full transparency of actual expenditure via the annual regulatory reporting process with the ERA.

As detailed throughout the proposal, supporting the ongoing energy transition is the biggest driver of costs. This includes the development and implementation of specific Government-driven projects, as well as new and expanded activities to allow AEMO to respond faster and more cost-efficiently to the reform agenda and energy transition.

As is the reality for most jurisdictions with rapidly de-carbonising economies, change in WA's energy sector will continue at pace into the foreseeable future. The pace of change and the current regulatory model has resulted in the development of two unavoidable in-period adjustment proposals during the AR6 period. We anticipate that in the absence of changes to the regulatory framework, future in-period proposals will be necessary during AR7.

While in-period processes can theoretically accommodate a higher level of certainty on costs when compared to the standard three-yearly cycle – as expected by the ERA's Guideline – they come with drawbacks. In-period processes provide inadequate certainty over market fee increases. Uncertainty surrounding fees and AEMO's cost of service has impacts for market participants and customers.

The development effort required to prepare submissions, including documentation under the ERA Guideline, is also significant and ultimately borne by the market. For this in-period submission, we estimate staff time amounting to more than 500 days has been required, across multiple areas of the organisation, including finance, legal, regulatory affairs, subject matter experts, project management office, and individual project managers/leads, in addition to some external consultant support. Furthermore, managing uncertainty cannot be fully mitigated with in-period submissions. Project design and implementation timing are often externally driven inputs, yet the timeframes for regulatory revenue adjustments are inflexible. While the in-period process should be an exception

rather than a rule, these issues are exacerbated by the current and ongoing times of significant and fast-paced change.

We have considered whether there are other options to address the uncertainty in expenditure estimates in this submission, prior to the ERA making a determination. A further in-period submission is not considered practical in the timeframes available. An alternative two-step approval process could be considered, seeking some funding initially and the remainder later in the year following more detailed planning. However, it is not clear how such an approach might be accommodated within the WEM Rules regulatory framework, or how practical a solution that would be. AEMO only recovers its actual costs, the accuracy of the forecast has limited bearing on the final cost of a project, therefore delaying commencement of works to allow for a more accurate forecast would not necessarily result in a lower cost, a more prudent, or a more efficient outcome, and would most likely delay implementation.

We are keen to continue to work with the ERA and market participants to navigate this inherent uncertainty as the ERA considers this proposal. We also welcome collaboration with the ERA and Energy Policy WA on how best to support fast-paced reform while demonstrating prudence and efficiency in AEMO's costs along with value for market participants and consumers. This collaboration may involve amendments to the WEM and GSI Rules and the ERA's Guidelines, coupled with enhanced transparency on the costs of delivering reform projects within AEMO's Regulatory Reporting Guideline⁶².

In the interim, we look forward to working with the ERA, industry, and consumers on the reform activities and expenditure adjustments presented in this in-period submission, and we welcome all feedback and inquiries.

⁶² AEMO Regulatory Reporting Guideline, ERA 2022, located at: <https://www.erawa.com.au/cproot/22887/2/D251941-AR.6---Final-regulatory-reporting-guideline.pdf>

A1. Non-capitalised project costs

The ERA's Guideline provides for AEMO to provide visibility of non-capitalised project costs⁶³. As per the Guideline, projects proposed as part of operating costs for early feasibility or research activities must result in the creation of a separately identifiable asset with a future benefit to AEMO. Non-capitalised costs typically include labour, software and licensing and consultancy costs, and are a subset of the overall opex forecast.

AEMO expects to incur non-capitalised project costs within the following capital projects:

- DER Aggregator Participation.
- Metering System Upgrades and Cost Allocation Review.
- RCM Review.
- DSR Review.
- WIC Review.

Each of these projects will result in an asset with a future benefit to AEMO and are being delivered by the AEMO WA department. Table 18 provides a summary of non-capitalised project costs that form part of this in-period opex adjustment.

