

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

Final Determination

15 May 2017

Economic Regulation Authority

WESTERN AUSTRALIA

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Determination

1. 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. After considering a proposal submitted by AEMO in September 2016, the Authority published its determination for the 2016/17 to 2018/19 period (**AR4**) on 16 December 2016.¹
2. In its initial proposal for AR4,² AEMO included expenditure to implement systems for the new market design arising from the Electricity Market Review (**EMR**). AEMO's proposal was based on the high-level market design developed by the EMR and a planned implementation date of 1 July 2018.
3. Following submission of AEMO's proposal, it became apparent that some of the legislation underpinning the reform would not be in place by the planned date. AEMO made a submission to the Authority on 5 December 2016 noting the uncertainties and advising that it had taken measures to "flatten its resources ramp up and defer signing up of significant expenditure". The submission included an estimate of the expenditure AEMO considered it would incur regardless of the timing, or final detail, of the reformed market.
4. As there was insufficient time for the Authority to consider AEMO's submission prior to the legislated deadline for the decision of 16 December 2016, expenditure relating to market reform was excluded from the Authority's decision.
5. As foreshadowed in the Authority's decision, AEMO reviewed and revised its estimates of expenditure required regardless of the timing, or final detail, of the reformed market and submitted a new application to the Authority on 17 February 2017. The application to adjust AEMO's allowable revenue and forecast capital expenditure was submitted in accordance with the requirements of clauses 2.22A.³ and 2.22A.14⁴ of the Wholesale Electricity Market Rules (**WEM Rules**).
6. AEMO's application is available on the ERA's website.⁵
7. On 7 March 2017, the Authority issued a notice inviting submissions on the application and a consultation paper to assist interested parties in understanding and making submissions on the application. Three submissions were received and are available on the ERA's website.

¹ See <https://www.erawa.com.au/cproot/14691/2/Final%20Determination%20-%20AEMO%20Allowable%20Revenue%202016-2019.pdf>

² Submitted in September 2016 see <https://www.erawa.com.au/cproot/14530/2/Attachment%20-%202016-2019%20WA%20Functions%20Allowable%20Revenue%20Proposal.PDF>

³ AEMO must apply to the Authority to approve the adjusted Forecast Capital Expenditure for the current review period if the budget for a financial year is likely to result in capital expenditure, over the relevant review period, being at least ten per cent greater than the Forecast Capital Expenditure approved by the Authority.

⁴ During a review period, AEMO may seek the approval of an adjustment to its approved Allowable Revenue and/or Forecast Capital Expenditure.

⁵ See <https://www.erawa.com.au/cproot/17238/2/AEMO%20Allowable%20revenue%20attachment%202%20AEMO%20Proposal.PDF>

8. In making its determination, the Authority has taken into account the matters set out in clause 2.22A.11 and 1.20.3 of the WEM Rules.
9. The Authority's determination of AEMO's allowable revenue and forecast capital expenditure is set out in Table 1 below.
10. The Authority considers AEMO's proposed expenditure to be reasonable. Given the continued uncertainties regarding the market reform program, the Authority considers AEMO has adopted a prudent approach by only requesting funding for works that are required to proceed, regardless of the wider EMR outcomes, and to continue progressing planning and regulatory design to prepare for and facilitate the implementation of wholesale electricity market reform as required under the WEM Rules.
11. AEMO's proposed adjustments to allowable revenue are 4.4 per cent and 2.2 per cent of the current approved allowable revenue for market operations and system management respectively. The WEM Rules allow AEMO to vary its costs by up to 15 per cent more than its approved allowable revenue before it must apply for a revised determination of allowable revenue.
12. The Authority considers the ability to spend a specified amount above the approved expenditure provides flexibility to AEMO to respond to changing circumstances (for example cost increases or the need for additional expenditure) during the period while providing for the accountability of AEMO to ensure that allowable revenue includes only those costs that would be incurred by a prudent provider.
13. Normally, the Authority would not expect AEMO to apply for an increase in its approved allowable revenue unless exceptional circumstances led to it needing to spend more than 15 per cent above its approved allowable revenue.
14. However, given the circumstances that led to the Authority not being able to properly consider market reform expenditure in its review last year, and the continuing uncertainty regarding the timing and detail of market reforms, the Authority considers an adjustment to AEMO's approved allowable revenue is appropriate in this instance.⁶
15. The proposed additional capital expenditure is 112 per cent and 59 per cent of the current approved forecast capital expenditure for market operations and system management respectively, which exceeds the range the WEM Rules provide for AEMO's actual capital expenditure to vary before it must apply for a revised determination of forecast capital expenditure.⁷ The Authority has amended AEMO's approved forecast capital expenditure to include AEMO's proposed adjustment.

⁶ Clause 2.22A.8 allows revenue recovery over the allowable revenue period to be up to 15 per cent higher than the approved allowable revenue.

⁷ Clause 2.22A.9 allows actual capital expenditure over the allowable revenue period to be up to 10 per cent higher than the approved forecast capital expenditure.

Table 1: Approved Adjusted Allowable Revenue and Forecast Capital Expenditure 2016/17 to 2018/19

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Allowable Revenue				
Authority Determination:				
Market Operations	16,224	13,826	14,213	44,264
System Management	17,156	17,344	14,885	49,386
Total	33,380	31,170	29,098	93,650
AEMO Proposal				
Market Operations				
Previously approved	15,616	13,312	13,555	42,483
Proposed adjustment	608	514	658	1,781
Proposed revised total	16,224	13,826	14,213	44,264
System Management				
Previously approved	16,665	17,090	14,558	48,313
Proposed adjustment	491	254	327	1,073
Proposed revised total	17,156	17,344	14,885	49,386
Forecast Capital Expenditure				
Authority Determination:				
Market Operations	6,807	4,832	1,678	13,317
System Management	7,337	4,826	120	12,283
Total	14,144	9,658	1,798	25,600
AEMO Proposal				
Market Operations				
Previously approved	1,779	2,830	1,678	6,287
Proposed adjustment	5,028	2,002	-	7,030
Proposed revised total	6,807	4,832	1,678	13,317
System Management				
Previously approved	4,828	2,769	120	7,717
Proposed adjustment	2,509	2,057	-	4,566
Proposed revised total	7,337	4,826	120	12,283

16. The reasons for this determination are set out below.

Reasons for the Determination

Legislative Requirements

17. The Authority is responsible for determining the allowable revenue AEMO can recover for the services it provides. AEMO's services are:
 - operating the WEM market and system management functions, as set out in the WEM Rules,⁸ and
 - preparing for and facilitating the implementation of Wholesale Electricity Market Reform.⁹
18. The allowable revenue determined by the Authority forms the basis for AEMO's annual budgets. Market fees are charged based on the volume of energy generated or consumed by market participants and are adjusted each year to reflect the annual budget. Market fees are adjusted annually for surpluses or deficits in revenues arising from differences between forecast and actual expenditure.
19. AEMO must apply to the Authority to reassess its allowable revenue if its budget proposal is likely to result in revenue over the three-year allowable revenue period being more than 15 per cent greater than the amount determined by the Authority. That is, the annual budget may vary from the allowable revenue determination, provided the total expenditure over the three-year period only varies by up to 15 per cent. Capital expenditure can vary by up to 10 per cent over the three-year period before AEMO is required to apply for a reassessment.
20. AEMO may seek approval of an adjustment to its approved Allowable Revenue and Forecast Capital Expenditure during the period the determination relates to.¹⁰ In such cases the Authority may, but is not required to, engage in public consultation before making a determination.
21. The factors the Authority must take into account when approving the allowable revenue and forecast capital expenditure are:
 - 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 that is 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

⁸ Clauses 2.1A and 2.2 of the WEM Rules provide a detailed list of AEMO's functions and services.

