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REVIEW OF AEMO'S SUBMISSION FOR AN IN-PERIOD ADJUSTMENT TO 2022-2025 (AR6) FORECAST CAPITAL EXPENDITURE

April 2023

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1. EXECUTIVE SUMMARY

1.1 Introduction

RSM Australia Pty Ltd (RSM) was appointed by the Australian Energy Market Operator (AEMO) to review AEMO's draft submission and the final submission ("the Proposal") to the Economic Regulation Authority (ERA) in Western Australia. AEMO is seeking an **In-Period Adjustment** to its forecast capital expenditure (capex) for the 1 July 2022 to 30 June 2025 review period, commonly referred to as the Allowable Revenue 6 (AR6) period.

1.2 Background

The ERA is responsible for determining funding for AEMO in the Western Australian energy markets. As the market operator, AEMO is responsible for the security and day-to-day operation of Western Australia's power system and WEM, and the provision of information regarding Western Australia's gas supply and services.

In accordance with clause 2.22A of the Wholesale Electricity Market (WEM) Rules¹ and rule 111A(5) of the Gas Services Information (GSI) Rules², AEMO is required to submit - to the ERA for approval - operating and capital expenditures relating to the provision of energy market services in Western Australia. Thereafter, AEMO recovers its costs from market participants through market fees. Therefore, every three years, AEMO must develop an *allowable revenue and forecast capital expenditure proposal* to cover the forward-looking costs of performing its functions. The ERA reviews the submitted proposal and determines AEMO's funding for the upcoming three-year period under the WEM Rules and the GSI Rules (collectively, the Rules). The Rules also outline the criteria that the ERA must consider in determining AEMO's funding proposal.

On 31 October 2021, the ERA published a guideline document to inform AEMO's proposal for allowable revenue and forecast capital expenditure for AR6. These guidelines were revised in version 3 of the *Guideline to inform AEMO's Funding Proposal*³ ("ERA Guidelines") on 28 October 2022. The Guidelines provide clarity and guidance to AEMO and market participants regarding the level of details about projects, functions and costs expected in AEMO's proposal. On 17 December 2021, AEMO submitted its funding proposal⁴ for the AR6 period. On 31 May 2022, the ERA published its final determination⁵ on AEMO's AR6 proposal.

AEMO's current submission for an In-Period Adjustment is to increase the level of revenue that can be recovered from market participants for the WEM Market Operations and Systems Management functions, and the GSI function, for AR6. AEMO's Proposal is seeking an upwards capex adjustment of **\$47.11 million** split across the following three categories of expenditure:

- WEM Reform (\$45.02 million);
- WEM Sustaining Capex (\$1.95 million); and
- GSI Sustaining Capex (\$0.14 million).

Additionally, in preparation of the Proposal, we understand that AEMO has:

- Improved internal verification processes for all financial inputs including the 'Back to Green' initiative carried out by Senior Management;
- Engaged SIA Partners to assist with the WEM Reform business case and for a high-level review on the financial model assumptions; and
- Engaged RSM Australia to conduct a review of the Proposal's alignment against the ERA Guidelines.

¹ <https://www.wa.gov.au/government/document-collections/wholesale-electricity-market-rules>

² <https://www.wa.gov.au/government/document-collections/gas-services-information-rules>

³ <https://www.erawa.com.au/cproot/22925/2/-AR.6---Final-funding-proposal-guideline.PDF>

⁴ <https://www.erawa.com.au/cproot/22361/2/AEMO-proposal.PDF>

⁵ <https://www.erawa.com.au/cproot/22675/2/-AR.6---Final-Determination.PDF>

1. EXECUTIVE SUMMARY (CONT.)

1.3 Scope of the Engagement

The scope of this engagement was to achieve the following key objectives:

- Review and comment in real time on inconsistencies between the Proposal against the ERA Guidelines, and identify actions to improve compliance;
- Provide recommendations in real time, to improve clarity of and consistency in language and financial inputs; and
- Issue a Summarised Consultancy Report (this report) to inform AEMO's Proposal. This report will confirm whether the Proposal is aligned with the ERA Guidelines, summarise the drivers, justifications and assumptions used by AEMO, and establish whether the Proposal is reasonably supported.

These objectives were achieved through interviews with key AEMO stakeholders and desktop reviews of three versions of the Proposal and supporting attachments. Whilst the entirety of the ERA Guidelines was used as the basis for this engagement, Section 4 of the ERA Guidelines (titled *AEMO's Proposal*) was mainly used as the reference point for alignment. A record of the draft / final Proposals reviewed is as follows:

- First review – draft version dated 28 February 2023
- Second review – draft version dated 21 March 2023
- Third review – final version dated 26 April 2023

1.4 Outcomes of the Engagement

Following review of each version of the Proposal, RSM provided feedback to AEMO for consideration in updating to the subsequent versions. The incorporation of this feedback was reviewed by RSM at the next review point to ensure alignment with the ERA Guidelines.

