Australian Energy Market Operator - Allowable Revenue and Forecast Capital Expenditure for 2016/17 to 2018/19 - Forecast Capital Expenditure Adjustment

Final Determination

7 December 2018

Economic Regulation Authority

WESTERN AUSTRALIA

D192394

Economic Regulation Authority

4th Floor Albert Facey House
469 Wellington Street, Perth

Mail to:
Perth BC, PO Box 8469
PERTH WA 6849

T: 08 6557 7900

F: 08 6557 7999

E: records@erawa.com.au

W: www.erawa.com.au

National Relay Service TTY: 13 36 77
(to assist people with hearing and voice impairment)

We can deliver this report in an alternative format for those with a vision impairment.

Contents

1. Determination

The Economic Regulation Authority is responsible for determining the revenue the Australian Energy Market Operator (AEMO) can recover from market participants for the services it provides in the Wholesale Electricity Market in Western Australia.

On 17 July 2018, AEMO proposed an adjustment to forecast capital expenditure for the fourth Allowable Revenue (AR4) period, covering the three years from 1 July 2016 to 30 June 2019. This followed a change[1] to the Wholesale Electricity Market (WEM) Rules by the Minister for Energy that conferred additional functions on AEMO to prepare and implement “Wholesale Electricity Market and Constrained Network Access Reform”.

AEMO’s latest funding proposal was made under clause 2.22A.9 of the Market Rules. AEMO must apply to the ERA to approve an adjustment to forecast capital expenditure if the proposed increase exceeds the approved forecast capital expenditure by more than 10 per cent. AEMO’s proposal is available on the ERA’s website.[2]

AEMO asked the ERA to approve an additional forecast capital expenditure of $11.2 million for the remainder of AR4 (11 months at the time the proposal was made). This additional expenditure was to fund several Information Technology (IT) projects and to commence new projects for the WEM reform program. The additional expenditure proposed represented a 43.8 per cent increase to the forecast capital expenditure previously approved by the ERA in AR4.

In AEMO’s proposal, the full cost to implement the projects was $19.5 million, offset by $8.3 million previously approved but not spent forecast capital expenditure.

In making its determination, the ERA has assessed AEMO’s proposed funding as either:

- approved as it meets the requirements in the Market Rules
- not approved because it:
  - is not required, as approved funding already exists
  - does not meet the approval requirements in the Market Rules.

On this basis, the ERA approves $6.5 million in additional forecast capital expenditure for AR4.

The ERA reviewed AEMO’s July 2018 proposal on a project-by-project basis to understand the detail underlying the funding proposal. The ERA does not approve funding at the project level and instead approves a total amount of forecast capital expenditure for AR4.

AEMO has reported an $8.3 million of previously approved, but not spent forecast capital expenditure, and the ERA has taken this into consideration in making its determination.

Table 1 provides a summary of the forecast capital expenditure proposed by AEMO in its July 2018 submission, and the amount approved by the ERA.

1 On 28 June 2018, the Minister for Energy changed Market Rule 1.20 (Government Gazette 29 June 2018).

2 AEMO July 2018 proposal

Table 1: ERA final determination on AEMO's July 2018 proposal

Item ($'000nominal)	AEMO proposed	ERA approved
Market Operations total forecast capital expenditure	**8,221**	**2,773**
Rule changes	3,612	-
Upgrade end-of-life Market Operations IT infrastructure	2,032	-
WEM reform	2,139	-
New facilities	438	-
System Management total forecast capital expenditure	**11,253**	**3,740**
Power system operations	3,740	-
System management systems transition	4,936	-
WEM reform	2,139	-
New facilities	438	-
Total	**19,474**	**6,513**

The ERA's determination increases the forecast capital expenditure for the WEM in AR4 by 25.4 per cent from $25.6 million to $32.1 million.

The Market Rules enable AEMO to spend an additional 10 per cent ($3.2 million) above the approved forecast capital expenditure in AR4 before it has to apply to the ERA for further approval.

AEMO did not request any additional allowable revenue funding in its July 2018 proposal. Therefore, the approved allowable revenue remains unchanged from the ERA's previous AR4 determinations (made in December 2016 and July 2017).

The total approved allowable revenue and forecast capital expenditure for the WEM in AR4 are shown in Table 2 below. This combines this determination on forecast capital expenditure with the allowable revenue and forecast capital expenditure already approved by the ERA in AR4.

Table 2: Total approved allowable revenue and forecast capital expenditure for AR4 (electricity only)

Item ($'000 nominal)	2016/17	2017/18	2018/19	Total
AEMO total forecast capital expenditure	**13,433**	**10,369**	**8,311**	**32,113**
Market Operations	**6,807**	**4,832**	**4,451**	**16,090**
Business as usual	1,779	2,830	1,678	6,287
Reform projects	5,028	2,002	2,773	9,803
System Management	**6,626**	**5,537**	**3,860**	**16,023**
Business as usual	905	1,180	120	2,205
System Management transfer of function	3,213	2,299	-	5,512
Reform projects	2,508	2,058	3,740	8,306
AEMO total allowable revenue	**33,381**	**31,170**	**29,098**	**93,649**
Market Operations	**16,225**	**13,825**	**14,213**	**44,263**
Business as usual	15,617	13,310	13,555	42,482
Reform projects	608	515	658	1,781
System Management	**17,156**	**17,345**	**14,885**	**49,386**
Business as usual	14,646	14,520	11,031	40,197
System Management transfer of function	2,019	2,570	3,527	8,116
Reform projects	491	255	327	1,073

The following factors informed the ERA's determination.

The ERA's obligation under clause 2.22A.11 (b) of the Market Rules is to only approve allowable revenue and forecast capital expenditure incurred by a service provider acting efficiently, seeking to achieve the lowest practicably sustainable cost of delivering its services.

There is no obvious step in AEMO's project planning and project costing process, and no identified requirement in its internal funding approval that acknowledged, or provided a 'checkpoint' to ensure that each project and its associated cost reflected:

- the WEM objectives
- the lowest practicably sustainable cost of delivery.

The ERA approves the additional forecast capital expenditure on the assumption that, where indicated, the capital projects will deliver operating costs savings in AR5 and beyond. For these projects, the ERA expects AEMO will identify these operating cost savings in its funding proposal for AR5.[3]

In its project documentation, AEMO presented different cost scenarios: low, medium and high. When assessing AEMO's proposal:

- The ERA's technical consultant confirmed that, in most cases, the low cost scenarios were reasonable given the complexity of the IT projects proposed by AEMO.

[3] These are operating cost savings identified for the Power System Operation and Upgrade end-of-life Market Operations IT infrastructure projects.

- The ERA used AEMO's low cost scenario as the basis for assessing additional expenditure. This was unless AEMO had clearly demonstrated in its proposal, or in information provided later, that the medium or high cost scenario represented the most practicably sustainable option.
- The ERA is not satisfied that AEMO has a consistent process for determining project contingencies. The ERA's technical advisor provided information on the reasonable range of project contingencies applied to major IT projects, similar to those included in AEMO's July 2018 proposal. Not all of the project contingencies AEMO applied, fell within this range. Also, AEMO was unable to explain why some project contingencies were different between projects, or why contingencies changed over time.

In the previous reform program, the commencement date for a new market design was 1 July 2018. In the current reform program, the new market commencement date is 1 October 2022. The ERA and its technical advisor acknowledge that this delay resulted in AEMO revising its approach to managing System Management functions and Market Operations IT infrastructure in advance of developing and building new market systems.

Some projects identified in the previous reform program and some projects included in the current WEM reforms have very similar scopes. In making its determination, the ERA has not approved additional forecast capital expenditure for activities where funding is already approved, but not spent by AEMO.

The assessment took into account that the timing of AEMO's July 2018 proposal and the ERA's determination (December 2018), are near to the end of the AR4 period (30 June 2019).

AEMO has not spent all previously approved AR4 forecast capital expenditure. As at May 2018, there was a material underspend of $8.3 million.[4]

The ERA noted market participants' feedback on the AEMO July 2018 proposal in response to the ERA issues paper, published on 5 September 2018.[5]

The reasons for the ERA's determination on additional forecast capital expenditure at the project level are provided in more detail from Section 5 onwards.

