

Geoff Brown & Associates Ltd

WESTERN AUSTRALIA WHOLESALE ELECTRCITY MARKET

**REVIEW OF ALLOWABLE REVENUE AND FORECAST
CAPITAL EXPENDITURE FOR THE AUSTRALIAN ENERGY
MARKET OPERATOR FOR YEARS 2016-2019**

Technical Advisor's Report

Prepared for

ECONOMIC REGULATION AUTHORITY

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DISCLAIMER

This report has been prepared for the Economic Regulation Authority (Authority) to assist in its review of the allowable revenue and proposed capital expenditure to enable the Australian Energy Market Operator (AEMO) to operate the south west interconnected power system (SWIS) over the period 1 July 2016 to 30 June 2019. Geoff Brown and Associates Ltd accepts no responsibility to any party other than the Authority for the accuracy or completeness of the information or advice provided in this report and does not accept liability to any party if this report is used for other than its stated purpose.

In preparing this report, we have relied on the accuracy of the information and data provided to Authority by AEMO in its AR4 revenue proposal and in response to our requests for additional information. We therefore do not accept liability for conclusions or errors arising from the use of inaccurate or incomplete data or information provided to us for the purposes of this review.

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EXECUTIVE SUMMARY

Our review covers only the revenue required to cover those components of AEMO's forecast expenditure for the AR4 period (1 July 2016 to 30 June 2019) related to system management (i.e. the operation and management of the SWIS) and does not consider the other components of AEMO's total revenue requirement, including revenue required for the operation of the electricity market, the gas bulletin board and expenditure on preparation for potential market reforms. It is based on AEMO's September 2016 revenue proposal, as the cost components we looked at were not changed in the subsequent November 2016 supplementary proposal. In undertaking the review, we assumed that the existing system management IT systems would remain in service until approximately July 2019, at which time they would be retired and replaced by new systems developed to support the proposed market reforms.

In its proposal, AEMO categorised its system management related expenditure as business as usual (BAU) and transfer of function (ToF). BAU costs are costs that would have been incurred if Western Power's ring-fenced System Management business unit had continued to operate the SWIS from Western Power's existing control room. ToF costs are incremental costs arising from the decision to transfer this responsibility to AEMO and to operate the SWIS from a new control room located within the Perth CBD. However, in our view some costs were not appropriately categorised in the proposal. For example, depreciation of IT systems categorised as ToF capital expenditure was treated as BAU, except for depreciation on property related capital expenditure on the new control room, which was categorised as ToF. We found such discrepancies confusing and our review was more difficult as a result.

Forecast System Management BAU Expenditure

The system management BAU forecast operational expenditure that we reviewed is shown in the table below. In comparing the expenditure in real terms with the corresponding approved expenditure for the AR3 period (1 July 2013 to 30 June 2016), we assumed an inflation rate of 2.9% for employee benefit expenditure and 2.5% for other expenditure, consistent with the baseline assumptions used by AEMO in preparing its proposal. We took 2016-17 to be the base year and, for simplicity, we assumed AR3 expenditure was spread evenly across the period.

\$000	Escalator	Approved AR3	2016-17	2017-18	2018-19	Total AR4
Nominal						
Employee benefits	-	16,790	6,009	6,576	5,803	18,388
Accommodation	-	926	456	592	489	1,537
Supplies and services	-	9,142	6,847	5,420	3,887	16,154
Real						
Employee benefits	2.9%	17,778	6,009	6,391	5,481	17,880
Accommodation	2.5%	973	456	578	465	1,499
Supplies and services	2.5%	9,605	6,847	5,288	3,700	15,835

Employee benefit expenditure is consistent with the corresponding expenditure approved for AR3. In real terms, accommodation costs are forecast to increase by 54% during AR4 due to the transfer of the control room to more expensive premises within the Perth CBD.