⁹ Clause 1.20 applies until 1 July 2020. Wholesale electricity market reform is defined as any proposed changes to the operation of the WEM or the legislative regime applying to the WEM (including the Electricity Industry Act, the WEM Regulations and WEM Rules) that have been endorsed by the Minister, whether or not legislation has been made to implement it. This includes the entire reform package set out in the report published by the Public Utilities Office of the Department of Finance entitled "*Final Report: Design Recommendations for Wholesale Energy and Ancillary Service Market Reforms*" published in July 2016.

¹⁰ Clause 2.22.15 of the WEM Rules.

efficiently, seeking to achieve the lowest practically sustainable cost of delivering the services in accordance with the WEM, while effectively promoting the wholesale market objectives;

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

AEMO's Proposal

22. AEMO's application proposes an adjustment to the allowable revenue and forecast capital expenditure approved by the Authority on 16 December 2016.
23. Table 2 and Table 3 below set out the allowable revenue and forecast capital expenditure approved by the Authority on 16 December 2016 with AEMO's proposed adjustments added.

Table 2: Allowable Revenue including AEMO proposed adjustment

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Market Operations				
Approved	15,616	13,312	13,555	42,483
Proposed Adjustment	608	514	658	1,781
After proposed adjustment	16,224	13,826	14,213	44,264
<i>Adjustment as a % of approved allowable revenue</i>	<i>3.8%</i>	<i>3.7%</i>	<i>4.8%</i>	<i>4.2%</i>
System Management				
Approved	16,665	17,090	14,558	48,313
Proposed Adjustment	491	254	327	1,073
After proposed adjustment	17,156	17,344	14,885	49,386
<i>Adjustment as a % of approved allowable revenue</i>	<i>2.9%</i>	<i>1.5%</i>	<i>2.2%</i>	<i>2.2%</i>
Total				
Approved	32,281	30,402	28,113	90,796
Proposed Adjustment	1,099	768	985	2,854
After proposed adjustment	33,380	31,170	29,098	93,650
<i>Adjustment as a % of approved allowable revenue</i>	<i>3.4%</i>	<i>2.5%</i>	<i>3.5%</i>	<i>3.1%</i>

Table 3: Forecast Capital Expenditure including AEMO proposed adjustment

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Market Operations				
Approved	1,779	2,830	1,678	6,287
Proposed Adjustment	5,028	2,002	-	7,030
After Adjustment	6,807	4,832	1,678	13,317
<i>Adjustment as a % of approved forecast capital expenditure</i>	<i>283%</i>	<i>70%</i>	<i>-%</i>	<i>118%</i>
System Management				
Approved	4,828	2,769	120	7,717
Proposed Adjustment	2,509	2,057	-	4,566
After Adjustment	7,337	4,826	120	12,283
<i>Adjustment as a % of approved forecast capital expenditure</i>	<i>52%</i>	<i>74%</i>	<i>-%</i>	<i>59%</i>
Total				
Approved	6,607	5,599	1,798	14,004
Proposed Adjustment	7,537	4,059	-	11,596
After Adjustment	14,144	9,658	1,798	25,600
<i>Adjustment as a % of approved forecast capital expenditure</i>	<i>114%</i>	<i>72%</i>	<i>-%</i>	<i>83%</i>

24. As can be seen in Table 2 and Table 3 above, the proposed adjustments over the three years of AR4 are approximately three per cent of total approved allowable revenue and 83 per cent of approved forecast capital expenditure.

25. AEMO's submission notes the proposed adjustment relates to a subset of the market reform work scope requested in its original submission in September 2016 for the AR4 period. AEMO states:

"With the delay of components of the EMR related regulatory packages that underpin the market reforms, and the pending WA State election, there is now a level of uncertainty as to when market reform (and associated regulatory changes) will occur and what this will involve. Given this uncertainty, AEMO has already take[n] prudent measures to revise the overall program approach, to reduce the resource profile, and to defer significant components of planned IT and market readiness expenditure.

As a result, for the duration of the 2017 calendar year and until such time as greater reform certainty is available, AEMO is seeking approval for a subset of the original WAMRP scope encompassing the following areas of activity:

- WEM Rules Changes: EMR components that are already enacted in the WEM Rules and which AEMO is required to implement to avoid non-compliance issues:
 - Third stage of changes to the Reserve Capacity Mechanism (RCM3)
 - The Reserve Capacity Auction.
- Single Perth Office Data Centre Works: The data centre works and communication links required to support the creation of the single AEMO Perth office.
- Power Systems Operations Core Security Management Systems: Critical system management IT systems (Energy Management Systems, Forecasting and Modelling) design and build work to reduce risk and avoid expenditure on end-of-life Western Power provided systems.
- Market Development: EMR market development activities during 2017:
 - Engagement with the Public Utilities Office on regulatory planning and rule proposal (not rule-making) functions.
 - Engagement with stakeholders to support market preparedness and market design acceptance.
- Market Solution Design: EMR market solution planning, scoping, initial solution, design, change management, IT, and prototyping of market systems to ensure that an integrated reform solution can go live in 2019. Without this work, there will be a high risk that a July 2019 implementation date may not be achieved, potentially pushing reform implementation into 2020 to avoid the summer period."

26. In preparing its adjustment proposal, AEMO states it considers that Wholesale Electricity Market Reform, as defined in the WEM Rules, includes the following:

"Transitional reforms to the Reserve Capacity Mechanism that commence on 1 October 2017, being undertaken within AEMO's RCM3 project, for which the amending WEM Rules were gazetted on 31 May 2016.

Reforms to the energy and ancillary service markets, which were endorsed by the Minister in July 2016 and are specifically referenced in clause 1.20.3 of the WEM Rules. AEMO's planned work schedule and budget includes preparatory work required to ensure that these reforms can be implemented in mid-2019, consistent with the current work program of the PUO. (These reforms include introduction of security-constrained, co-optimised dispatch of energy and ancillary services, separation of the Synergy portfolio for facility-based dispatch, pricing and settlement changes, and modifications to the outage and reliability management processes.)

Adoption of elements of Chapter 4 of the National Electricity Rules governing power system security, for which a position paper was published in January 2017. It is expected that these amendments would commence with reforms to the energy and ancillary service markets.

Development of a Reserve Capacity Auction, which was endorsed by the Minister in April 2016, with the amending WEM Rules gazetted on 31 May 2016 including an obligation for the development of such an auction (clause 4.1.33). AEMO anticipates that the first Reserve Capacity Auction could occur in 2019.

Establishment of a Reliability Advisory Committee, which was proposed in a position paper in February 2016 and acknowledged in a media statement by the Minister for Energy in July 2016. AEMO anticipates that the Reliability Advisory Committee will begin operation during 2017."