Table 18 Summary of non-capitalised project costs per capex project, \$ million nominal

Project	Market	Cost
P3099 DER Aggregator Participation	WEM	0.1
P3108 Metering System Upgrade and Cost Allocation Review	WEM	0.3
P3082 RCM Review	WEM	0.1
P3127 DSR Review	WEM	0.1
P3128 WIC Review	WEM	0.2
Total non-capitalised project costs		0.8

⁶³ Section 4.3.2 of ERA (2022) *Guideline to inform the Australian Energy Market Operator's funding proposal*, 28 October, p.15, located at <https://www.erawa.com.au/cproot/22925/2/-AR.6---Final-funding-proposal-guideline.PDF>.

A2. ServiceNow Revolution

Project description and scope

ServiceNow is an IT system used by the entire AEMO business to manage IT service requests and operations. AEMO has been using ServiceNow for almost a decade and it is a core enterprise-wide application.

In September 2023, upon reviewing the ServiceNow lifecycle and usage, AEMO decided to extend ServiceNow's use in the business as a strategic platform, and commenced installation of an upgrade patch that gives the business access to an additional suite of ServiceNow functions, including:

- Integrated risk management.
- Vendor and service workspace.
- Digital portfolio management.
- Release management.
- Participant portal/customer service management.

The Service Now Revolution upgrade (P3090) will improve the way the organisation manages IT management processes, as well as access to standardised risk management and vendor management tools that can be used across all departments, not solely IT. The upgraded software will help improve digital workflows, reduce manual activities, and help create a single source of data for a variety of everyday business activities.

The ServiceNow upgrade is scheduled to for completion in March 2024 at an estimated cost of \$1.8 million. This is an enterprise project, delivered by AEMO's central Digital team. Costs will be allocated to the AEMO WA department proportionally via an internal opex charge.

AEMO's allocation for this expenditure is \$0.26 million (14%). This is allocated based on based on headcount. The allocation is charged as an operating cost under the AEMO WA department's IT & Telecommunications cost centre and therefore forms part of AEMO's AR6 revenue requirement. There will be an uplift of \$20,000 per year to the ongoing operating cost associated with the upgraded system and additional capabilities.

Related function under the WEM Rules

The ServiceNow upgrade is necessary to allow AEMO to provide its functions under clauses 2.1A.1A and 2.1A.2(a) of the WEM Rules.

Criterion per Table PG.2 of the ERA's Guideline

b) This is a new cost for a new project.

A3. Uplift Finance Systems

Project description and scope

These projects (P1887) aim to deliver a modern integrated cloud-based enterprise resource planning platform, starting with the finance systems, that will address AEMO's current corporate systems which are fragmented and outdated.

These projects will implement a new suite of finance systems across AEMO that will support step change enhancements to fundamental business processes across project, time sheeting, invoicing and accounts payable as well as the core accounting functions. It will also enable broader transformation of AEMO's Finance function by reallocating finance talent from manual activities to more proactive and value add activities. The new finance system will form the foundation of a suite of corporate systems that will enhance corporate processes and drive efficiency.

The implementation of the new finance system will deliver benefits and mitigate operational risks (both Finance and Digital/Cyber) such as:

- Reducing time and effort spent on manual and repetitive tasks through automation and streamlining of business processes (including purchasing and payments, project labour costing and billing, employee expenses, corporate allocations, aggregation of budgets, and reporting).
- Improving data quality and timeliness of reporting to support reporting and decision-making.
- Improving efficiency of processes and compliance across all Finance functions.
- Mitigating cyber and operational risks associated with out of support/date software.
- Reducing license/maintenance costs of legacy systems.
- Improving user experience to improve attraction and retention of high performing talent in Finance.

While the Finance, Projects and Procurement teams will be a major beneficiary of the new system, the broader AEMO organisation will experience direct and indirect benefits of the new Finance system including improved user interface for activities such as time sheeting, expense management and approvals, improved data quality and reporting, integrated and streamlined financial and procurement processes and enhanced project accounting.