4 The $8.3 million underspend is 32 per cent of the $25.6 million forecast expenditure previously approved in AR4.

5 ERA website

2. AEMO's July 2018 proposal

AEMO's July 2018 proposal identified additional forecast capital expenditure for financial year 2018/19, the final year in the three-year AR4 period.

The additional expenditure proposal was triggered by the Minister for Energy's amendment to Market Rule 1.20, which conferred additional functions on AEMO. These new functions are listed in the box below:

> 1.20.1. The WEM Regulations provide for the Market Rules to confer additional functions on AEMO. Until 1 October 2022, the following additional functions are conferred on AEMO:
>
> (a) To prepare for Wholesale Electricity Market and Constrained Network Access Reform.
>
> (b) To facilitate the implementation of Wholesale Electricity Market and Constrained Network Access Reform (including through transitional measures).
>
> 1.20.2. Without limiting AEMO's discretion in performing its functions, AEMO may undertake any of the following activities in carrying out the function conferred on it under clause 1.20.1:
>
> (a) Procuring, developing, testing and otherwise preparing all systems, tools and procedures necessary or convenient for AEMO to continue to provide services and perform its functions and obligations on and from the commencement of Wholesale Electricity Market and Constrained Network Access Reform.
>
> (b) Designing, developing, and consulting about, changes to the legislative regime applying to the Wholesale Electricity Market (including the Electricity Industry Act, the Regulations and these Market Rules) to accommodate Wholesale Electricity Market and Constrained Network Access Reform.
>
> (c) Project management, governance, planning, change management and stakeholder management activities to facilitate implementation of Wholesale Electricity Market and Constrained Network Access Reform.

The July 2018 proposal, if approved in full, would increase total forecast capital expenditure in AR4 from $25.6 million to $36.8 million; an increase of 43.8 per cent. AEMO explained[6] that:

> "While this is a significant overall increase, the forecast capex proposed is similar to the amounts approved in the first two years of the AR4 period."

AEMO's current submission seeks to fund a mixture of projects, some of which overlap in scope with previously approved projects and some of which are new projects. AEMO states:[7]

> "AEMO seeks a forecast capex increase of $11.19 million, required to enable AEMO to:
>
> - Commence work on the design and implementation of WEM reforms as directed by the WA Government.

6 AEMO July 2018 proposal, page 5

7 AEMO July 2018 proposal, page 4

- Complete the Power System Operations (PSO) project, the first phase of which was approved in the February 2017 AR4 update.
- Complete the System Management Systems Transition (SMST) project that achieves IT separation from Western Power in preparation for the WEM reforms.
- Update end-of-life Market Operations IT infrastructure.
- Implement system modifications in response to two recent Rule Changes."

AEMO advised that the full capital cost of the proposed projects was $19.5 million. However, this was offset by a capital underspend of $8.3 million within its existing budget.[8] This reduced the net forecast capital expenditure proposal to $11.2 million.

> "The lower-than-forecast spend has been achieved by efficient management of budgets to date, only incurring costs that are necessary for business-as-usual activities and deferring investment where prudent to do so (without a deterioration in service).The lower-than-forecast spend was also achieved by initially reducing and ultimately ceasing the previous Government's reform activity when it became apparent the reforms may not proceed."

8 AEMO July 2018 proposal, page 6

3. Public consultation

In September 2018, the ERA published an issues paper[9] to assist interested parties to make submissions on any aspect of AEMO's proposal. The consultation period closed on 16 October 2018.

Five stakeholders made submissions: Bluewaters Power,[10] NewGen Power Kwinana,[11] Perth Energy,[12] Synergy[13] and Western Power.[14] The submissions are available on the ERA's website.

Common points raised by stakeholders included:

- AEMO's proposal did not include enough detail. This made it difficult to assess whether the proposed expenditure was reasonable.
- AEMO had requested funding for the implementation of the rule change 'Reduction of prudential exposure', that was $0.8 million above the estimate ($2.7 million) AEMO had previously made in the final rule change report.[15]
- AEMO's proposed expenditure for the WEM reform project is large, especially given the slow progress of reforms to date and the proximity to the end of the AR4 period.

Market participants appeared more supportive of some of AEMO's proposed IT projects, including the implementation of the new energy management system, and the upgrade of Market Operation's IT infrastructure. Despite this support, market participants recommended that the ERA applies due diligence before approving any expenditure.

Specific matters or comments made in stakeholder submissions are included in the relevant sections below.

9 ERA Issues paper

10 Bluewaters Power submission

11 NewGen Power Kwinana

12 Perth Energy

13 Synergy

14 Western Power

15 RC_2017_06 Final rule change report, page 31

4. ERA's assessment process

The Market Rules outline[16] what the ERA must consider to assess a funding proposal from AEMO:

- The ERA can only approve costs that would be incurred by a prudent provider acting efficiently and seeking to achieve lowest practicable and sustainable cost of delivering the services.[17]
- The ERA must determine AEMO's allowable revenue and forecast capital expenditure on the basis that Wholesale Electricity Market and Constrained Network Access Reform will be implemented before 1 October 2022.[18]

The ERA assessed the projects included in AEMO's submission individually and, where relevant, compared them against previously proposed projects and approved forecast capital expenditure. This is necessary because there have been two market reform programs in the AR4 period: one initiated by the former State Government and the current WEM reforms, initiated by the present government. When assessing forecast capital expenditure identified for WEM reform activities, the ERA compared the scopes of projects included in both reform programs to ensure that:

- Expenditure for activities common to both reform programs is not approved twice.
- Where AEMO's functions have been extended, then projects relating to these additional functions are appropriately funded.

AEMO's July 2018 proposal did not provide sufficient detail for the ERA to make a determination. To obtain sufficient information to be able to make a determination, the ERA:

- Sent three main requests to AEMO for additional information and followed up with clarifying questions.
- Met with AEMO's project leads for the projects listed in the proposal. These sessions informed a second major information request for project documentation. Once received, information in the project documentation generated further queries.
- Met with Western Power to confirm the costs that could be incurred if some of AEMO's proposed projects did not proceed, such as not transferring System Management IT system functionality to AEMO, and extending the current service arrangements.
- Sought confirmation that AEMO's cost allocation processes maintained clear separation between costs associated with AEMO operating in:
  - Western Australia's gas and electricity markets
  - the WEM and National Electricity Market.
- Requested information on the $8.3 million underspend[19] by project. AEMO provided additional information on the reasons for the underspend. These included extension of project timelines, cancellation of projects, and that actual implementation costs that were below budget.

16 The legislative requirements governing funding approval are provided in Appendix 1.

17 Clause 2.22A11 (b) of the Market Rules

18 Clause 1.20.3 of the Market Rules

19 AEMO July 2018 proposal, page 6

AEMO cooperated fully during the process, responded quickly to information requests, and made project staff available for meetings. The additional information clarified AEMO's:

- Governance and project processes that included development and approval of project concept documents:
  - Project concepts outlined each project's rationale and scope, approval and (where applicable) tendering processes, the required resourcing, low and high cost scenarios. The different cost scenarios reflected different resourcing estimates, risks and contingencies.
- Project cost and project risk assessment processes. These are informed by each project's rationale and requirements and also form part of the project concept documents. Depending on size of the expenditure and the strategic importance of the individual project, the project concept documents are presented for approval to AEMO's executive management team, or to the AEMO board respectively.

The ERA engaged Stantons International to provide technical advice and assistance during its review. The consultant's report is available on the ERA's website.[20] The technical consultant engaged with New Zealand's system operator (Transpower), to seek advice on the proposed market systems and associated costs.

In making its determination, the ERA has identified:

- Additional forecast capital expenditure for AR4 (Section 5) that meets the approval criterion in the Market Rules and has been approved.
- Additional forecast capital expenditure for AR4 that meets the approval criterion but has not been approved. This is because no additional funding is required, as previously approved forecast capital expenditure already exists (Section 6).
- Funding proposed by AEMO that failed to meet the approval criterion (Section 7).