As shown in the table and presented in AEMO's AR4 proposal, supplies and services costs are forecast to increase by \$6.23 million (64%) in real terms over the corresponding expenditure approved for AR3. This analysis is misleading, as it includes estimated expenditure of \$4.3 million (real) to compensate Western Power for depreciation and borrowing costs on its existing system management assets even though such expenditure would not have been categorised as supplies and services when approved for AR3. Western Power will continue to maintain its existing system management assets under a services contract to AEMO until they are no longer required, and we attribute much of the balance of the increased AR4 expenditure to be a consequence of the separation of operations and maintenance responsibilities.

System Management BAU Depreciation

AEMO's forecast system management BAU depreciation is shown in the following table.

\$000 (nominal)	Purchase Price	2016-17	2017-18	2018-19	Total AR4
AEMO Assets					
WA integration - system resilience	585	59	117	117	293
Software licences	2,823	565	565	565	1,694
WP data link	500	-	50	50	100
Total	3,908	624	732	732	2,087
Western Power Assets	2,010	710	1,180	120	2,010

This is all new expenditure. Depreciation on AEMO assets relates to capital expenditure required to enable the existing Western Power control assets to be controlled from the new AEMO control room. This includes new and upgraded software licences, as the licences for the existing system management software do not provide for remote control and do not allow for users other than Western Power. These depreciation components relate primarily to ToF capital expenditure, which we have reviewed and consider reasonable.

AEMO considers that Western Power's existing system management software is no longer fit for purpose and requires upgrading if it is to continue to be used. Our initial view was that, if the software was to be retired in July 2018, AEMO should be able to make do with it in its present state and limit expenditure to unavoidable replacements. However, given that a final decision to proceed with the planned reforms has not been made and that the existing systems now be required to remain in service until at least July 2019, we no longer consider this position tenable.

System Management Transfer of Function Operating Expenditure

AEMO's forecast operating expenditure attributed to ToF is shown in the table below. As this is new expenditure, a comparison with corresponding expenditure during AR3 is not possible.

\$000	Escalator	2016-17	2017-18	2018-19	Total AR4
Nominal					
Employee Benefits	-	2,109	1,560	1,658	5,237
Supplies and Services	-	-	737	1,541	2,278
Real					
Employee Benefits	2.9%	2,109	1,516	1,566	5,191
Supplies and Services	2.5%	-	719	1,467	2,186

The increase in employee benefits expenditure is due to the staffing increases needed to:

- increase from one to two the number of control room operators on duty during each shift. AEMO is not prepared to accept the risk of operating the power system with only a single shift operator on duty and notes the comments in PA Consulting audit reports that current staffing levels do not meet industry standards and, as a result of this current staffing level, Western Power's System Management has not been able to fully comply with the requirements of the WEM Rules.
- carry out market support functions such as validation of generator standing data, scheduling of plant outages and determination of loss factors. AEMO has indicated that at present these functions are either not currently being done or are being undertaken by business units of Western Power other than its ring-fenced System Management business unit.

In our view, AEMO has a lower tolerance for risk than Western Power, although this should not be interpreted as criticism. This is reflected in the higher staffing level and the relatively high level of

capital expenditure it is requiring on Western Power's existing system assets even though these are likely to be retired at the end of the AR3 regulatory period.

Expenditure on supplies and services relates to the lease of dark fibre communication links that will be used to connect AEMO's new control room to the outside world. There is also a provision for a payment of \$0.61 million (nominal) to compensate Western Power for the residual book value of its system management assets when they are taken out of service.

Summary

Our review has looked at whether AEMO's forecast expenditure is necessary and reasonable. We are satisfied there is no double counting and the expenditure covered by this review is reasonable. That said, the transfer of system management responsibility from Western Power to AEMO has increased the required expenditure due to:

- the need to provide for the cost of relocating the system control room into AEMO's new offices within the Perth CBD;
- the increased staffing costs resulting from AEMO's lower tolerance for risk; and
- provision for a higher standard of service than currently provided by Western Power's ring fenced System Management business unit.

Our ability to test the efficiency of the forecast and the risk provision that has been incorporated into it has been limited. We note that IT projects can be very difficult to manage and frequently exceed budget, and that some of the work covered by AEMO's forecast has still to be fully scoped.