The execution phase of Uplift Finance Systems Project is expected to start in May 2024, with the new finance system expected to be in place by June 2025 at an estimated cost of \$13.2 million. This is an enterprise program, delivered by AEMO's central Digital team. Costs will be allocated to the AEMO WA department proportionally via an internal opex charge.

The WEM's allocation for this expenditure is \$1.9 million (14.1%). This is allocated based on based on a weighted average of the number of FTEs. The allocation is charged as an operating cost under AEMO WA's IT & Telecommunications cost centre and therefore forms part of AEMO's AR6 revenue requirement.

Related function under the WEM Rules

The finance system upgrade is necessary to allow AEMO to provide its functions under clauses 2.1A.1A and 2.1A.2(a) of the WEM Rules.

Dependencies / interdependencies

Project delivery is subject to a series of business readiness activities. These activities cover a mix of initiatives that and will de-risk the project timeline and set the project up for success. Activities are grouped under the following themes:

- Data, including commencing data profiling and cleansing in legacy systems.
- Process, including redesigning certain business processes ahead of implementation into the new solution.
- People, ensuring we have the right people for the project and identified across the organisation.

The timing and cost of the Uplift Finance Systems project may be impacted by any material timing or scope shifts arising from these business planning activities.

Why costs cannot be deferred to AR7

The finance system uplift is being delivered by AEMO's central Digital and Finance functions and will be rolled out across the entire business. These projects have already commenced and elements are expected to be completed during financial year 2024-25. As a result, the AEMO WA department will start incurring cost allocations for these projects during the AR6 period and cannot accommodate the cumulative additional expenditure of this submission within the AR6 forecast or overrun allowances.

Criterion per Table PG.2 of the ERA's Guideline

- b) This is a new cost for a new project.

A4. WEM and SWIS Power System Modelling

Project description and scope

The purpose of this project is to uplift AEMO's internal techno-economic modelling of the energy system. AEMO has several obligations under the WEM Rules and GSI Rules that require it to be able to model electricity system outcomes and associated gas consumption and the approach to undertaking these activities needs to evolve to support the ongoing energy transition and reform initiatives. These obligations are summarised below:

- Clause 3.11A.2(e) of the WEM Rules requires AEMO to be able to determine whether an NCESS trigger condition exists.
- Clause 4.5.9(b) of the WEM Rules and relevant part of clause 4.5.10 of the WEM Rules require AEMO to prepare the WEM ESOO and establish the Reserve Capacity Target under the second limb of the planning criterion, both of which require detailed power system modelling.
- Clause 4.5A.10 of the WEM Rules in collaborating with the Coordinator of Energy in development of the Whole of System Plan.
- Rule 104 of the GSI Rules requires AEMO to prepare the WA GSOO, establishing the gas consumption associated with the WEM Gas Powered Generation fleet.

Historically, AEMO has fulfilled these modelling obligations by outsourcing the work to external consultants. The relative stability of the energy system made this a prudent and relatively low-cost exercise. However, the recent reforms to the market, combined with new energy transition activities, the scale of network, generation and storage investment needed to maintain reliability and the growing complexity of generation fleet and power system operations, means this is becoming an increasingly more expensive exercise – and one that is being required to be undertaken more frequently. These reforms include a requirement for AEMO to forecast the value of storage duration as this capacity comprises an increasing component of the fleet (undertaken through an assessment of the Availability Duration Gap). A new requirement has also been introduced for AEMO to report on the relative value of Capability Classes (representing different types of capacity), further uplifting the requirements of modelling underpinning the WEM ESOO.

AEMO has therefore reviewed the prudence and efficiency of current modelling arrangements and proposes to develop an internal modelling capability. This will allow AEMO to reduce – and possibly ultimately eliminate – ongoing external modelling costs, while building an internal resource that can be utilised for additional ad-hoc modelling requirements (rather than solely an annual view), including in support of other engineering studies which require verifiable dispatch outcomes for future system states to assess more complex power system phenomena.

Costs for the WEM and SWIS Power System Modelling project (P3112) will be opex only. The majority of works will be delivered by existing internal resources, supported by external consultants as required.