27. A breakdown of the proposed adjustment by activity is set out in Table 4 below.

Table 4: Proposed adjustment by activity

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Allowable Revenue				
Market Operations				
Approved Rule Changes - RCM3	126	270	331	727
Single Perth Office Data Centre Works	3	244	327	574
Market Development	479	-	-	479
Total	608	514	658	1,781
System Management				
Power Systems Operations	488	10	-	498
Single Perth Office Data Centre Works	3	244	327	575
Total	491	254	327	1,073
Total Proposed Adjustment to Allowable Revenue	1,099	768	985	2,854
Proposed Adjustment to Forecast Capital Expenditure				
Market Operations				
Approved Rule Changes - RCM 3	2,622	987	-	3,609
Approved Rule Changes - RC Auction	-	65	-	65
Single Perth Office Data Centre Works	1,663	58	-	1,721
Market Development	743	221	-	964
Market Solution Design	-	671	-	671
Total	5,028	2,002	-	7,030
System Management				
Power System Operations	646	1,107	-	1,753
Single Perth Office Data Centre Works	1,663	58	-	1,721
Market Development	200	221	-	421
Market Solution Design	-	671	-	671
Total	2,509	2,057	-	4,566
Total Proposed Adjustment to Forecast Capital Expenditure	7,537	4,059	-	11,596

28. AEMO's application notes it intends to make a further adjustment proposal in the third or fourth quarter of 2017 for funding to the end of the current AR4 period for the implementation of the full market reform program once there is clarification about the underpinning market reform legislation.
29. AEMO also comments on the decision published by the Authority on 16 December 2016 on AEMO's initial AR4 application:

"AEMO understands the unapproved BAU portion of AEMO's proposed Allowable Revenue was based on the ERA's analysis of functions previously undertaken by the Independent Market Operator but not transferred to AEMO (including rule-making and parts of the compliance enforcement function) and the ERA applying actuals rather than budget for Supplies and Services in the 2015/16 base year. In terms of AEMO's functions under the WEM Rules, the ERA appears to have taken a more conservative view than AEMO as to the appropriate scope of rule proposal and compliance activities. AEMO is still analysing the basis of this decision and its impact and will justify this expenditure in a future submission if deemed necessary."
30. AEMO's submission identifies potential additional risks for increased costs due to delay in market reform, but has not requested any expenditure in its adjustment proposal. It has also determined it is unlikely to need any additional funding in 2017 to address these risks. AEMO's applications notes:

"Minimal remediation allowances were included in the original AR4 business as usual budget and focussed on mitigation of the highest risks to avoid over-investing in systems that were expected to be decommissioned after the commencement of the new real-time market reforms in July 2018. The deferral of the real-time market implementation timeframe results in AEMO being exposed to these risks for a longer period of time. If the EMR fails to proceed, or is delayed beyond July 2019, AEMO considers it will probably need to revise its estimates for investment in 2018 and 2019 in current systems to include funding to replace legacy systems, relocate functionality from within Western Power data centres to AEMO data centres and increase support capability and longevity.

The delay in implementing the real-time market reforms provides an opportunity to re-plan the program with a more sustainable activity and resourcing profile and allow the implementation to be undertaken after finalisation of the WEM Rules (thus reducing the risk of rework), but AEMO considers this is dependent on approval of funding for market development and market solution design during 2017."

Public submissions

31. The Authority consulted on AEMO's adjustment proposal, publishing a consultation paper on 7 March 2017. Alinta Energy, Synergy and Bluewaters Power made submissions.
32. AEMO was invited to respond to, and provide further information in light of matters raised in, stakeholder submissions.
33. Matters raised in these submissions are discussed in the relevant sections below. Copies of the stakeholder submissions and AEMO's response are available on the ERA's website.

Authority's Assessment

34. In undertaking its review, the Authority has considered whether the proposed adjustments are equal to the costs that would be incurred by a prudent provider acting efficiently and seeking to achieve the lowest practicable and sustainable cost of delivering the services. The Authority's assessment has also taken into account the requirement of 1.20.3 that the Authority must determine AEMO's allowable revenue and forecast capital expenditure on the basis that the reform package is set out in the Wholesale Energy and Ancillary Service Report is fully implemented before 1 July 2020.
35. The Authority engaged Geoff Brown and Associates to provide technical advice and assistance. The report is available on the ERA's website.
36. Expenditure for each activity identified by AEMO is reviewed below.

Approved Rule Changes

Third Stage of Changes to Reserve Capacity Mechanism (RCM3)

37. On 31 May 2016, the Minister for Energy made a number of changes to the WEM Rules for the reserve capacity mechanism with commencement dates of 1 June 2016, 1 October 2016 and 1 October 2017. AEMO's RCM3 project relates specifically to the implementation of systems and processes associated with the changes commencing on 1 October 2017.
38. As set out in the PUO's *Final Report: Reforms to the Reserve Capacity Mechanism*, the changes include:
 - calculation of the Reserve Capacity Price in the transitional period prior to the commencement of the proposed new reserve capacity auction;
 - availability and performance requirements for Demand Side Programmes participating in the RCM; and
 - performance incentives for capacity providers including a dynamic Reserve Capacity refund regime and revised consideration of facility outages in the certification of Reserve Capacity.
39. AEMO's forecast expenditure to develop a system to implement the required changes are shown in Table 5 below.

Table 5: RCM3 – Proposed Adjustment to Allowable Revenue and Forecast Capital Expenditure

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Allowable Revenue				
Planning	30	-	-	42
Travel and Training	42	-	-	30
Program Costs	54	-	-	54
Depreciation	-	270	331	601
Total	126	270	331	727
Proposed Adjustment to Forecast Capital Expenditure				
Resources	905	167	-	1,072
Consultancy	1,236	651	-	1,887
Hardware	42	-	-	42
Software	8	-	-	8
Program Costs	431	169	-	600
Total	2,622	987	-	3,609

40. Synergy's submission notes that more than \$2.5 million of the proposed \$3.6 million capital expenditure for RCM3 will have already been incurred by June 2017.
- "While there is no ex-post capital expenditure adjustment available under the WEM rules, Synergy recommends the ERA tests the prudence and efficiency of expenditure already incurred and uses this assessment to inform whether the outstanding forecast expenditure is likely to be efficient for example, the reasonableness of the RCM3 consultancy costs."
41. The Authority's technical consultant, GBA, notes the least cost option was for AEMO to modify the existing reserve capacity system to meet the new requirements. However, as the existing reserve capacity system is tightly coupled with the existing WEM software, it could not be adapted to accommodate the reformed market. Consequently, AEMO's preferred solution was to develop a new stand-alone RCM component that could interface with both the existing WEM software, and also the software for the market reforms. Although this option had a higher initial cost, it was determined to be more cost-effective in the longer term, as the system would not need to be replaced when the market reforms are implemented.
42. GBA agrees with the decision taken by AEMO to build a new standalone system, rather than modify the existing system as a temporary short term solution pending confirmation of the reforms, as the WEM Rules require AEMO to conduct its operations on the assumption that the planned market reforms will be implemented before 1 July 2020.
43. GBA notes the program must be implemented by 1 October 2017 with a significant portion of the expenditure either incurred or committed. GBA considers it is too late for AEMO to modify its approach, and it is difficult to know what a decision by the Authority to reduce the allowed expenditure to less than AEMO's forecast would achieve.
44. GBA notes depreciation is calculated on a straight-line basis over a ten-year period commencing on 1 October 2017. GBA considers the depreciation profile to be

reasonable and recommends the forecast capital expenditure and allowable revenue be approved.

45. The Authority notes the amendments to the WEM Rules have already been gazetted, so AEMO must implement the necessary system changes to comply with the revised rules by 1 October 2017. As the rule change was gazetted on 31 May 2016, AEMO had only 16 months to build the new systems.
46. Taking account of GBA's advice, the Authority agrees AEMO's decision to develop a new stand-alone RCM module, rather than modify the existing system, was appropriate. The existing system is reaching the end of its life and will, in any case, need to be replaced when the market reforms are implemented.
47. As identified by GBA, it is too late for AEMO to modify its approach and most of the expenditure is already incurred or committed. Although it would have been preferable for the Authority to have been able to undertake a review of AEMO's expenditure proposal prior to AEMO committing to the project, this was not possible within the timescales required for implementing the RCM reforms.
48. However, the Authority notes AEMO undertook a comprehensive external tender process and selected the most competitive bid from five shortlisted vendors. As the expenditure is depreciated over ten years, the annual cost to market participants will be around \$360,000.
49. The Authority considers the approach AEMO proposes to adopt for future submissions on market reform expenditure should minimise the risk of expenditure being incurred or committed prior to being reviewed by the Authority.
50. Having considered the information provided by AEMO and the advice from GBA, the Authority considers AEMO's approach and expenditure to be reasonable and consistent with a prudent provider of the services described in clause 2.22A.1.