The following sections provide additional information on the proposed expenditure at project level and the reasons behind the ERA's decision.

[20] Stantons International (2018), Technical Advice report http://www.erawa.com.au/cproot/19898/2/Consultant%20report%20-%20Stantons%20International-%20AEMO%20forecast%20capital%20expenditure%20adjustment%202018.PDF

5. Additional approved forecast capital expenditure in AR4

The ERA has approved additional forecast capital expenditure of $6.5 million in AR4 to enable AEMO to complete the Power System Operations project and to implement two rule change projects.

The approved additional expenditure is $0.8 million less than the amount proposed by AEMO. The ERA has only approved proposed expenditure for the rule changes that met the approval requirements in the Market Rules.

5.1 Power System Operations project

The ERA has previously approved allowable revenue and forecast capital expenditure for the Power System Operations (PSO) project in AR4.

AEMO's latest request for additional forecast capital expenditure for the PSO project was assessed against the ERA's previous determination, together with AEMO's actual PSO project expenditure.

5.1.1 Previously approved funding for this project

As part of its determination in July 2017, the ERA approved $1.7 million in forecast capital expenditure and $0.5 million in allowable revenue for AEMO to commence the PSO project to move three System Management IT systems from Western Power to AEMO. These are the:

- Energy Management System
- South West Interconnected System (SWIS) power model
- Demand Forecasting system.

In its February 2017 proposal,[21] AEMO flagged that it would:

> "defer some of the more significant hardware and licensing costs until 2018. The estimated cost for completion of the Power System Operations components is $3.04M, (with approximately $1.8M of this relating to hardware and license purchases)."

5.1.2 Stakeholder comments on the current proposal

AEMO's July 2018 proposal identified additional forecast capital expenditure of $3.7 million to complete the PSO project in AR4. This is allocated $1.6 million to resourcing, $1.4 million to hardware costs and $0.7 million to software costs.[22]

AEMO advised that it has implemented the SWIS modelling system and the Demand Forecasting system within the approved funding. The additional funding is to complete the energy management system transition from Western Power's XA/21 system to version 2.5 of General Electric's e-terra platform.

---

21 AEMO Feb 2017 proposal, page 22

22 There was some residual funding allocated to 'other costs'. This is not shown because of the rounding to $ millions.

Perth Energy's submission supported the expenditure for the implementation of e-terra by stating:

> "We consider that, the timing of necessary upgrades of the market and system operations systems coupled with the timing of the proposed introduction of a constrained network access model provides the opportunity to introduce more appropriate IT systems, including a new energy management system."

In their submissions, while generally supportive of the transition to e-terra, both Bluewaters and NewGen Power Kwinana commented on the $0.7 million cost increase requested to complete the implementation of e-terra compared to AEMO's earlier estimate in February 2017:

> "The additional $0.7M revenue request is another example of a concerning under-estimate of the cost of implementation, being 23% above the initial estimate. The Authority should monitor the implementation costs of this and other projects. Any systematic bias of cost increases in IT project implementation should be factored into future revenue determinations."

The Bluewaters' and NewGen Power Kwinana's submissions commented on AEMO's Service Level Agreement with Western Power:

> "There is no information on the cost of the AEMO service agreement with Western Power for the utilisation of the existing XA/21 platform. It is unclear how much of the cost maintaining that platform, including the 2016 upgrade to it, has been borne by market participants and how much has been borne by Western Power. Market participants should understand if any cross-subsidisation to Western Power has occurred."

Western Power's submission stated:

> "Western Power supports AEMO's plans to cease relying on Western Power's energy management system, the XA/21 platform, and implement its own energy management system. This will remove the need for AEMO to use the East Perth facility as a back-up facility, and remove the costs associated with Western Power maintaining the XA/21 platform and the back-up facility."

5.1.3 The ERA's assessment and conclusion

To assess whether the proposed funding of $3.7 million to complete the PSO project met the funding approval requirements in the Market Rules, the ERA considered the following matters.

Moving to the e-terra energy management system

AEMO provided the ERA with high level costs associated with an alternative option of not moving to e-terra and continuing to rely on Western Power's XA/21 energy management system through the Service Level Agreement (SLA).[23] The comparison indicated that AEMO would incur significant costs if it chose this option, including:

- Western Power XA/21 upgrade:
  - When it met with the Secretariat, Western Power indicated that if AEMO wished to retain its reliance on the XA/21 system, it would be due for a main upgrade by the end of 2019. The high-level costs of this upgrade were expected to range from $6 to $8 million.

[23] The SLA is discussed further in Section 6.1.

  - Currently, Western Power uses the XA/21 platform to manage its transmission network. However, Western Power advised that it intends to transition its transmission systems onto a separate Power-On-Fusion platform, which already hosts its distribution network. Therefore, any costs to upgrade XA/21 would be borne by AEMO alone.
- Renegotiating the SLA:
  - AEMO is currently exercising an extension option in the SLA up to 31 March 2019. Extending the SLA beyond March 2019 would require commercial negotiations between Western Power and AEMO. Western Power commented that the future SLA cost had not been estimated, but was likely to be greater than the cost of the current SLA.
- Retaining the East Perth control room:
  - Western Power used to provide both system management and network services out of its control rooms in East Perth. Western Power is still using IT systems based in East Perth to provide system management services to AEMO. Western Power has advised that it intends to move its remaining network systems from the East Perth building to a new location during 2019. Therefore, once Western Power has transferred its own systems, it would only retain the East Perth facility to provide continued support to AEMO. The full cost to maintain and operate this facility would be met by AEMO.

These reasons supported AEMO’s decision to develop and implement the e-terra energy management system for the WEM and AEMO expects that it will commence operation around March/April 2019.

E-terra cost estimates

AEMO had previously advised the ERA that it would request additional forecast capital expenditure to complete the PSO project. In February 2017, this was estimated at just over $3.0 million. In the July 2018 proposal, this had risen to $3.7 million. The $0.7 million was attributed to additional hardware ($0.5 million) and increased labour costs ($0.2 million).

Additional information provided by AEMO indicated that the revised PSO project cost of $3.7 million was the low cost scenario. The project will be delivered by a combination of internal staff and contractors.

AEMO’s supporting information clarified that the hardware cost increase of $0.5 million was for additional hardware capacity needed to support the latest version of the e-terra energy management system (version 3.2). Upgrading the hardware capacity in advance would ensure that the planned upgrade to version 3.2 of e-terra in AR5 would only include resource costs. This is discussed further below.

AEMO also provided justification for the labour cost increase of $0.2 million. The project concept document assumed the PSO project would be delivered partially by internal resources. However, AEMO later determined that the complexity of the PSO project required external, more expensive specialists in some instances. AEMO confirmed to the ERA that the time taken to hire the appropriate specialists delayed the start of the project. This would have reduced estimated labour costs in AR4, but the reduction was offset by the higher labour rates. This was taken into account in the $0.2 million increase.

While AEMO is completing the PSO project, it will continue to rely on its SLA with Western Power. The initial term of the SLA expired on 30 September 2018 and AEMO executed the option to extend the SLA to 31 March 2019 on the current terms and conditions. AEMO considered this extension is sufficient to implement e-terra in the WEM.

AEMO's project concept document included information that once Western Power's XA/21 service has finished, there would be an annual operational saving of around $0.3 million. The ERA expects savings such as this to be identified in AEMO's AR5 funding proposal.

E-terra version and upgrade

AEMO uses version 2.5 of the e-terra energy management system in the National Electricity Market and is currently transitioning to e-terra version 3.2. After the new version has been fully implemented and tested and 'lessons learned' have been identified, AEMO is planning to upgrade e-terra in the WEM to version 3.2. This will happen during AR5.

Although the costs of the upgrade would be included in AEMO's AR5 funding proposal, the ERA questioned the need to upgrade to a new version of e-terra in the WEM so soon after implementation of version 2.5. The ERA asked AEMO to consider if the upgrade could be delayed until after the AR5 period.