Table 19 summarises the expected cost of the WEM and SWIS Power System Modelling project. These costs form part of the revenue allowance discussed in Section 2 of this submission.

Table 19 P3112 WEM and SWIS Power System Modelling, AR6 forecast opex, \$ million nominal

Opex cost	2022-23	2023-24	2024-25	Total AR6
Internal labour	-	0.45	0.33	0.78
External labour	-	0.15	0.13	0.28
Consultants	-	-	-	-
IT & Telecommunications	-	0.05	0.00	0.00
Contingency	-	-	0.08	0.08
Total		0.66	0.55	1.21

Related function under the WEM and GSI Rules

The WEM and SWIS Power System Modelling project will allow AEMO to improve its capability to support its functions under clauses 2.1A.1A, 2.1A.2(c), 2.1A.2(lA), 2.1A.2(lG) and 4.5.9 of the WEM Rules, clauses 8.1(d), (j), (ja), (jb) and (jc) of the GSI Rules, and to undertaking the specific modelling required to satisfy AEMO's WEM and GSI obligations under clauses 3.11A.2(e), 4.5.9(b), 4.5.10 and 4.5A.10 of the WEM Rules, and Rule 104 of the GSI Rules (as listed above)⁶⁴.

Dependencies / interdependencies

The project is intended to leverage the Medium Term Projected Assessment of System Adequacy (MT-PASA) Plexos model, which is currently being developed as part of the ongoing reform program⁶⁵. The timing and cost of this WEM and SWIS Power System Modelling project could therefore be impacted by any material shifts in that project.

It is also imperative that the new model in place for the beginning of the forthcoming Capacity Year and summer season, as this is the time when the power system modelling will be most valuable. The new model must therefore be in place by October 2024.

Why costs cannot be deferred to AR7

It is logical to deliver the WEM and SWIS Power System Modelling project in a timeframe (from late 2023 through to 2024) that supports the undertaking of reliability modelling for the development of the 2025 WEM ESOO, a key AEMO publication released mid-year. This modelling is performed in compliance with clause 4.5.9 of the WEM Rules for the WEM ESOO's Long Term PASA study. Reforms from the RCM Review will establish new critical metrics of reliability, which will add to costs of modelling exercises that are currently externally sourced. By undertaking this work in-house AEMO expects to avoid additional costs associated with externally sourced work in the future.

Another factor affecting timing is the rate of the energy transition, which is occurring at a pace that is stressing the system in ways that existing WEM Rules do not contemplate. The WEM Rules do not address or offer sufficient

⁶⁴ Costs of the WEM and SWIS Power System Modelling project related to AEMO's functions under the GSI Rules are allocated to GSI operating costs and can be accommodated within the existing GSI budget and/or the overrun allowance.

⁶⁵ The MT-PASA project was outlined to the ERA in AEMO (2021), *AEMO WA IT Roadmap 2022-2025*, located at <https://www.erawa.com.au/cproot/22507/2/AEMO-Western-Australian-IT-Roadmap-2022-2025.PDF> and was considered in the ERA's determination of AEMO's first AR6 in-period adjustment submission.

prescription or scope for AEMO to mitigate, for example, system strength issues or challenges associated with load uncertainty and variability associated with solar generation. AEMO needs capability to undertake modelling to forecast when system challenges are likely to manifest, within a time horizon that best allows AEMO to prepare to manage those challenges, including working with other parties including Energy Policy WA and Western Power, before the level of system risk becomes unmanageable.

The AR6 capex forecast did not include provision for the WEM and SWIS Power System Modelling project, which is a new project, and AEMO cannot accommodate the cumulative additional expenditure of this submission within the AR6 forecast or overrun allowances.

Criterion per Table PG.2 of the ERA's Guideline

b) This is a new cost for a new project.

A5. Project Eagle

Project description and scope

AEMO is supporting Energy Policy WA in the implementation of a significant package of regulatory reforms related to the 2021 recommendation by the Energy Transformation Taskforce to consolidate standards across multiple regulatory instruments, predominately under the *Electricity Industry Act 2004*⁶⁶. Project Eagle also creates a regulatory framework suitable for the regulation of DER.