Reserve Capacity Auction

51. The amendments to the WEM Rules gazetted on 31 May 2016 included a requirement for the development of an auction process to replace the current administered pricing provisions. A paper outlining the reserve capacity auction design was published on 31 January 2017.¹¹
52. AEMO's application notes its understanding that the auction is to begin operation in 2019. On that basis, during 2017 AEMO is planning to provide technical advice to support the auction design and rule drafting, prepare submissions in response to consultation papers, document implementation requirements to support the development of a future AR4 adjustment proposal and finalise specific functional and technical requirements.
53. The expenditure AEMO considers it needs to support this activity is set out in Table 6 below. AEMO indicates a future AR4 adjustment proposal will contain the balance

¹¹ See the Final Report: Reforms to the Reserve Capacity Mechanism at http://www.finance.wa.gov.au/cms/uploadedFiles/Public_Utility_Office/Electricity_Market_Review/Reforms-to-the-Reserve-Capacity-Mechanism-Final-Report.pdf and the accompanying media statement by the Minister for Energy at <https://www.mediastatements.wa.gov.au/Pages/Barnett/2016/04/Electricity-reforms-ensure-fairer-system-for-all.aspx>

of the estimate for full design, build and deployment of the reserve capacity auction solution.

Table 6: Reserve Capacity Auction – Proposed Adjustment to Forecast Capital Expenditure

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Forecast Capital Expenditure				
Resources	-	50	-	50
Program Costs	-	15	-	15
Total	-	65	-	65

54. Given the requirement in the WEM Rules for the development of an auction process, AEMO must ensure it is ready to implement a system when needed. However, as the requirements are still being finalised, the costs of a new system cannot be estimated at this stage. The Authority considers the cost proposed by AEMO is reasonable to undertake planning to develop the detailed design and implementation of the auction system.

Data Centre to support single AEMO Perth Office

55. AEMO's initial proposal for AR4 submitted in September 2016 included costs associated with the move to a single Perth office to co-locate the market operator and system operator staff. The communications hardware for the new Perth office was included in the forecast cost of establishing the office and approved in the Authority's determination published on 16 December 2016.
56. However, the costs of infrastructure necessary to connect to offsite data centre services and to achieve full integration of the Perth office with the broader AEMO systems were included in the market reform component of AEMO's submission. As the Authority did not include any market reform expenditure in its determination on 16 December 2016, these costs were not approved.
57. AEMO has included the data centre costs in its proposed adjustment and notes the office consolidation cannot proceed without this infrastructure. As set out in GBA's report, these costs can be classified into three areas:
- Data and voice communication links. These include equipment at the remote end of leased dark fibre links¹² between the Perth CBD office and the data centre, and at both ends of the links between the data centre and Western Power. These links must continue to operate if either the Perth CBD or the data centre lose power, to ensure that the management of the power system is not affected. Redundant voice and data communication links are also planned between Perth and AEMO's east coast facilities.
 - Network, computer, and storage equipment. This is the hardware located in the data centre racks.
 - Hosting services. This is the contract with the data centre to provide rack space and other services related to hosting equipment such as cabling.

¹² A dark fibre communications link is an optical fibre link that is not shared with any other user. The alternative is to lease bandwidth on a link where the fibre is shared with other users.

58. The forecast costs are set out in Table 7 below.

Table 7 Data Centre – Proposed Adjustment to Allowable Revenue and Forecast Capital Expenditure Allowable Revenue (\$'000)

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Allowable Revenue				
Travel and Training	2	-	-	2
Program Cost Allocation	4	-	-	4
Depreciation	-	489	654	1,143
Total	6	489	654	1,149
Market Operations	3	244	327	574
System Management	3	244	327	574
Proposed Adjustment to Forecast Capital Expenditure				
Resources	1,052	96	-	1,148
Hardware	1,960	-	-	1,960
Program Cost Allocation	314	20	-	334
Total	3,326	116	-	3,442
Market Operations	1,663	58	-	1,721
System Management	1,663	58	-	1,721

59. Synergy's submission states it supports AEMO's migration to a single location as it "makes economic sense to centralise AEMO's functions and Synergy appreciates the importance of ensuring IT infrastructure and systems are robust."

60. However, Synergy notes its understanding that, when AEMO accepted responsibility for market operations in WA in November 2015, it upgraded the communications infrastructure at its current location to conform to AEMO's higher IT specifications. Synergy considers AEMO's proposal has:

"... the effect of AEMO's communication infrastructure being upgraded in two Perth CBD locations within two years, an expenditure matter the ERA may wish to consider. Further the ERA should consider whether AEMO's recovery of the residual value of the already-installed assets and its treatment of accelerated depreciation is reasonable.

61. AEMO's response to this stakeholder comment notes:

"The November 2015 expenditure included a range of items, not all related to communications. The treatment of this is as follows:

- Adoption of AEMO cybersecurity standards for the WEMS. This was the single most expensive item. This equipment remains in service until the WEMS systems are replaced by new Market Systems. This is not expected to occur for several years and the equipment may then be repurposed if it has not fully depreciated. Therefore it is not impacted by this submission.
- Some minor upgrades to the infrastructure supporting the market systems. Again this infrastructure remains in service until the deployment of new market systems. Therefore this is not impacted by this submission.

- A communications link was put in place between the Perth Office and wider AEMO. This was a temporary solution until the office move could be completed and the term of the contract was limited. There was no capital cost since AEMO repurposed surplus hardware from storage in the east coast to support the link. This equipment will be repurposed elsewhere in AEMO. Therefore this is not impacted by this submission.
 - Upgrade of the videoconferencing system to interface with AEMO. This is intended to be reused at the new office. This reuse is reflected in the office move costings approved in the last submission.
 - Purchase of user firewalls at a cost of \$35,340.20. This hardware could nominally have been reused but did not meet the more stringent specification required for the new office, given additional system management staff and changing assumptions. This equipment will be repurposed elsewhere in AEMO.”
62. Based on the information provided by AEMO in its September 2016 submission, information AEMO has provided for this application and advice from GBA, the Authority considers AEMO has effectively managed the processes necessary to take on market operation, and subsequently system management functions, of the WEM and the expenditure it has incurred is reasonable.
63. Synergy also recommends the ERA should:
- “... review whether there is an overlap of the expenditure proposed in AEMO’s February 2017 submission and that already approved in December 2016.”
64. As set out in AEMO’s response to stakeholder submissions, there is no duplication of costs between the expenditure approved in December 2016 and the amounts proposed in February 2017. The system transfer costs approved in December included:
- “... the data links with the office as end point, excluding data centre traffic, i.e. the link between WP and the AEMO office for voice traffic and connections from the office to WP to allow the controllers to use WP systems.”
65. AEMO notes:
- “In our current submission, the data links referred to have the data centre as the endpoint, i.e. between the data centre and office, the data centre and other AEMO offices, the data centre to internet, voice and backup link from the data centre to WP (to ensure connectivity in the event the office is out of commission).”
66. Based on the information provided by AEMO and advice from GBA, the Authority is satisfied there is no duplication of costs between the expenditure approved in December 2016 and the amounts proposed in February 2017.
67. Bluewaters’ submission notes it has discussed the Data Centre and Power systems operation IT costs with AEMO and received some cost-benefit analysis from AEMO. Bluewaters recommends that the Authority review this analysis to satisfy itself that the proposed expenditures reflect “only costs which would be incurred by a prudent provider”.
68. Similarly, Synergy considers:
- “the ERA may wish to seek further information from AEMO to clarify what expenditure has already been incurred, and what is required above and beyond the \$1.61 million already approved. The ERA may also wish to consider AEMO’s statement in its proposed \$2.2 million communications links solution is “more expensive than other

options”¹³ and seek further detail on the other options that AEMO considered and why those options were not pursued.”

