*Geoff Brown & Associates Ltd*

# WESTERN AUSTRALIA WHOLESALE ELECTRCITY MARKET

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

**Technical Advisor's Report on Supplemental Document submitted on 17 February 2017**

**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 Australian Energy Market Operator's (AEMO) supplemental document covering the need for additional allowable revenue in 2017 to provide for the introduction of proposed reforms to the Western Australia Wholesale Electricity Market (WEM). 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 supplemental document 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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### Version Control

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| Draft 1 | 20/3/17 | Issued to the Authority for review and comment. |
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# EXECUTIVE SUMMARY

In February 2017 AEMO submitted to the Authority a supplemental document seeking approval of capital expenditure and allowable revenue for the AR4 regulatory period additional to that already approved by the Authority in December 2016. This additional capital expenditure and allowable revenue relates to expenditure incurred, or forecast to be incurred, between July 2016 and December 2017 on the development of the proposed electricity market reforms.

Approval is also sought for allowable revenue to cover depreciation through to the end of the AR4 regulatory period on assets related to the proposed market reforms that are expected to be commissioned prior to 31 December 2017. No approval is sought for capital expenditure beyond 31 December 2017 on market reforms that are still under development, or where development has not been started, at that point.

We were asked to provide advice to the Authority on the technical aspects of the expenditure for which approval is sought and this report documents this advice.

Apart from an adjustment to correct a relatively minor error in AEMO's analysis, we consider the forecast capital expenditure and allowable revenue requirement for which approval is sought to be reasonable. We have made this judgement on the following basis:

- The WEM Rules permit AEMO to continue with the development of the market reforms and clause 1.20.3 of the WEM Rules requires the Authority to determine AEMO's allowed capital expenditure and revenue requirement on the basis that the market reforms as currently proposed by the Department of Finance are to be implemented before 1 July 2020;

- While we are unable to provide an opinion on whether AEMO could reasonably achieve its objectives at a lower cost, we are satisfied as to the need for the IT systems that AEMO is proposing to build. We also agree with AEMO's rationale for building stand-alone systems that can accommodate changes to the current market reform proposals and consider the timing of the development of the proposed new systems to have been adequately justified;

- Most of the expenditure for which approval is sought will be incurred prior to 30 June 2017. This expenditure can now be considered either sunk or committed; and

- We consider the overhead structure that AEMO has in place to be reasonable for the management of development of the IT systems required by the market reform program recommended by the Department of Finance and see no basis for temporarily downsizing this to a significant extent if the reforms are to be implemented before 1 July 2020.

# 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 ring-fenced System Management business unit of Western Power performed the system management function.

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 is operating the WEM, as currently designed, using Western Power's existing IT systems.

AEMO must manage both the WEM and the SWIS in accordance with the Wholesale Electricity Market Rules (WEM Rules). Section 2.22A of the WEM Rules requires AEMO to obtain approval of its allowable revenue and forecast capital expenditure from the Economic Regulation Authority (Authority) if these costs are to be recovered from market participants. The delay in passage of the enabling legislation through the State Parliament has resulted in uncertainty over the final design and implementation of the market reforms. Because of this, the Authority's Determination on AEMO's allowable revenue and forecast capital expenditure for the AR4 regulatory period (1 July 2016 to 30 June 2019)[1] approved only expenditure required by AEMO to perform its existing functions and did not approve any expenditure related to the design and implementation of the proposed market reforms.

On 17 February 2017, AEMO submitted to the Authority a supplemental document (supplemental document)[2] seeking approval of additional capital expenditure and allowable revenue so that it could:

- complete the communications links and data centres needed for its new office and control centre in the Perth CBD to become fully operational. Due to the structure of

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11 *Allowable revenue and Forecast Capital Expenditure for the Australian Energy Market Operator 2016/17 – 2018/19. Final Determination*. – Economic Regulation Authority, 16 December 2016.