We consider that some depreciation expenditure could potentially be deferred to the following year due to the delay in retiring the existing system management assets, and also that for some line items annual increases are higher than AEMO's baseline inflation assumptions. However, given the high level of uncertainty inherent in forecasting IT expenditure requirements and the low materiality of any identified adjustments, we are not recommending any changes to AEMO's forecast.

1. INTRODUCTION

In accordance with decisions of the Western Australian State Government, the Australian Energy Market Operator (AEMO) has assumed legal responsibility for the operation of the Wholesale Electricity Market (WEM) and the South West Interconnected Power System (SWIS). These changes have been made in accordance with the recommendations of the Energy Market Review (EMR) currently being undertaken by the Public Utilities Office (PUO) of the State Department of Finance. Under the new arrangements AEMO is now responsible for:

- Market operation, system planning and market administration services under the WEM Rules;
- System management functions under the WEM Rules. These functions include:
 - the operation of the SWIS in accordance with WEM requirements;
 - procuring adequate ancillary services to ensure the secure and reliable operation of the SWIS; and
 - monitoring market participants' compliance with the WEM Rules in relation to dispatch, power system security and power system reliability.
- Operation of the Western Australian Gas Bulletin Board and preparation and publication of the annual Gas Statement of Opportunities report under the Gas Services Information (GSI) Rules.

Prior to the transfer of responsibility, the market operation and GSI functions were undertaken by the Independent Market Operator (IMO), while the system management function was performed by the ring-fenced System Management business unit of Western Power

In addition to this transfer of responsibility, the EMR has recommended to the State Government that the WEM, be reformed. The proposed reforms would mean significant changes to the way in which generation and ancillary services are scheduled and dispatched and would require the IT systems that currently support these functions to be replaced. However, implementation of the recommended reforms requires enabling legislation, which has yet to be passed by the State Parliament so, in the interim, AEMO will operate the WEM, as currently designed, using Western Power's existing IT systems.

Under the relevant provisions of the WEM and GSI Rules, in September 2016 AEMO submitted its proposed revenue and capital expenditure requirements for the period 1 July 2016 to 30 June 2019 (referred to as AR4 in this report) to the Economic Regulation Authority (Authority) for approval. As part of its review of the AEMO submission, the Authority has contracted Geoff Brown & Associates to provide technical advice in respect of the following expenditure components:

- Allowable revenue and capital expenditure for performing the system management function in a business as usual (BAU) mode; and
- Allowable revenue and capital expenditure for transfer of the system management function from Western Power to AEMO. Currently, the SWIS is still being operated by Western Power staff seconded to AEMO, but it is intended that AEMO operate the power system directly using its own staff. This will involve moving the SWIS control room from Western Power's premises in East Perth to AEMO's new offices within the Perth CBD. Expenditure in this category is referred to in this report as transfer of function (ToF) expenditure.

Other components of AEMO's revenue application, including the revenue required to fund BAU market operations, GSI functions, the planned move to new premises and expenditure on preparing for the possible introduction of the reformed market are not included in our review.

AEMO's September 2016 revenue proposal for AR4 assumed that the WEM reforms recommended by the EMR would go live on 1 July 2018 and provided for the development of the IT systems required to allow the WEM to operate in its reformed state. When it became apparent that this go-live date would not be met, it provided a supplementary proposal in November 2016. This supplementary proposal reduced the forecast expenditure on the development of IT systems to support the reformed market, but made no changes to the forecast system management BAU and ToF expenditures that are the subject of this review.

In undertaking our review, we have assumed that the implementation of the market reforms will be deferred until approximately July 2019, and that the IT systems that are currently used to manage the SWIS will need to be operational until then.