69. As set out in AEMO’s response to stakeholder submissions:

“The “more expensive than other options” comment was referenced from a section that specifically addressed AEMO’s use of dark fibre communication technology and did not refer to the overall cost of the data centre.

Dark fibre links are the most secure way of linking the new office to the data centre. The alternative is to use a standard leased line. The difference is that the leased line may pass through multiple pieces of infrastructure some of which may rely on mains power and be disrupted in the event of a total power loss. Dark fibre technology does not require any electrical power and so is unaffected in the event of a total loss of power in the area. There is nominally a premium for dark fibre compared to a standard leased line (hence the comment), but the premium is of the order of at most a few thousand dollars per link over the lifetime of the service and may be minimal when purchased through a competitive procurement process leveraging AEMO national purchasing power.”

70. The Authority’s technical advisor, GBA, notes that AEMO’s infrastructure design is based on the systems developed to support the National Electricity Market (NEM) and to manage the interconnected power system in the eastern states.
71. GBA notes that the NEM and its associated power systems are significantly larger and, arguably, more complex than both the WEM and the SWIS and it is possible that the infrastructure being put in place by AEMO is of a higher standard than required, particularly if the final market design is less complex than the current EMR proposal.
72. However, GBA notes that not approving AEMO’s proposed costs would require AEMO to revise its current plans and could delay the establishment of a new control room. On that basis, GBA recommends that the Authority approve AEMO’s proposed expenditure in full but require AEMO, when it applies for additional expenditure to implement the final design of the market reforms, to include an analysis that justifies the need for the full communications infrastructure currently being installed and reviews whether any of the communications links it has leased could be relinquished or replaced with a less costly alternative.
73. Taking account of AEMO’s application and GBA’s advice, the Authority considers the approach adopted by AEMO for data centre services is reasonable, including its use of dark fibre links rather than a standard leased line. Although the infrastructure may be more complex than is required for the current market, adopting AEMO’s existing processes and standards should ensure the success of the transfer of system management functions from Western Power to AEMO.
74. However, as recommended by GBA, when AEMO applies for additional expenditure to implement the final design of the market reforms it must include an analysis that justifies the need for the full communications infrastructure currently being installed and reviews whether any of its leased communications links could be relinquished or replaced with a less costly alternative.

¹³ Page 13, 2016-19 Allowable Revenue and Forecast Capital Expenditure Submission to Economic Regulation Authority, AEMO, 17 February 2017.

Power systems operations – core system management systems

75. Currently AEMO, in its role as System Management, is reliant on Western Power's operational systems to meet its obligation of ensuring the SWIS is operated securely and reliably. AEMO's application notes:

"As part of the integration of System Management with AEMO, an Interim Service Agreement was signed with Western Power to continue to provide access to critical operational systems until 2018 ... to allow AEMO enough time to implement its own systems (leveraging existing licences and capability to the extent possible for WA). Given the expected short-term nature of the Service Agreement, the contract was signed by both parties on the basis of "best efforts" support – essentially on the basis that these systems would be replaced as part of the reforms to the wholesale energy and ancillary service markets.

With the deferral of the market reforms, and to mitigate the risks of long-term exposure to aging operational systems, AEMO now proposes staging the introduction of these critical operational systems."

76. AEMO considers it needs to develop the following systems that are required for the management of the power system:
- An energy management system (**EMS**)
 - A demand forecasting system to produce short-term demand forecasts
 - A SWIS power system model
77. AEMO's proposed costs are set out in Table 8 below.

Table 8 Power Systems Operations – Proposed Adjustment to Allowable Revenue and Forecast Capital Expenditure

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Allowable Revenue				
Planning	13	10	-	23
Travel and Training	174	-	-	174
Program Cost Allocation	301	-	-	301
Total	488	10	-	498
Proposed Adjustment to Forecast Capital Expenditure				
Resources	225	-	-	225
EMS – Resources	86	40	-	126
EMS – PSO Licence Costs	10	322	-	332
WA Demand Forecast – Resources	94	193	-	287
WA Demand Forecast – Datacentre components	-	350	-	350
SWIS Models – Resources	12	13	-	25
SWIS Models – PSO Licence Costs	-	34	-	34
Program Cost Allocation	218	156	-	374
Total	645	1,108	-	1,753

78. AEMO notes the systems are forecast to be in service by mid-2018 and will require additional expenditure of approximately \$3 million in 2018 to complete them. Ongoing operational costs commencing in 2018 are estimated to be \$788,000 per

annum, which will be offset by a reduction in Western Power Service Agreement costs of \$300,000. AEMO notes the remaining costs to complete the build and deployment (including all hardware and licencing costs) of the full EMS, forecasting and modelling solutions will be included in a subsequent adjustment proposal.

79. Each of the three systems is considered in turn below.

Energy Management System (EMS)

80. AEMO is currently reliant on Western Power's energy management system, XA/21, which includes provision of:

- Dispatch of Synergy plant;
- Automatic Generation Control (AGC) for implementing Load Following Ancillary Services and general frequency management;
- Issuing of electronic dispatch instructions to market participants
- Collection and monitoring of System Control and Data Acquisition (SCADA) data;
- Monitoring and control of SWIS elements;
- Security analysis for real-time constraint management and outage processing;
- Offline security analysis and case storage for operational planning and outage approvals; and
- Collection of data for settlement, reporting, and compliance monitoring purposes.

81. AEMO identifies a number of reasons for discontinuing use of the XA/21 platform including:

- It cannot interface with many of AEMO's dispatch and planning systems, so will need to be replaced before any market reforms that rely on generator dispatch systems that AEMO uses in the NEM are implemented.
- The existing systems will be reaching end of life by 2019 so the cost of maintaining them in an operational state could increase.
- Western Power intends to stop using XA/21 so any maintenance or upgrade costs would be fully allocated to AEMO.

82. AEMO uses the GE e-terra EMS platform to manage energy in the NEM. AEMO proposes adopting the same platform to manage the SWIS noting:

"This approach will provide several benefits:

- AEMO already has significant internal expertise and will avoid the need to develop new competencies in relation to legacy systems that will eventually be discontinued.
- Discounted vendor licensing costs.
- Can be integrated with other NEM-style systems, such as the NEM Dispatch Engine as part of the proposed WEM market reforms, or (if the reforms do not proceed) as standalone applications.
- Enable AEMO to leverage synergies and economies of scale from having the same energy management systems across all jurisdictions and the same support processes for these systems.

- Allow AEMO to develop the e-terra model of the SWIS and train its operators appropriately.
- Allow Western Power to progress with internal business improvement plans, reduce the Service Agreement costs to AEMO and avoid inefficient investment in significant but short-lived upgrades.”

83. Synergy’s submission notes:

“While a new energy management system and forecasting tools may be required in the near future, Synergy considers at least in the short-to-medium term, AEMO continuing to share Western Power’s SCADA and energy management systems could be considered by the ERA as an interim step to incurring the expenditure until there is certainty of market design.

... Synergy queries whether it is prudent to incur expenditure on a new energy management system and forecast tools until there is a complete understanding of the future design of the energy market as this could result in systems ultimately not being fit-for-purpose.”

84. AEMO notes in response to Synergy’s submission that since AEMO took control of the System Management function from Western Power in June 2016, it has used Western Power’s personnel and IT systems and that these systems, in particular SCADA and forecasting and modelling systems, have reached the end of life and are creating a significant risk to the security of the electricity market.

85. AEMO further notes Western Power has advised AEMO that an upgrade is required at a significant cost to mitigate the risk to security of the electricity market. As Western Power plans to migrate to a new energy management system for its network functions, it is unlikely to undertake an upgrade of the XA/21 SCADA (estimated to cost between \$6 million to \$10 million).