2 *2016-19 Allowable Revenue and Forecast Capital Expenditure Submission to Economic Regulation Authority. Supplemental Document to Support Adjustment to Allowable Revenue and Forecast Capital Expenditure.* Australian Energy Market Operator, 17 February 2017.

AEMO's original AR4 submission[3] the Authority's current determination has approved capital expenditure for equipment to be installed within the new office and control centre but has not provided for equipment that needs to be installed at the remote end of the various communication links;

- develop and implement IT systems for energy management and demand forecasting. At present AEMO is performing these functions using legacy systems owned by Western Power and needs to install its own systems if it is to function independently of Western Power. These systems support AEMO's system management function and are not contingent on the WEM reforms;

- continue stakeholder engagement and consultation and other preparatory work for the probable introduction of WEM reforms. This includes working with the PUO as it further develops its electricity market reform package; and

- develop and implement the revised reserve capacity mechanism (RCM). This is already required by the WEM Rules but was treated as market reform expenditure in AEMO's original AR4 submission and has therefore not been approved by the Authority;

As part of its review of AEMO's additional revenue proposal in its supplemental document, the Authority has contracted Geoff Brown and Associates to provide advice on the technical aspects of the proposed expenditure. This report documents this advice.

[3] *2016-19 Allowable Revenue Submission to the Economic Regulation Authority.* Australian Energy Market Operator, September 2016.

# 2. REVIEW OF EXPENDITURE COMPONENTS

## 2.1 DATA CENTRE TO SUPPORT AEMO PERTH OFFICE

AEMO's current data centres in Perth are in a secure third party location that hosts the existing WEM and GSI systems. This will be upgraded to host the networking and communications to support AEMO's single Perth office with an appropriate level of redundancy in the event of equipment failure.

The design of AEMO's new Perth office, funding for which has already been approved by the Authority, is based on the design of AEMO's new Brisbane office and adopts AEMO standards for staff collaboration, cyber and physical security, and networking. The control room supports visualisation technology that will be hosted in the data centre location, which will provide the same functionality from a local disaster recovery location in the event of the Perth office being inaccessible. Eventually control of the SWIS will also be possible from AEMO's other locations in the eastern states.

Work covered by the data centre component of AEMO's supplemental expenditure forecast can be classified into three areas:

- Data and voice communication links. These include equipment at the remote end of leased dark fibre links[4] 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 eat coast facilities.

- Network, computer, and storage equipment. This is the hardware located in in the data centre racks; and

- Hosting services. This is the contract with the data centre to provide rack space and other services related to hosting equipment, such as cabling.

**Table 2.1: Forecast Capital Expenditure and Allowable Revenue ($000) – Data Centre.**

| | Actual (to Dec 2016) | Jan-Jun 2017 | Jul-Dec 2017 | Jan-Jun 2018 | Jul 2018 – Jun 2019 | Total |
|---|---|---|---|---|---|---|
| **Capital Expenditure** | | | | | | |
| Resources | 132 | 920 | 96 | - | - | **1,148** |
| Hardware | | 1.960 | | - | - | **1,960** |
| Program Costs | 60 | 254 | 20 | - | - | **334** |
| **Total** | **192** | **3,134** | **116** | **-** | **-** | **3,442** |
| **Allowable Revenue** | | | | | | |
| Travel & Training | 2 | - | - | - | - | **2** |
| Program Costs | 4 | - | - | - | - | **4** |
| Depreciation | - | - | 173 | 341 | 688 | **1,202** |
| **Total** | **6** | **-** | **173** | **341** | **688** | **1,208** |

[4] 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.

### 2.1.1 Comment and Conclusion

AEMO's original AR4 submission included the communications hardware located in its new Perth office in the forecast cost of establishing the office, and the communications hardware to be located remotely in the forecast cost of implementing the market reform program. Because that submission was structured in this way, the Authority's December 2016 final decision allowed expenditure on the Perth office hardware but not expenditure on the hardware to be located remotely. The forecast expenditure in Table 2.1 covers the expenditure that was not approved but is required to provide a fully functional communications infrastructure.