2. BACKGROUND

2.1 IMPLEMENTATION OF APPROVED MARKET CHANGES

While reforms to the design of the WEM are currently on hold, the following changes to the way the market is managed have been approved and are either already in place or in the process of implementation:

- AEMO assumed legal responsibility for market operations on 1 November 2015 and for the management of the power system from 1 July 2016. Between July and October 2016, the power system continued to be operated by Western Power under an operating agreement with AEMO.
- This operating agreement terminated on 31 October 2016 and was replaced by a services agreement and provides for continued access to Western Power's control room and control systems. It also provides for the secondment of System Management staff to AEMO to cover for the contingency that current Western Power control room staff do not accept AEMO's employment offer.
- AEMO is establishing a new system control room in new AEMO premises within the Perth CBD. This new control room is expected to be operational in September 2017 and the new premises will house all Perth-based AEMO staff.
- AEMO has also assumed responsibility for market support functions that are not undertaken in real-time and, in some cases, were previously undertaken by Western Power outside of its ring-fenced system management function. These include the management of transmission and generator outages, determination of loss factors and the verification of generator standing data.

2.2 REVIEW APPROACH

Given the limited time available, we have limited this review to a top down assessment.

It is standard practice for this type of review to compare past and forecast expenditures after they have been adjusted to a real or constant price basis. For this purpose, we have assumed an annual cost escalation factor of 2.9% for employee benefits, equal to the annual salary adjustment in AEMO's enterprise agreement. The rationale for this is that AEMO's costs are dominated by the cost of labour with specialist skills and the labour costs are therefore a more valid escalator than the consumer price index. For simplicity, we have also assumed that AR3¹ costs have been spread evenly over the three years of the AR3 period. We have taken 2016-17 to be the base year.

We have assumed an escalation rate of 2.5% per annum for non-employee costs for both AR3 and AR4, consistent with the AEMO assumption, which is based on the Department of Treasury advice and consistent with state budget estimates. This assumption is high for AR3, but it simplifies the analysis and the error should not be material for a high level top down analysis. The effect of this is to inflate AR3 non-salary costs by an escalator of 5.06% to derive the equivalent 2015-16 constant price cost.

¹ AR3 is the previous three-year regulatory period, which commenced on 1 July 2013 and ended on 30 June 2016.

3. BUSINESS AS USUAL EXPENDITURE

3.1 SYSTEM MANAGEMENT ALLOWABLE REVENUE

During AR4, BAU expenditure will be incurred by both AEMO and Western Power. However, under a BAU scenario, the costs should be similar, irrespective of who is providing the services, so for this analysis we have considered only the aggregated expenditure across both organisations.

A comparison of the proposed AR4 with the equivalent AR3 costs is shown in Table 3.1.

Table 3.1 Forecast BAU Operating Expenditure

\$000	Escalator	Approved AR3	2016-17	2017-18	2018-19	Total AR4
Nominal						
Employee benefits	-	16,790	6,009	6,576	5,803	18,388
Accommodation	-	926	456	592	489	1,537
Supplies and services	-	9,142	6,847	5,420	3,887	16,154
Real						
Employee benefits	2.9%	17,778	6,009	6,391	5,481	17,880
Accommodation	2.5%	973	456	578	465	1,499
Supplies and services	2.5%	9,605	6,847	5,288	3,700	15,835

It can be seen from Table 3.1 that:

- Labour costs are similar in real terms, as expected.
- Forecast accommodation costs in real terms are \$526,000 (54%) higher in AR4 rather than AR3. AEMO indicates that some of these costs are due to the retention of the Western Power control room as a back-up after September 2017 when the control room moves into new premises. This will account for the elevated accommodation expenditure in 2017-18.

Furthermore \$0.49 million nominal is attributed to the additional rental cost of the new office. We note that there is no accommodation component in the ToF cost category. The accommodation cost in 2016-17 is high when compared to the average annual AR3 cost. This cost includes rental cost for the existing control room, which is owned by Western Power, and also an allocation to System Management for the rental of AEMO's new premises within the Perth CBD. This seems reasonable, as three months is likely to be insufficient time to set up a system control room in new premises. The delay in implementation of the market reforms may mean that the existing control room is required as a backup beyond December 2017, but at this point AEMO has not requested any additional provision to cover this.