86. AEMO notes the cost of upgrading XA/21 is likely to be well in excess of the proposed AEMO e-terra installation. AEMO notes that the expenditure requested in its adjustment submission for a new EMS is for early works in 2017 that will enable AEMO to continue to use Western Power’s systems until a full e-terra solution can be built in mid-2018.

87. AEMO considers this is the most prudent, cost neutral, risk averse and sensible approach, that will enable it to execute System Management functions with minimal risk and reliance on a third party.

88. GBA notes

“AEMO’s use of the same software platforms that it currently uses in the eastern states, will result in savings in licensing and development costs. These savings are significant. For example, an indicative cost for upgrading Western Power’s existing XA/21 system is \$6-8 million whereas the total cost through to implementation of the replacement systems proposed by AEMO, including load forecasting and the power system model, is forecast to be \$3.3 million.”

89. GBA considers the issue is to decide whether the expenditure required to achieve an in-service date of mid-2018 for a new energy management system is warranted, rather than waiting until the reformed market commences in July 2019 or later. GBA considers:

“We have not seen any analysis to suggest that deferring the commissioning of e-terra by up to 18 months will result in a material savings, and AEMO’s position that it carries some risk has merit. To put these costs into perspective the forecast total cost of establishing the e-terra platform is less than \$920,000, excluding the overhead

allocation. We are satisfied this is much lower than the cost of building a new stand-alone system and recommend that the Authority approve the forecast expenditure.”

90. Based on the information provided by AEMO and GBA’s advice, the Authority considers AEMO’s proposal to implement the energy management system it uses in the NEM is reasonable and will ensure AEMO can exercise its system management functions with minimal risk and reliance on third parties. It is clear that the current system cannot be maintained in the medium to long term without incurring significant cost. The Authority considers AEMO’s proposed expenditure is reasonable.

Demand Forecasting System

91. Currently AEMO is reliant on Western Power systems to provide short term demand forecasts. AEMO intends to use its existing enterprise licence for similar software used in the NEM to develop its own WA system.
92. If AEMO does not develop its own component, it considers it will need to extend the service charges paid to Western Power and will continue to delay the model improvements currently on hold due to difficulties in modifying the forecast model within Western Power including:
- Introduction of an embedded PV model to the demand forecast
 - Improvement of weather services
 - Introduction of regional forecasts for constraint management
 - Development of statistical high/low forecast models
 - Introduction of additional block loads into the demand forecast model
93. AEMO’s application states:
- “These key activities must be progressed, not only for AEMO to continue to meet its obligations as System Management in the SWIS, but also to support constraint management, pre-dispatch planning and reliability planning prior to the implementation of the broader market reforms. The introduction of the SWIS demand forecast model in AEMO’s systems will allow AEMO to progress these activities in time for market reform implementation, in line with existing NEM methodologies and standards. Having some agility in the forecasting space will also allow AEMO to respond to emerging constraints more effectively, for example the recent Muja bus-tie transformer issues, or adjusting the forecast model to deal with emerging technologies such as the uptake of embedded photovoltaic (PV).”
94. GBA notes:
- “While we have no doubt there is merit in AEMO’s argument, we are not able to independently assess the criticality of the software development proposed by AEMO, particularly prior to implementation of the market reforms, or the reasonableness of the associated expenditure forecast. We understand that AEMO will not be able to continue to use Western Power’s forecasting services indefinitely, so the expenditure forecast provides for accelerating this transition to avoid the cost of upgrading Western Power’s current system. Subject to this proviso, we see no reason for the expenditure not to be approved.”
95. The Authority considers the software developments proposed by AEMO are critical to ensure system security and an efficient wholesale market. As identified in AEMO’s application, the current weaknesses in the short term demand forecasts and processes for managing constraints arising due to network outages contributed to the power system security difficulties that arose during the recent long term outages of major transformers in the Muja area. Implementing AEMO’s proposed developments

will strengthen the existing power system and will also play an important role in progressing market reform on constraint management.

96. The Authority agrees adopting the systems and processes used in the NEM will enable these improvements. The Authority considers the changes enable AEMO to meet its obligations and, adopting the NEM systems and processes should enable this to be done in a cost effective manner.

SWIS Modelling

97. A power system model is an off-line system required for training and planning purposes. AEMO considers introducing a SWIS power system model is essential to enable it to begin establishing internal security management and due diligence processes and notes:

“Introduction of a SWIS power system model in 2017 provides the following benefits:

- Supports AEMO constraint-modelling staff becoming conversant with the SWIS.
- Supports new AEMO staff becoming conversant with the analysis software.
- Supports AEMO conducting a due diligence process on security related information provided by other stakeholders, (such as Security Limits from Western Power).”

98. AEMO notes it already has the necessary analysis software to support this but needs additional licences to extend the use of this system to new users and will need to migrate the current network model to the new system.

99. GBA considers:

“AEMO continues to rely on Western Power for modelling of the power system. This should not continue if AEMO is to function as an independent system operator. It is planning to use the Digsilent Powerfactory software that it uses in the NEM, but needs additional licences to be able to use the software in Western Australia. The cost of establishing a system model is relatively modest and we recommend that it be approved.”

100. The Authority considers AEMO must have the necessary tools to enable it to function as an independent system operator. Adopting the system used in the NEM provides a cost effective means to achieve this.

Market development

101. AEMO describes “market development” as including engagement on regulatory planning and rule proposal functions and supporting market preparedness and market design understanding amongst stakeholders.

102. The WEM Rules¹⁴ require AEMO to prepare for and facilitate the implementation of any proposed changes to the operation of the WEM or the legislative regime applying to the WEM (including the *Electricity Industry Act*, the WEM Regulations and WEM Rules) that have been endorsed by the Minister, whether or not legislation has been made to implement it. The WEM Rules specify this as including the entire reform package set out in the “*Final Report: Design Recommendations for Wholesale Energy and Ancillary Service Market Reforms*” published in July 2016.

¹⁴ See clause 1.20 of the WEM Rules.

103. To meet this obligation, AEMO proposes to continue to provide subject matter input into working groups, drafting instructions, position papers and other instruments of the regulatory program. It also intends to continue to regularly engage with stakeholders to update them on these activities and provide technical advice and education.
104. AEMO proposes to maintain the resources dedicated to these tasks and has developed its work schedule and budget to ensure that the WEM reforms can be implemented in mid-2019.

Table 9: Market Development – Proposed Adjustment to Allowable Revenue and Forecast Capital Expenditure

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Allowable Revenue				
Travel and training	10	-	-	10
Planning	172	-	-	172
Program Cost Allocation	297	-	-	297
Total	479	-	-	479
Market Operations	479	-	-	479
System Management	-	-	-	-
Proposed Adjustment to Forecast Capital Expenditure				
Resources	732	346	-	1,078
Program Cost Allocation	211	96	-	307
Total	943	442	-	1,385
Market Operations	743	221	-	964
System Management	200	221	-	421

105. All stakeholder submissions commented on the proposed market development costs, in particular the difficulty in determining a reasonable cost given the current uncertainties.
106. Bluewaters' submission notes the difficulties in proposing market development costs given the recent change in government. Bluewaters considers:
- “On the one hand, it would not be prudent for AEMO to overcommit resources because the new government may decide not to proceed with the current EMR work program. On the other hand, AEMO needs to commit sufficient resources to be ready for the possibility where the new government decides to continue with the EMR work program with the tight target market commencement date of 1 July 2019.”
107. Bluewaters notes it obtained further information regarding these costs and offers the following observations for the Authority's consideration:
- “To support the market development work program:

- the AEMO has incurred an operating expenditure of \$479K and capital expenditure of \$543K for the time period up to December 2016. This is equivalent to 9.7 FTEs.¹⁵
- the AEMO has proposed a capital expenditure of \$842K for calendar year 2017. This is equivalent to 4.2 FTEs.