AEMO advised that the vendor-recommended timeframe for completing the upgrade to version 3.2 was by the end of calendar year 2019. From this point, system support for version 2.5 would be reduced. AEMO also provided an indicative cost for the upgrade.

Conclusion

The ERA assessed AEMO's current proposal to complete the implementation of the e-terra energy management system and was satisfied that the proposed project reflects the lowest cost, practically sustainable option under the current circumstances.

The ERA's technical advisor, Stantons International, notes:

> “The use of a standard project model was utilised for costing resources to the project. Review of the calculation outlined internal staff rates and contractor rates were in alignment with this model. The approach was considered structured and reasonable.
>
> "AEMO confirmed hardware and infrastructure for e-terra were purchased on the basis of supporting the latest e-terra version. Therefore, indicative upgrade costs were noted as being resourcing and not hardware / software costs. The information although preliminary, provided a level of comfort that future proofing from a software license and hardware perspective has been undertaken for the implementation.
>
> “The contingency rate for the project was 14 per cent, which was based on a structured project costing model and informed by project risk, assumptions, issues and dependencies documented in the project concept document. The approach for informing and calculating the contingency was considered reasonable and within an acceptable ICT project contingency value.
>
> “Stantons considers that as far as reasonably practical the upgrade should be delayed, but does not consider AEMO should accept support related risk to the system.
>
> “Useful life of e-terra be reviewed with consideration of whether a 10-15 year life and longer participant recovery timeframe would be suitable.”

Stantons International confirmed that e-terra is used as an energy management system in other jurisdictions. Benchmarking indicated that other sites currently using version 2.5 are in the process of upgrading to version 3.2. These discussions confirmed that the upgrade is vendor-driven.

During the review, Stantons International contacted Transpower, New Zealand's system operator which operates e-terra. Although Transpower's energy management system is differently configured to the WEM, Stantons International confirmed that AEMO's "Base costing provided was considered reasonable and aligned with requirements in Market Rules, contingency rates were considered an acceptable value for an ICT project."

Based on its assessment of the information provided by AEMO, comments from market participants and advice from its technical advisor, the ERA approves additional forecast capital expenditure of $3.7 million for AR4 on the basis that this meets the funding approval requirements in the Market Rules.

5.2 Approved rule changes

In 2018, the Minister for Energy made two changes to the Market Rules that required AEMO to amend several of its IT systems. These rule changes were:

- the New Notional Wholesale Meter Manifest Error (Notional Wholesale Meter) rule change:
  - This rule change commenced on 1 September 2018.
- the Reduction in the Prudential Exposure in the Reserve Capacity Mechanism (RoPE) rule change:
  - This rule change will commence on 1 June 2019.

These are two new rule changes and there is no approved funding for them in AR4.

The Rule Change Proposal process required AEMO to provide estimates of what the proposed rule changes would cost to implement. These costings informed the final decision on the rule changes by the independent Rule Change Panel.

In the final reports for each of these two rule changes, AEMO advised that the implementation costs would be $105,000 for the Notional Wholesale Meter rule change and $2.7 million for the RoPE rule change.

The ERA referenced these cost estimates when assessing AEMO's proposal for additional forecast capital expenditure to implement the rule changes.

5.2.1 Notional Wholesale Meter rule change

In the final rule change report, AEMO estimated the implementation cost for this rule change at $105,000.[24] The July 2018 proposal sought additional forecast capital expenditure of $112,000 to implement the rule change, with all expenditure allocated to fund internal and external technical resources.

None of the public submission discussed the proposed funding for this rule change.

The ERA received additional information from AEMO for this rule change implementation project: the project concept document, an updated forecast and actual financial information.

[24] ERA website, Rule Change Panel, https://www.erawa.com.au/cproot/19006/2/RC_2018_01%20--%20Final%20Rule%20Change%20Report.pdf, page 7

The project concept document identified a low cost and a high cost scenario to implement the rule change. In both cases, external costs comprised 80 per cent of the total project cost. The July 2018 funding proposal for $112,000 represented the high cost scenario.

The project concept document outlined that the project would need to be delivered by an external vendor, supported by AEMO internal resources. It stated that crucial internal staff were unavailable as they were working on other projects. Relying on internal resources to implement the rule change would have resulted in a delay. AEMO would have missed the rule change commencement date of 1 September 2018 and breached the Market Rules.

AEMO issued a request for tender to identify the most competitive external service provider to modify and extend its IT systems to implement the rule change.

AEMO has already implemented the Notional Wholesale Meter rule change to meet the commencement date of 1 September 2018. The actual implementation cost was $73,387. This was below AEMO's low cost scenario.

Conclusion

The ERA approves additional forecast capital expenditure of $73,387 for AR4.

The level of funding meets the approval requirements in the Market Rules, as AEMO ran a competitive tender process for the project (given that no in-house capability was available to make the necessary changes on time) and is satisfied that given the circumstances, AEMO has implemented the rule change as efficiently as possible.

5.2.2 Reduction of Prudential Exposure rule change

In the final rule change report, AEMO estimated the implementation cost for this rule change at $2.7 million.[25]

The July 2018 proposal sought additional forecast capital expenditure of $3.5 million to implement the approved rule change. All of the expenditure was allocated to internal and external resources. The proposal also flagged that AEMO will need additional forecast capital expenditure of $1.6 million in the first year of the next allowable revenue period (AR5)[26] to complete the implementation of the RoPE rule change, bringing the total requirement for this rule change to $5.1 million.

All public submissions, except for Western Power's which did not comment on the rule change project, questioned the increase in costs for this rule change from $2.7 million in the final rule change report to $5.1 million in AEMO's July 2018 proposal.

Perth Energy's submission noted that:

> "AEMO has not provided any information supporting the increased costs. As such, we recommend that the ERA limits the total capital expenditure to $2.7 million, and considers an appropriate apportionment over the project timeframe."

[25] ERA website, Rule Change Panel, https://www.erawa.com.au/cproot/19118/2/RC_2017_06%20Final%20Rule%20Change%20Report.pdf, page 31

[26] The fifth allowable revenue period (AR5) runs from 1 July 2019 to 30 June 2022.

Bluewaters' and NewGen Power Kwinana's submissions stated:

> "AEMO is seeking a total of $5.13M to implement RC_2017_06 over two stages ($3.5M in this request). This compares with AEMO's initial estimate of $400,000 to $500,000 made in the Rule Change Panel's (RCP) draft rule change report; and with a revised cost of $2.7M in the RCP's final rule change report. Notwithstanding the cost-benefit value of the rule change, this escalation in costs is significant and concerning.
>
> …..
>
> Additionally, AEMO has not indicated how much of this cost is to be incurred by external vendors as opposed to internal resources. It would be concerning if all the additional cost for a rule change is being tendered externally. It would be even more concerning if some of the costs are being met internally, but AEMO is charging market participants for these costs. AEMO employs a large staff to manage its IT systems and processes. What is unclear form the AEMO submission is the extent that this team is deployed on items such as managing system changes emanating from rule changes as part of BAU [business as usual]. Bluewaters/ NewGen Kwinana expects AEMO's BAU activities to cover a substantial component of the works required to manage the impacts of rule changes, given rule changes are a normal part of the market's function."

AEMO has subsequently advised that implementing the rule change itself will cost approximately $2.7 million, as estimated in the final rule change report. The additional $0.8 million requested in AR4 and the $1.6 million identified for AR5 were required to implement changes to the 'Prudential requirements' market procedure. This procedure is intended to improve "the responsiveness of the Outstanding Amount calculation and the efficiency and effectiveness of the prudential framework."

The proposed procedure change is undertaken at AEMO's discretion, meaning it is not mandated as part of the rule change process.

The project concept document outlines low and high cost scenarios for the implementation of the rule change and for the procedure change separately.

The $2.7 million cost estimate for the rule change, as advised in the final rule change report, is the high cost scenario. This includes a project contingency (calculated as a percentage of the capital expenditure estimate) to cover the risk of additional costs being incurred, should the implementation of the rule change be more complex than previously anticipated.