Table 2.1 shows that more than 90% of the forecast 2017 capital expenditure will be incurred prior to June 2017, presumably because AEMO needs to have its communications infrastructure fully operational before it moves into its new Perth CBD control room. This suggests that the expenditure is likely now committed and much of it could already be categorised as sunk. The Authority needs to consider whether to approve the forecast in this context.

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. 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 AEMO is of a higher standard than required. This could well be the case if the final market design is less complex than the current EMR proposal.

Apart from a small amount of operational expenditure, incurred in 2016, the allowable revenue shown in Table 2.1 comprises depreciation of the capital expenditure including the allocated program expenditure. It is depreciated on a straight-line basis over a five-year period, commencing in October 2017. A five-year depreciation period is reasonable for hardware and software of this nature. The depreciation shown in Table 2.1 is higher than the $1,149,000 in Table 6 of the supplemental document, as our table corrects an error we found in AEMO's spreadsheet model[5].

Given the present situation, we see little point in the Authority not approving the forecast expenditure in full. This would require AEMO to revise its current plans at the last moment and could potentially delay the establishment of the new control room. However, we suggest that in its final decision the Authority require that AEMO's application for approval of any additional expenditure required to implement the final design of the market reforms include an analysis that justifies the need for the full communications infrastructure currently being installed and reviews whether any of its hired communications links could be relinquished or replaced with a less costly alternative.

## 2.2 POWER SYSTEM OPERATIONS - CORE SYSTEM MANAGEMENT SYSTEMS

AEMO is proceeding with the development of the following systems that are required for the management of the power system:

- An energy management system;
- A demand forecasting system;
- A SWIS power system model.

These systems are stand-alone in the sense that, while they are required to effectively manage the power system and support the market, their development will not be affected by changes to the design of the market reforms. The systems proposed by AEMO can be utilised with both the current and any reformed market design.

K [5] AEMO has provided the Authority with a spreadsheet model that provides a full analysis of how the forecast expenditure in its supplemental document was derived. Depreciation was not calculated on the submitted full capital cost of the work because the $170,000 expenditure on licences in Row 55 of worksheet *Data Centre Project* was not totalled in Cell R55 of that worksheet.

The new systems will replace legacy systems currently owned by Western Power and made available to AEMO under its services agreement. They will use the same software platforms that AEMO currently uses in the eastern states.

AEMO has justified the development of a new energy management system on the basis that Western Power's XA/21 cannot interface with many of AEMO's dispatch and planning systems, so will need to be replaced before any market reforms that rely on the generator dispatch systems that AEMO uses in the NEM are implemented. Even though the last upgrade to this system was completed as recently as early 2016, this upgrade was delayed by up to a year. In AEMO's view, by 2019 the existing system will be nearing the end of its life and the cost of maintaining it in an operational state could increase. These costs would be wasted if the system needed to be replaced in early 2020 to allow the market reforms to proceed.

Vendor advice is that Western Power's Metrix demand forecasting system needs to be upgraded to the current version in 2018 if it is to continue to be supported.

Given this situation, and the fact that replacement systems can be developed in a way that is independent of the design of any market reforms, AEMO is proceeding with the development of new energy management and demand forecasting systems with implementation planned for mid-2018. Once AEMO's new systems are operational, the XA/21 system will no longer be required as Western Power will have migrated control of its transmission network to its PowerOn Fusion system.

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 the 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. This cost was included in the market reform component that was not approved in the Authority's December 2016 determination, and approval is now required if development is to continue.

The power system model is an off-line system required for training and planning purposes. It will be implemented on the Powerfactory Digsilent system that AEMO currently uses but some new costs, such as additional user licences and costs related to migrating the network model to the new system, have been included in this submission.