To support the market solution design work program, AEMO proposed a capital expenditure of \$1.342M for the second half of calendar 2017. This includes 8 to 10 FTEs.

Bluewaters recommends that the Authority assesses if the proposed resource level reflects an adequate balance in light of the EMR policy uncertainty discussed above. In particular, the proposed 8 to 10 FTEs as discussed above.”

108. Synergy’s submission supports in principle the “components of AEMO’s proposal that are already enacted in the WEM rules and are therefore subject to less regulatory uncertainty than other components of AEMO’s forecast expenditure”. However, it raises concerns regarding future reform:

“The ERA should consider certainty of market design when assessing whether any expenditure relating to market reforms that has not already been implemented should proceed or whether further clarity from the state government on market design is required to assess the proposal prior to expenditure being incurred.

...

Further, given AEMO has indicated it will submit a further allowable revenue adjustment in the third or fourth quarter of 2017 “once clarification has been obtained about the underpinning market reform legislation (expected after the WA State Election)”, the ERA should satisfy itself that it can make an informed decision on reform-related expenditure in the absence of this clarification.”

109. Alinta’s submission is

“... supportive, in principle, of the AEMO continuing to undertake EMR market development and market solution activities during 2017 in order to support a possible 2019 market go-live date. Noting this support, there will be significant policy uncertainty until such time as the new WA Labor Government has formally announced its intentions regarding continuation of the reform process. If the Government changes the reform agenda, AEMO must ensure it can react appropriately and cease unnecessary expenditure in the affected reform areas.”

110. As set out in AEMO’s response to stakeholder submissions, the specific resources for market development during the 2017 calendar year are:

- One full time project manager across the wholesale workstream¹⁶ and power system operations work-stream.
- One part time work-stream lead for the wholesale workstream.
- One part time work-stream lead for the power system operations workstream.
- One full time business analyst shared across the two workstreams.
- A mix of System Management employees that are part of business as usual operations but have a small percentage allocation (five or ten per cent) of their time on an “as required” basis. The total resource is equivalent to approximately 1.2 people.

¹⁵ FTE means Full Time Equivalent

¹⁶ The wholesale workstream includes RCM rule changes, WEM energy and ancillary service markets and WEM settlements and prudentials.

111. GBA's report notes the proposed capital expenditure is about four per cent of the original forecast cost of market reforms of \$36 million, "which does not seem unreasonable".
112. The WEM Rules require the Authority to make its determination on the basis that the reform package set out in the *"Final Report: Design Recommendations for Wholesale Energy and Ancillary Service Market Reforms"* is implemented by 1 July 2020.
113. The Authority considers the market development activity proposed by AEMO is necessary to ensure that it achieves its obligations under clause 1.20 of the WEM Rules. The level of resource achieves a reasonable balance between ensuring there are sufficient resources to progress the reforms, whilst minimising the cost on market participants.

Market solution design

114. AEMO describes "market solution design" as including

"... expenditure for initial planning, scoping, business and functional requirements, design, change management, IT and prototyping of market systems to ensure an integrated reform solution can go live in 2019."
115. AEMO's submission notes:

"One of the key challenges that the WAMRP faced prior to regulatory delay was the requirement to undertake technical build and test of market solutions simultaneously with finalising rules, policies and business requirements.

The delay to wholesale energy and ancillary service market reforms affords the opportunity to establish and finalise these market rules – effectively the market requirements that will need to be underpinned and supported by technical solutions. It is well understood and accepted that the detailed design, build, test, and deployment of these solutions needs to be well planned and executed and include initial market trials.

Critically, this activity needs to be based on a strong, stable, agreed, and finalised market design. Once finalised, this design provides the foundation on which a technical solution to support the critical processes and functions therein can be delivered.

To facilitate the go-live of the new markets in July 2019, it is important that these detailed market design and early technical activities advance during the 2017 calendar year."
116. AEMO's proposed adjustment includes expenditure to:
 - Document initial procedures to assist finalising rules and prepare for market system designs with a focus on key procedures that are the most complex and introduce the most change for stakeholders. Initial planning work would also be conducted around assessing the impact of a frequency control ancillary services market and quantifying ancillary service constraints.
 - Develop and document business and IT requirements. This will cover functional and non-functional (such as technical or performance-related) aspects, to confirm the ultimate solution that will meet stakeholder needs.
 - Undertake program wide management of IT solution prototyping and high level design activity including:
 - Supporting the development of rules from a technical design/feasibility perspective.

- Developing technical solution requirements to support the design and proof of concept activities.
- Testing feasibility of rules for WEM (proof of concept).
- Supporting engagement and understanding of solution with market participants (via prototyping).
- Completing high-level application and infrastructure architecture design and review based on new rules and market designs.
- Testing suitability of automated test harness for certification, based on WEM Rules and associated requirements.
- Conducting early analysis into aspects of the solution such as reporting and data requirements.

117. AEMO's proposed expenditure is set out in Table 10 below.

Table 10: Market Solution Design – Proposed Adjustment to Forecast Capital Expenditure

\$'000 (nominal)	2016/17	2017/18	2018/19	Total
Proposed Adjustment to Forecast Capital Expenditure				
Resources	-	1,050	-	1,050
Program Cost Allocation	-	292	-	292
Total	-	1,342	-	1,342
Market Operations	-	671	-	671
System Management	-	671	-	671

118. As set out in AEMO's response to stakeholder submissions, the specific resources for market solutions design are:

- One full time change manager, dedicated to working with market participants on design, prototyping, issues and concerns management and readiness for the new markets.
- One part time stakeholder manager to continue forums and broad engagement as needed.
- Three full time Business Analysts to cover documentation of requirements, conceptual designs and prototype design.
- A mix of internal AEMO staff and external consultants (circa \$300k) to provide IT resources (solution architect, enterprise architect, developers, testers etc) to support the business and solution requirements and the prototype build and deployment.
- Costs for software licenses and support for prototyping purposes (approximately \$100,000).

119. Stakeholder comments on market solution design were included in the previous section on market development.

120. GBA's report notes:

"While there is uncertainty as to what will happen to the market reform project, particularly after the recent change in government, the Authority is bound by Clause 1.20.3 of the WEM Rules, which requires it to determine AEMO's allowable revenue on the basis that the market reforms currently proposed by the EMR are implemented in full before 1 July 2020. On this basis, the forecast capital expenditure seems reasonable. As it has been categorised as capital expenditure, it will not be recovered until AR5 and there will be no impact on the cost to market participants during AR4."

121. Similar to the proposed expenditure on market development, the Authority considers the market solution design activity proposed by AEMO is necessary to ensure that it achieves its obligations under clause 1.20 of the WEM Rules. Undertaking the proposed detailed market design and early technical activities during 2017 will facilitate achievement of market reform by July 2019. The level of resource achieves a reasonable balance between ensuring there are sufficient resources to progress the reforms, whilst minimising the cost on market participants.

General

Merger efficiencies and cost benefit analysis

122. Bluewaters' submission includes comments on merger efficiencies and cost benefit analysis.

"Merger efficiency"

In the Bluewaters' December Submission, it was recommended that the Authority "seeks to narrow the rate gap [between the NEM and the WEM] to the maximum extent possible" by "taking advantage of the merger efficiencies between the NEM and WEM operations."

Bluewaters recommends that the Authority assesses if such merger efficiency has been fully taken advantage of in the AR4 Supplementary Proposal.

Bluewaters anticipates that the market reform implementation expenditure proposal that AEMO intends to submit later this year will also take full advantage of all available merger efficiencies opportunities.

Cost Benefit analysis

In order to ensure that the requirements under MR 2.22.12(b) are met, Bluewaters considers any future major expenditures proposed by AEMO should be supported by a robust cost-benefit analysis. This analysis should:

- Articulate the various options available to AEMO for meeting its objectives;
- Discuss the advantages and disadvantages for each option; and
- Explain the reasons for choosing the recommended option.