The outcome to the third review of the final version dated 26 April 2023 is that RSM did not identify any significant misalignments with the ERA Guidelines. Moreover, the engagement established that the Proposal is reasonably supported in terms of the drivers, justifications and assumptions used by AEMO for the expenditure variations.

1.5 Scope Exclusion

This report did not incorporate a technical review of the proposed capital expenditure projects, including variations requirements, and the appropriateness of the estimated expenditure based on technical requirements. Moreover, whilst the financials presented in the Proposal have been traced back to the Finance Tracking Sheets (FTS) maintained at the individual project level, the engagement did not incorporate an in-depth review of the FTS data itself.

The identification of any Rule compliance issues that may result from the proposed delayed / descoped work, whilst initially included in the scope, was later agreed with AEMO to be removed from the scope. This was to avoid any duplication of effort, as AEMO's project change management processes would have already considered such issues as part of project execution.

Signed



J Lam
Director
RSM Australia Pty Ltd

Melbourne
26 April 2023

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT

The engagement noted that the *project-level*/FTS provided an overview of to-date and forecast costs for, inter alia, internal labour, external labour, hardware, software, finance costs and contingency. The *project-level* variance between the forecasts and the funding allocated from the previous ERA Determination is used to build up the financials in the Proposal. Further details of the financials have been incorporated by AEMO as Appendices to AEMO's Proposal.

The main driver of costs for the upwards adjustment has been the under-estimation of complexity and effort in delivering the WEM Reform Program. External factors such as higher inflation, higher borrowing costs and tightening of the labour market have also driven the upwards adjustment across capex projects. This section summarises the three main categories of capex adjustments (and associated projects), as well as the drivers, assumptions and justifications.

2.1 WEM Reform

2.1.1 Design, Planning and Management

Summary

In the original forecast for the WEM Reform Program ("Program"), the Project Management Office (PMO) was expected to scale down after go-live and winding down completely by March 2024. However, the shift in scope of some projects beyond 1 October 2023 requires additional resources to reinforce the PMO to run at a higher capacity and for longer. Due to the scale and complexity of the program, the PMO was reinforced with additional personnel for resource planning, risk management, financial control, commercial roles and external assurance etc., thereby increasing overall costs.

Additionally, the WEM Reform Core project covers costs for external assurance and reviews applied to the Program. Delivery pressures and the recent scope elaboration/variation processes have required more external scrutiny and quality assurance reviews than originally anticipated; thus, driving the higher overall cost. Projects 'Market & Regulatory Design' and 'Technical & Process Design' are completed and closed out, but costs were incurred during the AR6 period. Whilst minor costs may be incurred due to potential minor rule amendments post go-live, these would be managed under the WEM Reform Core project, thereby increasing overall costs.

RSM Comments

AEMO accommodates the change in timelines, provides continued support after go-live and fulfils the regulatory reporting requirements. Information presented in the Proposal on the \$2.68 million increase is aligned with the requirements of Section 4 of the ERA Guidelines.

2.1.2 Integration

Summary

The integration section includes the following projects:

- P2083 Digital Platform Enablement;
- P2080 Integration;
- P2306 E2E Testing & Market Trial;
- P2081 Compliance Monitoring and Reporting; and
- P2175 Hypercare and Support.

The focus is on developing and delivering the Digital Platform including essential processes such as integration, testing, market trials and post-go live operational and market participants support. This development is also aligned to meet the Market Surveillance Data Catalogue (MSDC) requirements which are to be defined by Energy Policy WA and the ERA.

RSM Comments

Due to the underestimation during the AR6 forecasts, scoping work did not capture several essential costs in relation to the Program. Therefore, AEMO is seeking an increase in its development and delivery of the Digital Platform to market participants to incorporate integration, testing, market trials, compliance monitoring and reporting. Its proposed increase of \$20.44 million is presented as required by Section 4 of the ERA Guidelines.

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT (CONT.)

2.1 WEM Reform (Cont.)

2.1.3 Legacy Markets

Summary

The Reserve Capacity Mechanism (RCM) Reform provides stability and assurance in the supply of electricity whilst the Short-Term Energy Market (STEM) Reform facilitates the transacting of electricity for market participants. The release of WEM Rules Tranche 6 has increased the complexity for the RCM Reform and provided clarity in requirements for the STEM Reform. This has resulted in an increase of \$0.62 million for the RCM Reform and a reduction in costs for the STEM Reform by \$0.95 million.