Similar to the Notional Wholesale Meter rule change, project documentation confirmed that AEMO intends to use an external vendor to implement the rule change, supported by AEMO internal staff. AEMO identified competing projects and a shortage of internal staff with the required knowledge as the main reasons for seeking external delivery of the project.

Conclusion

The Rule Change Proposal process for the RoPE rule change incorporated extensive stakeholder engagement. The estimated implementation costs, included in the final rule change report, would have been considered in the Rule Change Panel's decision. This process and decision sets an expectation that the RoPE rule change will cost $2.7 million to implement by the 1 June 2019 commencement date.

The inclusion of a project contingency in the RoPE funding proposal is appropriate, given the number of AEMO's IT systems (around 21) that will be affected by this rule change. The project contingency percentage is within the acceptable range for an IT project, as advised by the ERA's technical consultant.

The ERA approves additional forecast capital expenditure of $2.7 million for AR4 as meeting the funding requirements in the Market Rules. This will enable AEMO to implement the RoPE rule change by the required commencement date.

AEMO has recently commenced workshops with market participants on the proposed changes to the market procedure that supports the RoPE rule change. The ERA expects this process will include clear communication with market participants on the estimated costs and benefits associated with the intended changes to the market procedure.

The ERA expects AEMO to provide clear evidence that market participants are aware of the estimated costs, and support the implementation of changes to the market procedure, should AEMO seek funding for the procedure change through its proposal for funding in AR5.

6. Previously approved forecast capital expenditure already exists

The ERA does not approve the $7.0 million additional forecast capital expenditure in AR4 proposed by AEMO for the two projects discussed below.

The proposed funding for the projects does meet the funding approval requirements in the Market Rules. However, additional forecast capital expenditure is not required in AR4 as there is funding previously approved but not spent to enable AEMO to continue with these projects in AR4.

6.1 System Management Systems Transition

The ERA has previously approved allowable revenue and forecast capital expenditure associated with the transfer of System Management from Western Power to AEMO. The project scopes of former System Management transfer projects and the scope of the new SMST projects were compared, together with AEMO's actual expenditure.

6.1.1 Previously approved funding for similar projects

In 2016, when AEMO became responsible for System Management in the SWIS, it did not transfer the IT systems out of Western Power immediately. Instead, AEMO maintained the System Management functionality and operations with Western Power and the parties created a Service Level Agreement (SLA) to detail the services provided and to compensate Western Power.

At the time, this was considered the most cost effective solution, as the market design under development was expected to introduce new market rules and market systems by 1 July 2018. New System Management systems would have to be designed and implemented to support the new market design.

In its AR4 determination in December 2016, the ERA approved $5.5 million in forecast capital expenditure and $8.1 million in allowable revenue for a System Management Transfer of Functions project.[27] The costs included the initial and ongoing expenditure associated with the physical transfer of the System Management control room from Western Power to AEMO and the adequate resourcing of the control room.[28]

The forecast capital expenditure previously approved by the ERA for System Management transfer projects and AEMO's actual expenditure as at May 2018 are shown in Table 3 below.

27 This project was separated from the business as usual expenditure for transparency reasons.

28 Previously there was one controller per shift, which was not consistent with comparable system operations and was raised as risk in an independent audit.

Table 3: Former System Management Transition of Functions projects: previously approved expenditure, actual expenditure and variance

Item ($million nominal)	Previously approved	Actual	Variance
Western Australian Integration[29]	390	61	(329)
Software licencing	2,823	-	(2,823)
New office fit-out	2,299	2,852	553
Total SMST project	**5,512**	**2,913**	**(2,599)**

AEMO advised the ERA that the net underspend of $2.6 million as at May 2018 was because:

- The software licencing funding was not required.
- It did not spend all of the funding approved for the WA Integration project.
- These underspends were partially offset by a cost overrun for the office move.

In December 2016, the ERA also approved $2.2 million in forecast capital expenditure for System Management business as usual projects that were aimed at implementing 'several small improvements to system management systems'. At May 2018, AEMO reported that it had not undertaken these projects.

Consequently, there is a $4.8 million underspend of forecast capital expenditure previously approved for transitioning System Management out of Western Power and other System Management related projects.

6.1.2 Stakeholder comments on the current proposal

AEMO's July 2018 proposal identified additional forecast capital expenditure of $4.9 million to transfer the functionality of Western Power's System Management IT systems to AEMO's own infrastructure. This is allocated $4.0 million to resources and $0.9 million to hardware.[30] These systems provide dispatch, outage management, planning and forecasting, and data provision and reporting functionality.

AEMO advised that it also intends to seek further $0.5 million through its AR5 submission to complete work on this project in the first AR5 year, bringing the total cost to $5.4 million.

Perth Energy's submission stated:

> "We note that AEMO has not provided the benefits or costs of any alternatives it states it has considered, including for example leaving the systems within Western Power's infrastructure. If one of the alternatives is more efficient than transitioning IT infrastructure now, the ERA should not approve the requested capital expenditure."

Perth Energy's submission added:

> "Perth Energy questions the need for AEMO to spend $4.9 million to transfer end-of-life IT infrastructure from Western Power to AEMO.

29 This included activities associated with the integration of the market operation function into AEMO.

30 There was some residual funding allocated to 'other costs'. This is not shown because of the rounding to $ millions.

> As previously noted, WEM IT systems were due to be updated or replaced in 2016/17. Moreover, they will be largely redundant within 3-4 years as the re-designed WEM is proposed to be implemented by 2022. This will require new systems to facilitate security constrained economic dispatch."

Bluewaters/ NewGen Power Kwinana questioned the legitimacy of the cost estimate and its recovery through market fees. Their submissions noted:

> "Bluewaters/ NewGen Kwinana suggest that the transfer cost of System Management to AEMO should be met by government. And Bluewaters/ NewGen Kwinana requests that the Authority investigate whether market participants could reasonably expect System Management to own its own systems after being funded by participants for 10 years."

Western Power supported the project:

> "Western Power is of the view that, as the critical IT systems are reaching their end-of-life, it is vital that the transition is completed by late 2019 and that the duration of the new services agreement is kept to a minimum. Additional, AEMO's estimated systems transition completion date is in line with Western Power's plant to commence the decommissioning of its East Perth back-up facility.
>
> Western Power is unable to comment on the reasonableness of AEMO's forecast capital expenditure for the systems transition. However, to achieve the least cost option, it would be prudent to finalise the systems transition as soon as possible."

6.1.3 The ERA's assessment and conclusion

In supporting documentation provided to the ERA, AEMO demonstrated that it had investigated different options prior to creating and costing a new project to replicate (essentially 'copy and paste') the existing System Management software codes onto AEMO's own infrastructure.

> "Numerous options were considered for the SMST project, such as physically moving the systems, outsourcing to a third-party vendor until the end of 2022, purchasing off the shelf products or redesigning completely. It was determined that the only feasible options were to either to retain the systems within Western Power, or to end the arrangement with Western Power and bring in-house using a strategy of "copy, paste, re-platform" into AEMO environments."[31]

One of the two options that AEMO considered feasible was to retain the systems with Western Power until the end of 2022 (three months after the intended commencement of the new market). Later, AEMO disregarded this option. AEMO advised that had the systems remained with Western Power, there would have been material expenditure ($6 to $7 million) required to replace existing end-of-life software and hardware to supportable versions. AEMO also argued that maintaining reliance on Western Power's current systems to October 2022 increased its own operational risk.

AEMO provided cost comparison information for the two feasible options:

- Retaining system management functionality using Western Power's IT systems until the commencement of the new market design.
- Copy and paste system management functionality across to AEMO's in-house infrastructure.

[31] AEMO July 2018 proposal, page 28

The ERA confirms that the 'copy and paste' option is the least cost option.

Supporting financial information provided to the ERA indicated that the July 2018 proposal for additional funding of $5.4 million[32] was the high case scenario. This was calculated as 30 per cent contingency above the cost of the low case scenario cost. The contingency rate applied is at the high end of the range Stantons International considers is acceptable for IT projects.

AEMO subsequently revised the expenditure profile of the project. This reduced the anticipated total cost, and indicated that some of the funding requested for 2018/19 would be moved into the following financial year (2019/20) and would be included in the AR5 submission.