- Forecast expenditure on supplies and services is \$6.2 million (64%) higher in AR4 than actual expenditure in AR3. In part, this additional provision arises from the need to outsource the maintenance of the existing IT systems used from the control of the SWIS to Western Power until they are no longer required. During this transition period, synergies from a single entity being responsible for both the operation and maintenance of these systems are not available. However, this provision also covers costs that would not have been categorised as supplies and services during AA3 including:

- \$4.55 million to cover Western Power's depreciation costs on its existing assets; and
- \$0.36 million to cover Western Power's borrowing costs on these assets.

We consider these costs reasonable.

3.2 SYSTEM MANAGEMENT CAPITAL EXPENDITURE

The BAU capital expenditure covers expenditure and hardware replacements, software enhancements and upgrades that AEMO believes is necessary to maintain the existing systems used by Systems Management in a serviceable condition until they are replaced by the new system currently being developed to support the reformed market.

AEMO's forecast BAU capital expenditure for AR4 is shown in Table 3.2.

Table 3.2: Forecast BAU Capital Expenditure

\$000	Escalator	Approved AR3	2016-17	2017-18	2018-19	Total AR4
Nominal						
	-	3,999	710	1,180	120	2,010
Real						
	2.5%	4,201	710	1,151	114	1,975

The nominal expenditure in Table 3.2 is described in Table 14 of AEMO's September 2016 proposal as capital expenditure but this description is inaccurate. It is actually a depreciation table reflecting the capital expenditure shown in Table 3.3, with the 2016-17 capital expenditure depreciated over two years and expenditure in 2017-18 and 2018-19 fully written off in the year in which it occurs.

It is not clear how much of the approved AR3 capital expenditure was utilised. The AR3 expenditure was approved before the EMR was established and we understand that expenditure on some of the planned AR3 capital projects was reduced after it became clear that the WEM energy management system would likely be replaced by a new system capable of supporting the proposed market reforms.

To justify the system management BAU forecast, the proposal states that:

A number of projects are required within the AR4 review period for System Management to continue to provide effective management and operation of the WA power network, including:

- *Enhancements to the Dispatch Training Simulator (DTS) system which is used to train controllers and other staff in a real-time environment (including dispatch of participants and scheduling of generation).*
- *Improvements to System Management operational systems to ensure critical systems are secured to an industry acceptable standard, as defined by AEMO.*
- *Specify, design, and implement small-scale changes to Operational Systems to ensure they are fit for purpose to manage dispatch and system security.*
- *Addressing the risks of obsolete and/or unsupported hardware through a remediation program of the critical System Management Operational Systems.*

To support its proposal, AEMO provided the Authority with the following breakdown of this expenditure:

Table 3.3: Breakdown of System Management BAU Capital Expenditure

\$000 (nominal)	2016-17	2017-18	2018-19	Total AR4
DTS Enhancements	150	150		300
System management – system resilience	750			750
Small scale operational system remediation	120	120	120	360
Operational system support continuity	400	200		600
WA Integration	195			
Total	1,615,	470	120	2,205

The first four line items of Table 3.3 are a scaled down version of the forecast capital expenditure in Western Power's System Management's now withdrawn proposal to the Authority in February 2016. This proposal assumed that the WEM reforms would not occur and was based on a comprehensive remedial programme for the existing systems to ensure their serviceability for an indefinite period. AEMO's scaling process reduced the forecast capital expenditure from \$6.63 million to \$2.01 million, on the basis that the system would be replaced on 1 July 2018 by a new system that would support the reformed market.

While we recognised the impact of the scaling, we nevertheless considered the residual provision shown in Table 3.3 to be very high, if the only requirement was make do with the existing system until it was decommissioned on 1 July 2018. We speculate that the proposed amount largely reflects a conservative approach to risk by AEMO, which is not satisfied that the existing Western Power systems are fit for purpose in their present state. Appetite for risk is a matter of judgement and we nevertheless understand this conservative stance, as it mitigates what AEMO might consider a significant business risk. A failure of Western Power's current systems could potentially result in a power system blackout. Such an event could seriously damage AEMO's reputation in Western Australia were it to occur in the initial years of its stewardship, irrespective of the cause of the failure.