The deliverable will be a new instrument, the Electricity System and Market Rules (ESMR), which will replace the current WEM Rules, Electricity Networks Access Code 2004, Technical Rules, Electricity Industry (Metering) Code 2012, and the Network Quality and Reliability of Supply Code 2005. The standards from these existing instruments will be reviewed and amended where required, before being consolidated into the new instrument, with an appropriate governance framework established to manage ongoing amendments. The result will be an end-to-end framework for Power System Security and Reliability (PSSR) standards that represents modern-day requirements, removes duplication, addresses gaps, and provides for a consistent amendment process to ensure standards do not diverge over time.

Energy Policy WA is also managing a DER workstream that will consider matters relating to the distribution network, as well as a potential third stream to manage remaining content from the above instruments that are not captured in the PSSR Standards Review or DER workstreams.

AEMO's Project Eagle project (P3111) captures AEMO's resourcing requirements to support the PSSR Standards Review workstream and overall coordination with Project Eagle's DER elements (which are predominantly captured under AEMO's DER Program) and with other elements likely to be undertaken during the AR7 period.

A scope of work for the PSSR Standards Review published by Energy Policy WA in October 2023⁶⁷ provides a high-level overview of Energy Policy WA's expectation of AEMO's involvement. This includes representation on the Technical Working Group responsible for providing significant input into the review and amendment of existing standards and identifying gaps in standards. AEMO is also represented at a PSSR working group under the MAC. During the rule drafting stage, AEMO will be tasked with developing and reviewing rules. While detailed scoping is pending, this is expected to be a significant volume of work, noting the size of existing instruments that will be accommodated under the new ESMR and the likelihood for extensive changes to WEM Procedures. There also exists the possibility that engineering studies will be needed to underpin decisions, limits and metrics determined in the creation of end-to-end reliability standards and potentially in managing obligations under the ESMR.

Delivering the body of work required under Project Eagle will necessitate subject matter expertise across multiple teams within AEMO. The uplift and development of the new standards, planning and operational process improvements will require assessments of existing prescription to facilitate the removal of redundancies or duplication. It is expected that transitional arrangements will need to be designed to support the reliable operation of the market, system and network as the existing instruments are 'stripped of content' and this content ported to

⁶⁶ Energy Policy WA (2022), *Energy and Governance Legislation Reforms - Project Eagle, Information Paper*, December, located at <https://www.wa.gov.au/system/files/2023-01/Project%20Eagle%20Information%20Paper.pdf>.

⁶⁷ Energy Policy WA (2023), *Power System Security and Reliability Standard for the SWIS*, Project Scope, October, located at https://www.wa.gov.au/system/files/2023-11/power_system_security_and_reliability_standards_review-scope_of_work.pdf.

the ESMR. Once implemented, there is likely to be an additional ongoing workload for AEMO resulting from integrated reliability frameworks, a significantly larger volume of rules, as well as new and/or improved planning and operational arrangements.

The Energy Industry (Distributed Energy Resources) Bill 2023 was recently passed by the WA Parliament. The implementation phase of the PSSR elements of Project Eagle is scheduled for completion in October 2025, three months into AR7 (financial year 2026).

Costs for AEMO’s Project Eagle project will be opex only. The majority of works will be delivered by existing internal resources, supported by external consultants as required.

Table 20 summarises the expected cost of Project Eagle (excluding the contribution from DER project resources). These costs form part of the revenue allowance discussed in Section 1 of this submission.

Table 20 P3111 Project Eagle AR6 forecast opex, \$ million nominal

Opex cost	2022-23	2023-24	2024-25	Total AR6
Implementation	-	0.60	1.87	2.47
Contingency	-	0.10	0.62	0.71
Total		0.70	2.48	3.18

Related function under the WEM Rules

Project Eagle is an activity under WA Government’s Energy Transformation Strategy Stage 2: 2021-2025⁶⁸, which was announced by the Minister for Energy on 30 August 2023⁶⁹. AEMO’s key role as the Market and Power System Operator and its technical expertise makes it key to the effective design and implementation of the centralised PSSR standards framework for the SWIS. AEMO will undertake Project Eagle in accordance with its general functions and its function of facilitating and implementing decisions by the Minister and Coordinator as conferred onto AEMO under clauses 2.1A.2 (a) and (II), as well as clauses 2.1A.2 (d) and (ID) of the WEM Rules.