The ERA's technical advisor notes:

> "The contingency rate has changed since the project concept reviewed and increased from 30 per cent to 35 per cent. The project also had a $650k decrease in low cost resourcing. AEMO noted that approximately $500k was deferred to AR5, however, without deferring associated contingency into the AR5 period. Retaining the full allocation of contingency for the AR4 period, while deferring costs into the AR5 period (increasing the contingency rate to the higher 35 per cent) did not provide confidence that the contingency rate was reviewed for the project."

The ERA calculated that the capital investment for copying the systems' codes into AEMO supported infrastructure, compared to retaining them at Western Power, is lower in both the low cost and high cost scenarios.

Conclusion

AEMO undertook an effective options analysis and cost estimation process, and the proposed and revised funding of $3.5 million provided in supplementary information met the approval requirements in the Market Rules.

However, the ERA does not approve additional forecast capital expenditure funding of $3.5 million or $4.9 million in AR4. This is because there is previously approved forecast capital expenditure that AEMO has not spent and could allocate to this project.

In making its determination, the ERA has taken into account:

- The revised financial information provided by AEMO late in the determination process that showed the estimated total cost had reduced.
- The previously approved and underspent forecast capital expenditure for similarly scoped, but cancelled projects.

The ERA reviewed all supporting information provided by AEMO and compared the scope of the current project with previously approved System Management projects. This was to clarify if the latest proposal sought funding for comparable projects previously put on hold.

32 This includes around $0.5 million that AEMO flagged will be requested as part of its AR5 submission in March 2019.

6.2 Upgrade end-of-life Market Operations IT infrastructure

The ERA has previously approved forecast capital expenditure associated with Market Operations IT infrastructure. The ERA compared the project scopes of former Market Operation IT projects and the scope of the new Market Operations IT infrastructure project, together with AEMO's actual expenditure.

6.2.1 Previously approved funding for similar projects

In its December 2016 determination, the ERA approved forecast capital expenditure of $1.6 million for 'Architectural alignment of infrastructure'. This was included in Market Operations' business as usual funding. AEMO explained[33] this as "Planned expenditure relates to hardware refreshes and infrastructure upgrades which will comply with AEMO standards."

In later information provided to the ERA, AEMO advised that it had only used $0.2 million of the approved funding and was underspend by $1.4 million (at May 2018).

6.2.2 Stakeholder comments on the current proposal

The July 2018 proposal sought approval for additional forecast capital expenditure of $2.0 million to upgrade of end-of-life Market Operations IT infrastructure.

AEMO took ownership of this infrastructure in November 2015 when it became responsible for market operations in the WEM. The additional forecast capital expenditure is allocated $0.7 million to resources, $0.6 million to hardware and $0.7 million to software.

The IT infrastructure hosts the Wholesale Electricity Market Systems (WEMS), the Reserve Capacity Mechanism (RCM) systems and the Gas Bulletin Board. AEMO advised that part of the costs will be allocated to its gas market activities. The $2.0 million is the portion of the total cost that is related to the WEM.

Perth Energy commented:

> "Perth Energy has no objection to the movement of the market operations systems from the Malaga Data centre to AEMO's private, cloud-based system as it is stated to be the lowest cost alternative."

Bluewaters' / NewGen Power Kwinana's submissions stated:

> "Bluewaters / NewGen Kwinana requests the Authority and its technical consultants to gather further detail from AEMO and make a determination on the lowest cost outcome that continues to provide the market with an appropriate level of operational risk management."

6.2.3 The ERA's assessment and conclusion

AEMO advised that the Market Operations IT infrastructure was due for refreshment or replacement in 2018/19. This was an opportunity to move the infrastructure from the current

33 AEMO September 2016 proposal, page 22

location in the Malaga Data Centre to AEMO's private cloud infrastructure in Brisbane and Sydney. AEMO identified the risks of not undertaking the project, and stated that:

- The existing infrastructure at the Malaga Data Centre no longer met AEMO's infrastructure and security standards
- Operational knowledge of the existing IT infrastructure is concentrated in a few staff, which represents a resource risk.

AEMO said that moving the infrastructure to its private cloud would:[34]

- use spare capacity on its Norwest private cloud infrastructure
- reduce its operating costs for the Malaga Data Centre
- provide improved capacity and scalability for WEM systems
- ensure market operation services met AEMO's IT standards
- improve system reliability and performance.

The ERA reviewed the alternatives AEMO had considered for upgrading the IT infrastructure, the cost information provided, and that the proposal only included funding estimates for costs incurred in the WEM.

The supporting project documentation demonstrated that AEMO had considered several other options. These were to:

- refresh the systems at the Malaga Data Centre
- merge Market Operations IT systems with System Management infrastructure at the Malaga Data Centre
- move the Market Operation IT infrastructure to a public cloud (Zetta cloud).

AEMO subsequently disregarded these options either because they were higher cost, or because they did not meet its required reliability and availability requirements.

The ERA's technical consultant Stantons International assessed the options analysis AEMO undertook to arrive at its decision to move the IT infrastructure to its private cloud and stated:

> "Options analysis to determine staying at Malaga vs AEMO private cloud was reviewed. AEMO's rationale for this was that utilising shared infrastructure will result in minimal hardware and software requirements…
>
> "Other options, such as the public cloud, were assessed and were not progressed due to considerations of security risk, costs and reduced control."

Stantons International confirmed that taking into account risk, contingency, and project management methodology, the proposed cost appeared to be the lowest practical sustainable cost to implement the move.

The ERA assessed all the supporting information provided by the AEMO on this project, including the project concept document and the financial updates that were supplied later in the process. The funding request in the July 2018 proposal did exclude 12.5 per cent of the

34 AEMO July 2018 proposal, page 31

total project's costs that accommodated gas systems infrastructure. However, the requested $2.0 million was the high cost scenario for the project.

AEMO undertook an effective options analysis and cost estimation process, and proposed funding of $1.6 million (the low case scenario) meets the approval requirements in the Market Rules. However, the ERA does not approve additional forecast capital expenditure funding of $1.6 million or $2.0 million in AR4. This is because there is previously approved forecast capital expenditure that AEMO has not spent and could allocate to this project.

7. Proposed funding that does not meet approval criterion

The ERA does not approve the $5.2 million additional funding proposed by AEMO for the two projects below.

The Market Rules require the ERA to approve costs that would be incurred by a prudent provider acting efficiently, and seeking to achieve lowest practicable and sustainable cost of delivering the services. AEMO has not demonstrated that the proposed expenditure for the WEM reform and the new facilities projects has met these requirements.

7.1 WEM reform project

The ERA has previously approved allowable revenue and forecast capital expenditure associated with market reform projects in AR4. The project scopes of former reform projects and new reform projects were compared, together with AEMO's actual expenditure.

7.1.1 Previously approved funding for similar projects

In July 2017, the ERA approved forecast capital expenditure of $11.6 million and allowable revenue of $2.9 million for AEMO to commence work on projects that formed part of the WEM reform program. This funding, expected to be used by December 2017, was allocated to the following projects:

- Reserve Capacity Mechanism (RCM3) and Reserve Capacity Auction:[35]
- The creation of a new Data Centre to support a single AEMO Perth office.
- A Power System Operations (PSO) project.
  - This project was to transition IT systems owned, operated and supported by Western Power to AEMO. These systems included an Energy Management System, a short-term Demand Forecasting system, and a South West Interconnected System power system model.
- Market Development and Market Solution Design projects.
  - These projects were for AEMO's continued support to the Public Utilities Office to develop market design solutions, rule changes, and to provide subject matter expertise.

The forecast capital expenditure previously approved by the ERA for these projects and AEMO's actual expenditure as at May 2018 are shown in Table 4 below.

[35] RCM3 project - The Minister's changes included changes to the arrangements for Reserve Capacity pricing and refunds, strengthening of the incentives for Scheduled Generators to make their capacity available, and changes to the treatment of Demand Side Programmes. The Reserve Capacity Auction project was cancelled as it was removed from the WEM reform program.