Project title	Reason for variance	AEMO Proposal April 2022 (\$ million)	ERA Determination May 2022 (\$ million)	Revised Estimate April 2023 (\$ million)	Additional WEM Reform forecast capex (\$ million)
RCM Reform	- Lack of specialist skilled resource to work on the network access quantities (NAQ); and - WEM Rule changes under Tranche 6 resulted in complex capacity obligation quantity calculations which were not sufficiently resolved and anticipated to make detailed planning/design.	6.50	5.83	6.45	0.62
STEM Reform	- WEM Rule changes under Tranche 6 has reduced the complexity and improved the understanding of data requirements.	1.20	0.94	(0.01)	(0.95)

RSM Comments

The RCM Reform is understood to be progressing well and on track for completion. However, the variances were mainly due to a lack of skilled resources and as a result of the extension of the project due to the WEM Rule changes under Tranche 6. The STEM Reform, through the Back to Green review led at the Executive General Manager level, has been merged with the Registrations Reform project as initial plans have been evaluated to be non-essential in the short term. These assessments and review of variances are internally recorded and captured in a spreadsheet on decision making, recording of cost savings, consequence analysis, etc. Whilst this is a cost-saving, project details in AEMO's proposal are as required by Section 4 of the ERA Guidelines.

2.1.4 Registrations

Summary

Registrations Reform is a project to make necessary changes to support new registration taxonomy such as the registration portal, registration form management functionality and processes, etc. There had been an underestimation of the complexity and technical requirements of the existing system, hence requiring more specialist skillsets. This has led to difficulties in recruiting the right resources to implement and deliver the software changes as required.

RSM Comments

This is an ongoing project where the planning phase is understood to be complete and good progress is being made towards delivery. However, additional funds of \$1.66 million are required due to resourcing difficulties, resulting in longer than anticipated time for completion, and a change in solution design to rectify the initial plan of having two Registrations Systems (one for existing market and one for new market) running in parallel. Information presented in the Proposal is aligned with the requirements of Section 4.1 and Section 4.2 of the ERA Guidelines.

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT (CONT.)

2.1 WEM Reform (Cont.)

2.1.5 Settlements

Summary

The Settlements project concerns the updating of the settlement systems and processes to reflect the new WEM settlement formulas and timelines. It will also ensure settlement adjustments for the current market rules can be performed for the first 12 months post go-live. Whilst the project is well advanced, the proposed solution must be modified to account for a rule change on the uplift payments for the Frequency Control Essential System Services (FCESS).

RSM Comments

Additional funding of \$0.69 million is required due to the impact on FCESS and the underestimation of the effort required to implement the new system. Information presented in the proposal is aligned with Section 4 of the ERA Guidelines.

2.1.6 Security Constrained Economic Dispatch (SCED)

Summary

The table below provides an overview of the cost variances for SCED and associated projects:

Project title	Reason for variance	AEMO Proposal April 2022 (\$ million)	ERA Determination May 2022 (\$ million)	Revised Estimate April 2023 (\$ million)	Additional WEM Reform forecast capex (\$ million)
WEMDE ⁶	- Underestimation of effort required and changes to the scope and requirements due to the Tranche 5 and 6 Rules release.	2.30	1.88	10.04	8.16
WEMDE UI ⁷		2.80	2.61	8.86	6.25
Real Time Market Submissions	- Impact on RTMS submission schema, validations and unconstrained withdrawal and injection quantities due to Tranche 6 Rules; and - Higher than expected number of defects emerging during testing.	0.07	0.07	0.32	0.25
DTS ⁸ Integration & SCED Offline Tools	- Deferral of project to post go-live results in higher borrowing and labour costs; and - Identification of more development work that requires engagement of external consultants and vendors.	1.90	1.54	3.08	1.54
Constraint Management	- Project is completed with minor cost overruns.	0.05	0.05	0.07	0.02

RSM Comments

A significant amount of additional funding required in WEMDE and WEMDE UI were from the underestimation of efforts required to implement the WEMDE prototype, complexity of the project and the requirements of the Rules. There had to be reworks in designing and development to align the solution with the requirements of the rules. Information presented in the proposal is aligned with the requirements of Section 4 of the ERA Guidelines.

⁶ WEM Dispatch Engine (WEMDE)

⁷ WEMDE User Interface (WEMDE UI)

⁸ Declared Transmission System (DTS)

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT (CONT.)