In addition, the cost-benefit analysis should be included in the public consultation for the allowable revenue proposal."

123. Alinta's submission:

"... fully supports the Authority scrutinising, including by way of comparative benchmarking, the adjustment proposal to determine that it is appropriate, and also take full account of merger efficiencies arising from System Management being consolidated into AEMO."

124. The determination published by the Authority on 16 December 2016 included benchmarking information. It is likely the WEM will always be more expensive (on a \$/MWh basis) than larger markets, such as the NEM, that have economies of scale.

As set out in the Authority's decision, efficiencies could be achieved by reducing duplication of functions and costs between the NEM and WEM operations.

125. Adopting AEMO's system management and market systems to implement the EMR reforms should provide further opportunities for reducing costs in the WEM. However, it will take time for AEMO to implement these changes, so such efficiencies are likely to fall outside the AR4 period.
126. When AEMO submits its proposal for the remaining market reform expenditure later this year, the Authority intends to consider:
 - whether the expenditure requested is supported by a robust cost benefit analysis, including identification and evaluation of options available; and
 - whether efficiencies, including any outside the AR4 period, available from reducing duplication of functions and costs between the NEM and WEM operations and adopting AEMO's system management and market systems have been adequately identified.

ERA costs for functions transferred

127. Bluewaters' and Alinta's submissions request information on the Authority's costs, following its expanded role, to enable market participants to fully assess the market fee impact on their businesses. This information will be made available through the normal market fee approval and publishing processes.¹⁷
128. As set out in the Authority's decision published on 16 December 2016, adjustments were made to AEMO's proposed allowable revenue to ensure costs for functions not transferred to AEMO were removed from AEMO's allowable revenue.
129. The additional costs incurred by the Authority to provide the functions transferred to it are offset by a corresponding reduction in costs for AEMO (compared with the costs incurred by the Independent Market Operator when it had responsibility for these functions), so there should be no net increase in fees for market participants as a result of the functions transferred.

Overhead/indirect costs

130. Synergy's submission comments on the level of overhead/indirect costs proposed to be capitalised:

"... the overhead/indirect costs proposed to be capitalised by AEMO seem high, particularly compared with other regulated businesses. The majority of regulated businesses capitalise 10-15 per cent of indirect costs.¹⁸ AEMO appears to have capitalised around 20 per cent or \$1.9 million of program costs. Synergy recommends the ERA should assess whether 20 per cent capitalisation is prudent and efficient under the circumstances. In that regard, the ERA may wish to:

¹⁷ Clause 2.24.5 of the WEM Rules allows the Authority to recover a portion of its budget approved by the Treasurer for its costs for undertaking its functions under the WEM Rules. The Authority must identify in its budget the proportion of its costs that relate to the performance of these functions. Clause 2.24.6 requires the Authority to provide the dollar amount to AEMO no later than five business days prior to 30 June each year.

¹⁸ Synergy notes the ERA's draft determination for ATCO Gas Australia referred to the AER's recently approved 15 per cent for SP Ausnet, 13 per cent for Envestra Victoria and 5 per cent for Multinet Victoria, stating that "... and overhead allocation of 15 per cent would be more in line with industry practice". Page 120, Draft Decision on Proposed Revisions to the Access Arrangement for the Mid-West and South-West Gas Distribution System, 14 October 2014.

- Consider which of AEMO's costs are incremental, and which costs are simply AEMO's internal fixed costs that are being allocated to WA (i.e. staff with BAU roles that are not being replaced) and would otherwise be allocated to other jurisdictions; and
- Benchmark these indirect costs against those of other businesses."

131. Synergy also notes:

"... the treatment of costs as either capital or operating expenditure is dependent on whether these costs result in an asset for regulatory purposes. For example, it would not be appropriate to capitalise planning and development costs if the market reforms are changed such that no asset is required. In the event expenditure already incurred is capitalised then the ERA should be satisfied as to the basis of the costs being capitalised and whether the market should bear this cost and any impact on market fees ..."

132. Synergy's estimate of 20 per cent capitalisation appears to be based on the total \$1.9 million program costs against the overall \$11 million capital expenditure forecast.

133. GBA reviewed the capitalised costs and advises:

"The overhead or program costs that AEMO is seeking to recover through its supplemental document include only overhead costs in planning for the market reforms and managing the reform program. There does not appear to be any attempt to recover overheads arising from AEMO's presence in Western Australia or to recover costs incurred by AEMO staff based in the eastern states.

While an overhead of 4.5 FTEs may seem high when benchmarked against the amount of expenditure for which approval is sought through the supplemental document, it is more reasonable if assessed against the full \$36 million market reform program currently proposed. The reform implementation delay only emerged late in 2016 and for most of the six-month period through to the end of 2016 AEMO was planning a July 2018 market reform commencement date. Clause 1.20.1 of the WEM Rules confers on AEMO the function of preparing for the reform of the electricity market and clause 1.20.3 requires the Authority to determine AEMO's allowable revenue on the basis that the market reforms currently proposed by the EMR to be implemented in full before 1 July 2020. In this context we consider the program overheads that AEMO is seeking to recover are not excessive and we recommend they be approved.

We also asked AEMO to provide the basis for distinguishing between capital and operational expenditure and were advised that its capitalisation policy is aligned with Australian Accounting Standards and that travel and training costs, as well as costs that were related to the feasibility or discovery phases of a project were not capitalised."

134. From the information provided by AEMO and GBA's advice, the Authority notes:

- Overheads relating to AEMO's operations in Western Australia have not been capitalised.
- Costs incurred by AEMO staff based in the eastern states for NEM activities have not been included in the proposed adjustment.
- The apparent high level of capitalisation observed by Synergy is due to the program resources during 2016 being based on a fully scoped market reform program with a cost of \$36 million.
- Costs related to the feasibility or discovery phases of projects, travel and training costs have not been capitalised, consistent with Australian accounting standards.

135. Based on the information provided by AEMO and GBA's technical advice, the Authority considers AEMO's capitalisation policy is appropriate and the level of costs capitalised is reasonable.

Future Market Reform Expenditure

136. Alinta's submission refers to its previous submission on AEMO's initial AR4 application where it suggested AEMO could seek "opportunities for a gradual transition of current systems to those of the NEM". Alinta notes it is "pleased to see the staged approach adopted as part of this AR4 adjustment proposal". However, Alinta notes:

"... AEMO has foreshadowed a further adjustment proposal in the third or fourth quarter of 2017 for funding to the end of the current AR4 period for the implementation of the full market reform program (once there is more clarity around energy policy direction). Alinta urges the ERA, in conjunction with AEMO, to continue to consider options for a more gradual transition of the WEM's current systems to those of the NEM. Alinta considers that this approach may be more appropriate given the anticipated significant cost impact to current Market Participants as a result of almost every system in the WEM changing within a relatively short period of time.¹⁹"

137. In its response to stakeholder submissions, AEMO notes that the expenditure it is seeking for market solutions design will:

"... help ensure that both the overall architecture and timing of any transition of systems (WEM to NEM) are undertaken in the most efficient and risk averse manner."

138. AEMO also notes:

"This will include exploring feasibility of options to introduce new solutions that don't undermine the philosophy of leveraging national AEMO NEM expertise and support arrangements. It also allows various options of exact transition timelines to be explored such that a robust roadmap of IT solutions can be prepared, shared with the Market Participants in 2017 and enable an early design and build activity to commence in 2018."

139. The Authority considers the incremental approach AEMO is taking to develop future expenditure proposals for market reform is prudent and will continue to engage with AEMO to prepare for future submissions as necessary.

¹⁹ Alinta notes that, not only do participants fund AEMO's development costs via the market fee regime, they also have to implement their own system changes, which Alinta considers can also be detailed, time consuming and costly.