**Table 2.2: Forecast Capital Expenditure and Allowable Revenue ($000) – Power System Operations**

| | Actual (to Dec 2016) | Jan-Jun 2017 | Jul-Dec 2017 | Total |
|---|---|---|---|---|
| **Capital Expenditure** | | | | |
| Resources | 225 | 192 | 246 | **663** |
| Hardware | | | 350 | **350** |
| Licence Cots | | 10 | 356 | **366** |
| Program Costs | 101 | 117 | 156 | **374** |
| **Total** | **326** | **319** | **1,108** | **1,753** |
| **Allowable Revenue** | | | | |
| Planning | 11 | 2 | 10 | **23** |
| Travel & Training | 174 | - | - | **174** |
| Program Costs | 301 | - | - | **301** |
| Depreciation | - | - | - | **-** |
| **Total** | **486** | **2** | **10** | **498** |

### 2.2.1 Comment and Conclusion

As an independent system operator AEMO requires all three core system management systems discussed in this section and currently relies on Western Power's legacy systems through its services agreement. We consider each system in turn.

*Energy Management System*

Western Power's XA/21 energy management system is incompatible with the other IT systems that AEMO is planning to use in the reformed market and will eventually need to be replaced with the e-terra system that it uses in the NEM. Western Power has no further need for the XA/21 as it can migrate the control of its transmission system to the PowerOn Fusion system that it currently uses to control its distribution network. Given that cost of upgrading XA/21 (estimated at $6-8 million) is substantially higher than replacing it with the e-terra system that AEMO currently uses, we accept that this is not an option even if the market reforms did not proceed.

The XA/21 was last upgraded by Western Power in early 2016, although this upgrade was originally planned to occur in 2015. This means that the current version has now been in service for little more than a year and is still fully supported by the vendor. AEMO's position is that its e-terra system needs to be in place six months before the cut-over date for any market reforms so the system can be fully tested and proven. This is reasonable, and based on clause 1.20.3 of the WEM Rules means that an in-service date no later than January 2020 should be assumed.

The issue therefore is whether the Authority should approve the expenditure required to achieve AEMO's preferred in-service date of mid-2018. AEMO's preference for the earlier commissioning date appears to be based on the following considerations:

- It will allow it to terminate its current services agreement with Wester Power;
- Its costs for using and maintaining the XA/21 system are likely to increase once Western Power no longer uses it for its own purposes;
- By 2019 the XA/21 software will be at least four years old and an upgrade is likely to be available. At this point, hardware and software maintenance costs are likely to be higher and AEMO sees little benefit in incurring these costs on a system that will soon be redundant; and
- We suspect the AEMO would prefer not to be testing and proving its energy management systems at the same time as it is commissioning the market reforms.

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

*Load Forecasting*

AEMO uses the same load forecasting software in the NEM (Itron Metrix) as Western Power is currently providing it through the services agreement. However, the vendor has recently advised that an upgrade will be required by 2017-18, at an estimated cost of $300,000 if support is to be maintained.

The total forecast expenditure (through to mid-2018 (excluding the overhead allocation) is $1.38 million, of which 50% is forecast in 2017. This includes not only the hardware and software costs of establishing AEMO's forecasting platform in Western Australia, but also the cost of developing new software, which is currently on hold "due to difficulties in

modifying the forecast model within Western Power". This expenditure, which will need to be incurred even if Western Power's current system is retained, includes:

- 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.

AEMO's supplemental document 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).*

While we have no doubt that 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.

*System Model*

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.

## 2.3 MARKET DEVELOPMENT

Notwithstanding the delay in the Western Australia Government passing the required legislation, work being undertaken by the Public Utilities Office (PUO) in designing the proposed market reforms continues. This cannot be done in isolation. The PUO must consult with AEMO on an ongoing basis to ensure that its proposals are practical and capable of implementation. There is also a continuing need for AEMO to consult with market participants and other stakeholders so they better understand the changes that AMEO is planning and to help them prepare for the introduction of the reformed market. These stakeholder consultations are provided for in clause 1.20 of the WEM Rules.

The forecast capital expenditure and allowable revenue in Table 2.3 provides for this ongoing engagement and consultation.