It is now apparent that implementation of the reformed market by 1 July 2018 is unachievable. We also understand that only two of Western Power's current system controllers, both trainees, accepted AEMO's employment offer, and AEMO has had to recruit new staff to take over their roles. While the existing Western Power staff will be available for an interim period to operate the power system and train the new recruits, eventually the system will likely be operated by a full team of less experienced staff who may also be less familiar with the configuration of the SWIS. In such circumstances, there is a heightened risk that the consequences of a partial or full failure of the existing IT systems will be exacerbated by an inappropriate operator response.

We note that AEMO's supplementary proposal does not request additional capital expenditure for BAU system management and in the light of the changed circumstances, we now consider its forecast provision reasonable.

The final line item in Table 3.3 is system resilience related expenditure that is intended to ensure the integrity and reliability of the IT landscape, following the transfer of market operations and system management functions to AEMO. This was apportioned between the market operator and system management function. This expenditure, which was all provided for in 2016-17 totals \$780,000, of which \$195,000 was allocated to market operations, \$195,000 to system management BAU (shown in Table 3.,3) and the balance to system management ToF (shown in Table 4.3). This was not well explained in AEMO's September 2016 proposal and it is still not clear to us why AEMO has chosen to

split the system management allocation between BAU and ToF. That said, some expenditure is undoubtedly needed and we have seen nothing to suggest that the total provision of \$780,000 is unreasonable.

3.2.1 Depreciation

The system management BAU depreciation forecast is shown in Table 3.4. We have not included a comparison with AR3 as depreciation costs on Western Power's existing system management assets are to be recovered through the services agreement.

Table 3.4: Forecast System Management BAU Depreciation

\$000 (nominal)	Purchase Price	2016-17	2017-18	2018-19	Total AR4
WEM System Management					
WA integration- system resilience	585	59	117	117	293
Software licences	2,823	565	565	565	1,694
WP data link	500	-	50	50	100
Total	3,908	624	732	732	2,087
WEM System Operator (Western Power)	2,010	710	1,180	120	2,010

The capital expenditure to which each line item in Table 3.4 relates is discussed below:

- \$390,000 of the WA integration -system resilience capital expenditure is the corresponding ToF expenditure shown in Table 4.3 and the balance is the final line item in Table 3.3. Notwithstanding the inclusion of a depreciation component in the ToF operating expenditure forecast, AEMO has allocated some depreciation of ToF capital expenditure to BAU. This is very confusing.
- The software licence capital expenditure is also shown in Table 4.3 and is also categorised different from its associated depreciation.
- The WP data link line capital expenditure is a component of the new office fitout ToF costs shown in Table 4.3. The only reason that depreciation of this component of these costs is considered BAU rather than ToF (like the depreciation on the property related components of the office fitout capital expenditure) would appear to be that the data link capital expenditure is systems rather than property related.
- The WEM system operator depreciation line item relates to the capital expenditure shown in Table 3.3, most of which is fully depreciated by 2017-18 as Western Power's system management assets will be taken out of service at the commencement of the reformed market. Technically, the timing of some of this expenditure could be deferred to reflect the delay in retiring the assets; however impact of any changes would not be material to the total revenue requirement, so we have not recommended any adjustment to the schedule proposed in AEMO's September 2016 proposal.

4. SYSTEM MANAGENT TRANSFER OF FUNCTION

4.1 ALLOWABLE REVENUE

ToF relates to the recovery of incremental expenditure arising from the decision to transfer system management responsibility from Western Power to AEMO. As we understand it, this is new expenditure resulting from the decision to employ AEMO as an independent system manager and that would not have occurred had system management continued to be undertaken by a ring fenced business unit of Western Power. As it is new expenditure, it cannot be directly compared with expenditure incurred by Western Power's System Management during AR3.

AEMO's proposed ToF allowable expenditure for AR4 is shown in Table 4.1.