Dependencies / interdependencies

Project delivery is highly dependent on the timeframes set by the WA Government. AEMO acknowledges that delivering to the September 2025 start date for the PSSR elements represents an ambitious endeavour, but stands ready to support the WA Government on meeting its timing commitments, informed by the accelerating energy transition of the SWIS and supported by the recent passage of legislation.

There are also dependencies with other projects, including matters pertaining to the second stream are largely being dealt with via other WA DER Projects, including the DER Aggregator Participation project. There will likely be interconnections between the first and second stream to ensure that PSSR elements of DER enablement are adequately captured and aligned with the broader PSSR frameworks.

⁶⁸ Energy and Governance Legislation Reform, located at <https://www.wa.gov.au/government/document-collections/energy-and-governance-legislation-reform> and Western Australia’s Energy Transformation Strategy moves to its next stage, located at <https://www.wa.gov.au/government/announcements/western-australias-energy-transformation-strategy-moves-its-next-stage>.

⁶⁹ New legislation to modernise electricity sector rules, located at <https://www.wa.gov.au/government/media-statements/Cook-Labor-Government/New-legislation-to-modernise-electricity-sector-rules--20230830>.



Why costs cannot be deferred to AR7

There are externally driven timeframes for the delivery of this project that fall substantially within the AR6 period. The implementation phase of the PSSR elements of Project Eagle is scheduled for completion in October 2025, meaning only the final three months fall within the AR7 period (financial year 2026). For this reason, AEMO is unable to defer project costs to the AR7 period and cannot accommodate the cumulative additional expenditure of this submission within the AR6 forecast or overrun allowances.

Criterion per Table PG.2 of the ERA's Guideline

b) This is a new cost for a new project.

Abbreviations

Term	Definition
5MS	Five-minute market settlement
AAS	Australian Accounting Standards
AEMO	Australia Energy Market Operator
AR5	Allowable Revenue period 5 (1 July 2019 to 30 June 2022)
AR6	Allowable Revenue period 6 (1 July 2022 to 30 June 2025)
AR7	Allowable Revenue period 7 (1 July 2025 to 30 June 2028)
Capex	Forecast capital expenditure
CPI	Consumer Price Index
CRC	Certified Reserve Capacity
D&A	Depreciation and Amortisation
DER	Distributed Energy Resources
DMO	Distribution Market Operator
DSO	Distribution System Operator
DSP	Demand Side Participation
DSR	Demand Side Response
Energy Policy WA	Energy Policy Western Australia
ERA	Economic Regulation Authority
ESMR	Electricity System and Market Rules
FTE	Full-time equivalent
ERA's Guideline	The ERA's <i>Guideline to inform the Australian Energy Market Operator's funding proposal</i>
ESS	Essential System Services
GSI	Gas Services Information
IT	Information technology
LRC	Low Reserve Conditions
MAC	Market Advisory Committee
MT PASA	Medium Term Projected Assessment of System Adequacy
MWh	Megawatt hour
NCESS	Non-Co-optimised Essential System Services
NEM	National Electricity Market
Opex	Operational expenditure
PASA	Projected Assessment of System Adequacy
PSSR	Power System Security and Reliability
PV	Photovoltaic systems
RCM	Reserve Capacity Mechanism
SRC	Supplementary Reserve Capacity
SWIS	South West Interconnected System
WA	Western Australia
WEM	Wholesale Electricity Market

Abbreviations

Term	Definition
WEM ESOO	WEM Electricity Statement of Opportunities
WA GSOO	WA Gas Statement of Opportunities
WIC	WEM Investment Certainty