2.1 WEM Reform (Cont.)

2.1.7 System Planning

Summary

The table below provides an overview of the cost variances for System Planning and associated projects:

Project title	Reason for variance	AEMO Proposal April 2022 (\$ million)	ERA Determination May 2022 (\$ million)	Revised Estimate April 2023 (\$ million)	Additional WEM Reform forecast capex (\$ million)
Outage Management Reform	<ul style="list-style-type: none"> - Scope elaboration and results from UAT and SIT⁹ resulted in additional efforts, extended run of the project and additional labour costs; - Impacted by resource attrition which resulted in delays in schedule and multiple releases of the system to meet commitments to market participants. 	0.60	0.57	3.60	3.03
Commissioning Tests Reform	- Through the Back to Green review, the project has been merged with Outage Management Reform	1.30	1.03	(0.07)	(1.10)
Forecast Integration	- Unexpected additional efforts to integrate requirements with downstream systems.	0.50	0.36	0.93	0.57
MT PASA ¹⁰ Reform	- Scope elaboration and underestimation of the complexity of building MT PASA into the Plexos tool.	1.10	0.83	2.77	1.94
ST PASA ¹¹ Reform	- Project currently on hold as it is dependent on the progress on WEMDE.	1.60	1.22	1.16	(0.06)
System Operation Planning Tools Reform	- There are no longer any costs associated with this project, as the proposed scope has been moved to other reform projects (Outage Management and MT PASA)	0.90	0.69	(0.04)	(0.73)

RSM Comments

Whilst there are cost savings on certain projects, significant amounts of additional funding requested for System Planning are due to the underestimation of efforts, complexity in execution and integration with systems across the board. The details provided for the proposed increases are aligned with Section 4 of the ERA Guidelines.

⁹ User Acceptance Testing (UAT) and System Integration Testing (SIT)

¹⁰ Medium-Term Projected Assessment of System Adequacy (MT PASA)

¹¹ Short-Term Projected Assessment of System Adequacy (ST PASA)

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT (CONT.)

2.2 WEM Sustaining Capex

Summary

At the time of the final determination (May 2022), the WEM sustaining capex had not commenced and was still in the concept phase of project planning. Currently, with the progression of the Program, AEMO has revised its IT Roadmap 2022-2025 and identified several essential and necessary adjustments, resulting in five new projects and an additional project rolled over from AR5. Details are as follows:

Project title	Summary of driver	Additional WEM forecast capex (\$ million)
New projects		
WEM EMS GPS ¹² clock	Western Power has advised it will no longer provide this service. Therefore, AEMO must set up its own backup system as a failsafe.	0.08
APIM ¹³ on-premises	Cyber security requirements to allow market participants' system to interact securely with AEMO systems.	0.43
Project rolled over from AR5		
Oracle upgrade	AEMO's Oracle environment is relying on physical servers which will reach their end-of-life during the AR6 period and will no longer receive appropriate level of vendor support. Work planned during the AR5 period did not commence due to resourcing constraints. Instead, the upgrade has been pushed into A6.	1.44
Total additional WEM Sustaining Capex (excluding GSI allocations)		1.95

RSM Comments

We have reviewed the Proposal for the project details. With reference to the ERA Guidelines, we noted that AEMO has considered the available options for each project and measured against the funding determination criteria. The details provided for the proposed increase of \$1.95 million are aligned with Section 4.1 and 4.2 of the ERA Guidelines.

¹² Energy Management System Global Positioning System (EMS GPS)

¹³ Application Programming Interface Management (APIM)

2. REVIEW OF CATEGORIES OF CAPEX ADJUSTMENT (CONT.)

2.3 GSI Sustaining Capex

Summary

The proposal for additional funding is driven by the GSI Rule change relating to trucked liquified natural gas (LNG) and GSI allocation of expenditure on upgrades to enterprise (AEMO-wide) systems. Details are as follows:

Project title	Summary of driver	Additional GSI forecast capex (\$ million)
New projects		
APIM on-premises	Cyber security requirements to allow market participants' systems to interact securely with AEMO systems.	0.00 ¹⁴
WEM EMS GPS clock	Western Power has advised it will no longer provide this service. Therefore, AEMO must set up its own backup system as a failsafe.	0.00 ¹⁴
Trucked LNG	Trucked LNG rule change helps promote the GSI objectives.	0.04
Project rolled over from AR5		
Oracle upgrade	Enterprise program delayed from 2021/22	0.09
Total additional GSI Sustaining Capex		0.14 ¹⁵

RSM Comments

The details provided for the proposed increase of \$0.14 million are aligned with Section 4 of the ERA Guidelines.

¹⁴ No additional costs for GSI Sustaining Capex but includes additional costs for WEM Sustaining Capex as per the previous table.

¹⁵ Totals do not sum up due to rounding.

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