Table 4.1: Forecast ToF Operating Expenditure

\$000	Escalator	2016-17	2017-18	2018-19	Total AR4
Nominal					
Employee Benefits	-	2,109	1,560	1,658	5,237
Supplies and Services	-	-	737	1,541	2,278
Real					
Employee Benefits	2.9%	2,109	1,516	1,566	5,191
Supplies and Services	2.5%	-	719	1,467	2,186

The major component of the employee benefit expenditure is the cost of employing an additional eight operators to increase the pool of available operators from 6 to 14 full time equivalents (FTE) to enable control room staffing to be increased from one to two staff per shift, as recommended by PA Consulting in its Independent Assurance Report on the compliance of System Management with the market rules and market procedures². In addition, AEMO is proposing to employ an additional two FTE to work in operational support roles.

Employee Benefits Expenses

The PA Consulting report noted:

We note that the level of staffing in [System Management] is low compared with the staffing levels of comparable system operators. The low staffing levels are of particular concern in the control room where there is only one controller on shift (with two shifts per day). This practice is not consistent with the practice of comparable system operators internationally and is an area of significant compliance risk in our view. Specifically:

- In high-risk or emergency situations it can be challenging for a single controller handle both security and dispatch creating scope for non-compliance. Such scenarios are likely to arise during summer peak intervals and carry with them high risk of dispatch non-compliance and/or noncompliance with power system security obligations.*
- The timeliness issues around dispatch advisories is related, in part, to a single controller being on shift. The controller may be too occupied with security and dispatch issues to notify market operations staff of the need to issue an advisory.*
- In the event that a controller becomes incapable carrying out their duties (e.g. due to sickness or other unforeseen circumstances), the control desk may remain unattended until a replacement controller arrives to take over the shift.*

² Independent Assurance Report: Compliance of System Management with the Market Rules and Market Procedures: P A Consulting Group, 4 November 2015.

We recommend that SM immediately increase the level of staffing in the control room to two controllers: one responsible for security and the other for scheduling and dispatch.

We note that PA Consultant's recommendation is related to the existing System Management infrastructure, where generator dispatch is performed manually. Assuming the market reforms proceed, the real time market management system software will be interfaced to the system dispatch engine, which automatically dispatches generation and ancillary services to a five minute dispatch cycle. Under this arrangement, the control room operators will no longer be required to intervene in the routine management of the system, and so should arguably have the time to ensure full compliance with the WEM Rules.

Nevertheless, AEMO has indicated to the Authority that it is not prepared to accept the risk of operating with a single shift controller, either as the WEM currently exists or after it has been reformed. That being the case, we would be surprised if the issue was not discussed and agreed with the EMR before AEMO agreed to assume responsibility for the operation of the WEM.

On balance, we agree with AEMO's rationale for increasing the staffing level. The power system is the lifeblood of the Western Australian economy and, should a contingency arise that had consequences similar to the blackout that recently occurred in South Australia, AEMO would be subject to intense media and political scrutiny. We have no doubt that in the aftermath of such an event, operation of the control room with only one person on shift would be strongly criticised. Western Power had partially mitigated this risk by locating its system control room next to its distribution network control room, providing some level of backup operator support in the event of a system emergency or operator incapacitation, but this support will not be available when the control room is shifted to AEMO's new premises in the Perth CBD.

AEMO's submission says that two additional FTEs have been provided for the ongoing development and support of operating procedures, IT project management support, training, independent security review of outage requests and transfer of other activities from Western Power (such as marginal loss factors and generator performance testing). The need for these additional staff is less clear, as this is not new but work that should still have been required when system management was under Western Power's stewardship. It may have been that some of these functions were undertaken by Western Power outside of its ring-fenced System Management business unit. AEMO has indicated to the Authority, however, that some functions, such as the development of operating procedures, are additional in that they have not been performed historically by either System Management or Western Power due to a lack of resources. It further notes that the PA Consulting audit report highlights these functions as serious risks for System Management if they were not addressed. We agree – a lack of properly documented and tested operating procedures, for example, is a significant risk if inexperienced operators are exposed to an emergency situation, as the risk of an already difficult operating situation being exacerbated by an inappropriate response is significant.