Table 4: Former WEM reform projects: previously approved expenditure, actual expenditure and variance

Item ($ million nominal)	Previously approved	Actual	Variance
RCM3 and RCM Auction	3,674	5,221	1,547
Data Centre	3,442	2,565	(877)
PSO	1,753	1,753	-
Market Development and Market Solution Design	2,727	200	(2,527)
Total	**11,596**	**9,739**	**(1,857)**

The 'Market Development and Market Solution Design' project is underspent by $2.5 million. This is very similar in scope to the WEM reform project in AEMO's July 2018 proposal.

7.1.2 Stakeholder comments on the current proposal

The July 2018 proposal sought approval for an additional $4.3 million forecast capital expenditure for the new WEM reform project.

All of this expenditure was allocated to resourcing. AEMO estimated that 21 additional staff members would be needed to work on the WEM reform project to the end of AR4.

In addition to internal staff, the project plan included the recruitment of several specialist (senior level) market design consultants, contractors,[36] and staff recruited on fixed-term contracts to back-fill for permanent AEMO employees seconded to the project.

Market participants' comments were generally not supportive of the proposed expenditure for this project, and requested the ERA to apply a very conservative view when assessing the funding proposal. The main concerns expressed included:

- The extent of AEMO's expanded role in the market reform program.
- The high staff levels proposed by AEMO, particularly given the slow progress of the reforms to date.
- The timing of the proposed recruitment so close to the end of the AR4 period.

The Bluewaters and NewGen Power Kwinana submissions noted that other jurisdictions undertake and fund their own energy market reforms. The approach taken in the WEM to involve AEMO deviated from this model and appeared arbitrary. The submissions stated:

> "What this means is that the WA government has unilaterally introduced new rules and regulations, without any consultation with the electricity sector, which enables it to allocate some of the costs for designing, planning and implementing its policy suite of proposed market reforms to market participants. In some instances, the cost allocation appears arbitrary."

36 The contractors are identified as power system subject matter experts and various project leads.

Perth Energy commented on the proposed staff numbers AEMO intended to hire for the WEM reform program during the remainder of 2018/19:

> "This number of staff [30] is similar to a medium stand-alone organisation and seems excessive given the support role AEMO is playing throughout the reform process, and the limited (eight-month) time left in the AR4 period."

Synergy's submission commented in a similar manner:

> "Synergy is concerned the level of proposed expenditure on staff to undertake work on the WEM reform program in 2018/19 seems high given the nature of the activities to occur in this period and progress to date."

Bluewaters' and NewGen Power Kwinana commented on the reform agenda stating:

> "The reform agenda which AEMO is preparing for is ill-defined and by no means *fait accompli*. History suggests that expenditure on complex WEM reforms often end up wasted, as reforms do not progress. Given the uncertainty of the current reform process, Bluewaters/NewGen Kwinana suggest the Authority applies a very conservative approach to approving additional funds to AEMO at this stage."

7.1.3 The ERA's assessment and conclusion

To assess whether the proposed funding of $4.3 million for the WEM reform project met the funding approval requirements in the Market Rules, the ERA considered the following matters.

Changes in AEMO's functions

Historically, AEMO's market reform functions have been captured in market rule 1.20 as follows:

- In December 2016, a new rule 1.20 was introduced to the Market Rules. This conferred additional functions on AEMO to prepare for and implement wholesale electricity market reform as part of the previous reform program.
- In June 2018, the Minister for Energy amended rule 1.20 to its current form. Two of the amendments extended:
  - AEMO's role to include preparation for and implementation of constrained network access reform
  - the reform timeline to 1 October 2022 (from 1 July 2020).

The current rule 1.20, explicitly references 'constrained network access reform'. This is in addition to 'wholesale electricity market reform' that had previously been included as one of AEMO's functions in the December 2016 version of rule 1.20. If the reference to constrained network access reforms represented a new function for AEMO, then the ERA should recognise and account for it in this determination.

A review of the high level scope of the former and current market reform programs confirms that moving to constrained network access was an integral part of both reform programs. This was despite each program having a different approach to adopting constrained network access. AEMO also confirmed that all WEM reform work that it had undertaken, and is engaged in currently, was on the premise that constrained network access framework will be implemented in the SWIS.

The ERA compared the scope of the previously approved market reform projects (Market Development and Market Solution Design) with the scope of the current WEM reform project and identified material similarities, such as AEMO's engagement in market design and implementation activities.

Both Bluewaters and NewGen Power Kwinana questioned the extent of AEMO's expanded role in the current reform program, as noted in their first comments in the previous section. This was the Minister for Energy's decision and is outside the scope of this determination. The ERA's role is to ensure the funding for AEMO's market reform functions meets the requirements in the Market Rules.

Resource estimates

The ERA requested more detailed information on AEMO's WEM reform project. This included:

- Financial information including:
  - how resource costs were estimated, such as daily labour rates for existing staff, contractors and consultants
  - contingency rates and cost recovery times used in project costing.
- Resource planning information that provided a breakdown of staff allocated to sub-projects, how this changed over time and the rationale around the requirements for consultants with specific skillsets, such as IT solution architects.

Towards the end of the ERA's review, AEMO provided updated forecast and actual resource figures that showed a lower rate of recruitment that reflected the slower than expected progress of the reform program. The information also identified efficiencies anticipated from recruiting additional staff on fixed-term contracts rather than at day rates, and resource expenditure that AEMO had expected to incur, but that was instead incurred by the Public Utilities Office.

AEMO identified 15 internal and contracted positions and six consultant positions that it intended to fill by the end of June 2019. These positions include power system and markets projects leads, technical consultants and subject matter experts.

AEMO advised that it had not developed a project concept document for the WEM reform project. The ERA did not receive sufficient additional information from AEMO to clearly justify the number of estimated resources for the project, when these resources needed to be hired and why, and the composition of the project teams required to undertake work on the WEM reform project.

The supporting information AEMO provided on the WEM reform project showed low, medium and high cost scenarios, but did not clarify what led to the different cost options. The contingency rates applied were high: 53 per cent (between the low and medium case scenarios) and 80 per cent (between the low and high case scenarios).

Such high project contingency rates are unusual and AEMO did not clearly substantiate them in its proposal, or in supporting documentation. Based on the information provided, the ERA's technical consultant concluded that the variance in the cost estimates can be partially explained by different team compositions, meaning different combinations of internal, consulting and contracted staff. Other factors, such as risk considerations, contributed to the various contingency rates, suggesting there is a high level of uncertainty around this project.

The July 2018 proposal requested additional forecast capital expenditure funding of $4.3 million. This represented the medium cost option.

Conclusion

The ERA finds that the market reform activities have not substantially changed from when it previously approved funding in July 2017. The scopes for former and current market reform projects are comparable.

AEMO has underspent approved forecast capital expenditure for the previous Market Development and Market Solution Design reform project by $2.5 million (see Table 4).

Although AEMO provided additional detail to the ERA on its proposed resourcing plan for the WEM reform project, this information did not fully justify:

- Why additional resources estimated at $4.3 million were required.
- Why none of the resources had been recruited using previously approved forecast capital expenditure.
- What activities these resources would be doing to justify the chosen team composition (internal staff, contractors and consultants).

Based on its assessment of the information provided by AEMO, and acknowledging the concerns expressed by market participants in their submissions, the ERA does not approve an additional $4.3 million forecast capital expenditure for AR4.

7.2 New facilities

In December 2016, the ERA approved forecast capital expenditure of $3.8 million for AEMO to set up a new single Perth office and System Management control room. AEMO moved to levels 44 and 45 of the Central Park building and leased both floors for 10 years, with a further five year option.

This strategy took into account the long-term requirements of a market and system management operator. The funding proposal was based on AEMO's anticipated requirements at the time, which included implementing the previous market reform program. At the time AEMO stated: [37]

> "A new, fit-for-purpose office facility, capable of housing all employees and the necessary infrastructure will provide the workplace and environment for AEMO to develop standalone systems and prepare for the new market to be introduced in July 2018."