AEMO has provided a breakdown of the proposed employee benefits expenses and there appear to be some inconsistencies with what is said in its submission:

- Unit rates increase by 9.5% in 2017-18 and 6.3% in 2018-19, significantly higher than its stated assumption of 2.9%. Offsetting this, the breakdown appears to assume only 7 additional FTEs, rather than the 8 indicated in the proposal.
- The 2016-17 provision allows for the employment of 15 FTEs for a four-month period, in addition to its additional staffing requirement, to cover a handover of tasks. AEMO has advised that 15 Western Power staff did not accept its employment offer and all these positions are required to be filled³. Recruitment has now concluded and all positions have now been filled with start dates ranging from November 2016 through to January 2017. The 15 additional FTEs provide

³ We assume this includes back office staff as well as system controllers.

for the payment of seconded Western Power employees who will remain in position until their replacements are trained and competent to perform their tasks.

On balance, we consider the provision reasonable. The departure of so many Western Power staff amounts to a mass exodus, which makes it difficult for AEMO to pair experienced staff with new recruits, in order for the recruits to learn on the job over an extended period of time. We would have considered the provision high, had the attrition rate been lower.

Supplies and Services

A breakdown of the supplies and services line item in Table 4.1 is shown in Table 4.2 below.

Table 4.2: Forecast ToF Supplies and Services Expenditure:

\$000	Escalator	2016-17	2017-18	2018-19	Total AR4
Nominal					
Control room data link	-	-	101	120	221
AEMO data link	-	-	212	251	463
WP data link	-	-	424	501	925
Residual WP asset value				668	668
Real					
Control room data link	2.5%	-	99	114	213
AEMO data link	2.5%	-	207	239	446
WP data link	2.5%	-	424	477	891
Residual WP asset value	2.5%			606	606

The first three line items in Table 4.2 provide for the leased data links that are required to connect the new control room within the Perth CBD to the outside world. The residual WP asset value is a payment to Western Power to compensate it for the residual value of its system management assets at the time they are taken out of service. A portion of this payment could now be deferred to 2019-20 to reflect the delay in retirement of the assets, but we have not recommended this as we do not consider the adjustment material.

We are not able to comment on the reasonableness or otherwise of any of these costs, although we accept that expenditure is required in all cases. We assume that AEMO has estimated the costs in good faith and doubt that variations from the actual costs will be material to the AEMO's total revenue requirement. We note however that there is an increase of 18% between 2017-18 and 2018-19 in the nominal cost of operating each of the data links. This is much higher than the assumed escalation factor of 2.5%.

Conclusions

Given on the information provided, we have no basis on which to conclude that the employee benefit costs for 2016-17 or the data link costs for 2017-18 are excessive, although we caution that we have been unable to independently assess the reasonableness of these costs. As this is new expenditure, we are unable to compare the forecast with the corresponding actual spend during AR3. However, the escalation of these expenditures in subsequent years is materially higher than the escalation rates AEMO stated that it assumed in preparing its submission, and AEMO has not provided any explanation for this discrepancy.

4.2 CAPTIAL EXPENDITURE

AEMO's forecast ToF capital expenditure is shown in Table 4.3 below.

Table 4.3: Forecast ToF Capital Expenditure

\$000 (nominal)	2016-17	2017-18	2018-19	Total AR4
WA Integration	390	-	-	-
Software licensing	2,823	-	-	-
New office fitout	-	2,299	-	-

New office fitout costs are out of scope for this review so these costs are not considered further. However, we note that this forecast includes a provision of \$500,000 for data links, presumably for interfacing the leased dark fibre data links to AEMO's IT systems. Depreciation on this component is provided for in the WP data link line item in Table 3.4.

The WA integration cost line item is discussed in Section 3.2.

In respect of the software licensing line item AEMO's submission states:

These costs relate to licensing arrangements that are required for access to system management systems owned by Western Power (such as PI (OSI), XA 21 (GE), and Oracle), following transfer to AEMO. The existing license arrangements held by Western Power do not support outsourcing arrangements, therefore additional licensing will be required (subject to final vendor negotiations).

It appears this expenditure will be needed but we have insufficient information on which to assess its reasonableness.

4.2.1 Depreciation

The ToF depreciation costs in the AEMO submission relate to the property related components of the fitout of the new office and control room and are therefore not considered in this report.