AEMO's July 2018 proposal sought additional forecast capital expenditure of $0.9 million (equally shared between System Management and Market Operations) for additional office facilities, office fit-out and end-user IT equipment. This is allocated $0.5 million to office fit-out, $0.1 million to leasing costs and $0.3 million to additional end-user IT equipment.

Synergy was the only market participant that commented on the new facilities project stating:

> "Synergy accepts AEMO will need to provide accommodation and equipment for the additional staff and contractors required to deliver the work outlined in its proposal. Synergy notes that AEMO expects it will need to accommodate an additional headcount of 38, plus expert consultants. This headcount increase seems high and appears to be largely driven by the resourcing needs of the WEM reform program."

[37] AEMO September 2016 proposal, page 27

The ERA reviewed why AEMO needed additional accommodation, why this was based in the same building, whether other accommodation options had been considered, and the additional cost information provided by AEMO.

Previous proposals have not identified any requirements for additional space to accommodate market reform activities, as noted by the ERA's technical consultant:

> "The current submission was unclear on how the additional resources spacing requirements deviated from the original 2016-19 submission or the Head Office Relocation, especially given the level of cancelled projects within the AR4 period. Whilst justification for staff volumes across projects indicated additional space was needed, it was unclear why this was not included in the original new office scope of work."

As noted in Section 7.1.3, the scope of the current WEM reform program mirrors much of the scope of the previous reform program. The ERA recognises that AEMO's role in the reform process has altered with new functions to manage an element of the new market design and implementation. It is reasonable that AEMO will require additional resources over the reform period and these will need office accommodation.

The two floors currently occupied by AEMO accommodate around 80 staff, including the System Management control room. In its July 2018 proposal, AEMO estimated its new facility requirement on the basis that it would need to accommodate and equip an additional 38 individuals in AR4. AEMO has also indicated that its anticipated staffing levels will rise further in AR5, as it moves into the implementation of market reforms.

AEMO has already leased space on level 46 in the Central Park building, and has commenced procurement of office fit-out and end-user IT equipment.

In response to the ERA's request to justify the required headcount increase of 38, AEMO provided the following statements:

> "The estimate of 38 additional staff was calculated for the purpose of understanding potential additional floor space requirements and based on an assessment of the 'new' projects and their resource profiles."
>
> ".., the significant majority of these resources are contractors or consultants and are not permanent additions to AEMO's WA headcount."

The ERA accepts that AEMO will need to accommodate additional resources during the reform program. However, the inherent uncertainty in AEMO's project resource planning means it is difficult to determine how many additional resources will be needed, when and for how long.

There is also merit in keeping all staff in the same building. However, the ERA asked if AEMO had considered other options prior to leasing level 46 in the Central Park building. Such options could have included:

- Increasing density on the two existing floors to accommodate additional contractors/consultants on an 'as needed' basis.
- Hot-desking, given that not all of the additional staff would need to be at AEMO's premises at all times.
- Requiring consultants hired for reform projects to work from their own offices.
- Costing office space in nearby buildings as alternative accommodation.

AEMO has not provided the ERA with sufficient information to demonstrate that it has undertaken an option analysis before settling on its preferred option. AEMO advised that it did not develop a project concept document for the new facilities project and instead applied for board approval directly.

Based on the current WEM reform timeline, the new market will commence on 1 October 2022. Supporting information provided by AEMO confirmed that the additional space on level 46 has been rented for nine years (until 2027) to align with the lease for floors 44 and 45. This was a condition of the additional lease, requested by the landlord, so that AEMO could lease level 46 at the same rate as the other two floors.

To account for the shorter-term accommodation requirements of the additional staff (to October 2022), supporting information provided by the AEMO stated that “both leases include the provision for AEMO to sub-lease or assign to another party any spare space not required in future years.” If this were to eventuate, AEMO would have to demonstrate to the ERA in its future funding proposals that accommodation for a third party is not being subsidised through market fees charged to gas and electricity participants.

AEMO used the same providers and consultants to fit out level 46, without running a new tender process. AEMO justified this given the small project scope and scale.

The ERA recognises that running a new tender would have incurred additional cost. However, the ERA questions the reasonableness of using the same providers for the new facilities project, given that the cost of moving to AEMO’s current offices was around $1 million higher, or 26 per cent, than the budgeted funding of $3.8 million.

AEMO has provided supporting financial information which states that the office fit-out element in the new facilities project has already incurred costs that are 12 per cent higher than budgeted.

Given the slower than expected progress of the WEM reforms, the ERA suggests that AEMO could have explored using its existing space to accommodate additional project staff in the interim, prior to leasing additional office accommodation.

The ERA is not satisfied that AEMO’s new facilities project is a prudent, lowest practical cost option and does not approve this forecast capital expenditure in AR4.

The ERA acknowledges that AEMO will need to accommodate additional resources during the market reforms. However, until the market reform timetable and AEMO’s resource planning is much firmer, the accommodation requirement is uncertain. Therefore, the ERA is unable to develop and compare alternative cost options and determine the least cost, practically sustainable option for the remainder of AR4.

If AEMO were to propose funding in AR5 for new facilities accommodation and equipment, there would need to be a robust business case and consideration of alternative options before the ERA could approve expenditure that meets the funding approval requirements in the Market Rules.

Appendix 1 Legislative requirements

The ERA is responsible for determining the allowable revenue and forecast capital expenditure the AEMO can recover for the services it provides to the WEM. These are to:

- Operate the WEM and carry out system management functions, as defined in the Market Rules.[38]
- Prepare and implement Wholesale Electricity Market and Constrained Network Access Reform.[39]

The approved allowable revenue is the basis for the annual budgets that AEMO uses to determine annual market fees and charges. AEMO must publish its annual budgets, market fees and charges on its website. Market fees and charges are based on the forecast volume of energy generated or consumed by market participants. Market fees and charges are adjusted annually for surpluses or deficits in collected revenue, arising from differences between forecast and actual expenditure.

The Market Rules require AEMO to apply to the ERA for a reassessment of its allowable revenue and forecast capital expenditure, if AEMO's budget for a financial year is likely to result in:

- Revenue recovery being at least 15 per cent greater than the allowable revenue approved by the ERA for the relevant three-year review period.[40]
- Capital expenditure being at least 10 per cent greater than the forecast capital expenditure approved by the ERA for the relevant three-year review period.[41]

The ERA must take the following factors into account when approving allowable revenue and forecast capital expenditure:

- The allowable revenue must be sufficient to cover the forward looking costs of providing the relevant services in accordance with the following principles:
  - Recurring expenditure requirements and payments are recovered in the year of expenditure.
  - Capital expenditure is to be recovered through the depreciation and amortisation of the assets acquired by the capital expenditure in a manner consistent with good accounting principles.
- The allowable revenue and forecast capital expenditure must include only those costs that would be incurred by a prudent provider of the services, acting efficiently, seeking to achieve the lowest practically sustainable cost of delivering the services in accordance with the Market Rules, whilst effectively promoting the wholesale market objectives.

38 Clauses 2.1A and 2.2 of the Market Rules provide a list of AEMO's functions and responsibilities.

39 Rule 1.20 applies until 1 October 2022. Wholesale Electricity Market and Constrained Network Access Reform is defined as any proposed change to the operation of the Wholesale Electricity Market or related network access arrangements, or the regulatory regime applying to the Wholesale Electricity Market (including the Electricity Industry Act, the Regulations and the Market Rules) that has been endorsed by the Minister, whether or not legislations has been made to implement it and includes reform initiatives as set out on the Public Utilities Office's website.

40 Market Rules, clause 2.22A.8.

41 Market Rules, clause 2.22A.9.

- Where possible, the ERA should benchmark the allowable revenue and forecast capital expenditure against the costs of other market operators providing similar services in other jurisdictions.
- Where costs incurred by AEMO relate to both the performance of functions in connection with the Market Rules and the performance of AEMO's other functions, the costs must be allocated on a fair and reasonable basis between:
  - Costs recoverable as part of AEMO's allowable revenue and forecast capital expenditure.
  - Other costs not to be recovered under the Market Rules.