**Table 2.3: Forecast Capital Expenditure and Allowable Revenue ($000) – Market Development**

| | Actual (to Dec 2016) | Jan-Jun 2017 | Jul-Dec 2017 | Total |
|---|---|---|---|---|
| **Capital Expenditure** | | | | |
| Resources | 374 | 358 | 346 | **1,078** |
| Program Costs | 169 | 42 | 96 | **307** |
| **Total** | **543** | **400** | **442** | **1,385** |
| **Allowable Revenue** | | | | |
| Planning | 172 | - | - | **172** |
| Travel & Training | 10 | - | - | **10** |
| Program Costs | 297 | - | - | **297** |
| Depreciation | - | - | - | **-** |
| **Total** | **479** | **-** | **-** | **479** |

### 2.3.1 Comment and Conclusion

The capital expenditure shown in Table 2.3 is about 4% of the $36 million[6] forecast capital cost of the market reforms, which does not seem unreasonable.

## 2.4 MARKET SOLUTION DESIGN

During the second half of 2017 AEMO is planning to start the high-level development of its reformed market solution, drawing on the outcome of the consultation discussed in Section 2.3. The submission notes that one consequence of the implementation delay is that there is more time for the market design to be formalised before software development commences. The ability to design the solution and develop the software sequentially should be more efficient than undertaking the two tasks in parallel, as changes made during the design process are less likely to require rework on software development.

The planned market solution design work during the second half of 2017 will include, without being limited to, the documentation of rules and business processes, development of high level system architecture based on the rules and processes and conducting early analysis into aspects of the solution such as reporting and data requirements.

**Table 2.4: Forecast Capital Expenditure ($000) – Market Solution Design**

| | Actual (to Dec 2016) | Jan-Jun 2017 | Jul-Dec 2017 | Total |
|---|---|---|---|---|
| **Capital Expenditure** | | | | |
| Resources | - | - | 1,050 | 1,050 |
| Program Costs | - | - | 292 | 292 |
| **Total** | **-** | **-** | **1,342** | **1,342** |

### 2.4.1 Comments and Conclusion

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

6 This cost is taken from Table 18 of AEMO's September 2016 AR4 revenue submission, but excludes the forecast cost of the retail component.

2020. One this basis this 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.

## 2.5 RESERVE CAPACITY MECHANISM

To address the excess in generation capacity in the WEM, the Western Australian State Government has gazetted changes to the RCM in the WEM Rules, which take effect on 1 October 2017. AEMO is currently developing systems and processes to implement these changes.

The changes will impact:

- the calculation of the reserve capacity price to for each year of the transitional period leading up to the proposed new reserve capacity auction, which may not be required until 2021;
- the availability and performance requirements for demand side programs 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.

The least cost option in the short term was to modify the existing reserve capacity system to meet the new requirements. However, this system is tightly coupled with the existing WEM software and could not be adapted to accommodate the reformed market. AEMO's preferred solution is 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. While this option has a higher initial cost, it was determined to be the more cost-effective in the longer term, as the system would not need to be replaced when the market reforms are implemented.

AEMO's forecast capital and allowable revenue to develop a system to implement the required changes to the RCM are shown in Table 2.5.

**Table 2.5: Forecast Capital Expenditure and Allowable Revenue ($000) – Reserve Capacity Mechanism**

| | Actual (to Dec 2016) | Jan-Jun 2017 | Jul-Dec 2017 | Jan-Jun 2018 | Jul 2018 – Jun 2019 | Total |
|---|---|---|---|---|---|---|
| **Capital Expenditure** | | | | | | |
| Resources | 154 | 751 | 167 | - | - | **1,072** |
| Consultancy | 315 | 921 | 651 | - | - | **1,887** |
| Hardware | 42 | - | - | - | - | **42** |
| Software | 8 | - | - | - | - | **8** |
| Program Costs | 234 | 197 | 169 | - | - | **600** |
| **Total** | **753** | **1,869** | **987** | **-** | **-** | **3,609** |
| **Allowable Revenue** | | | | | | |
| Travel & Training | 3 | 39 | - | - | - | **42** |
| Planning | 30 | - | - | - | - | **30** |
| Program Cost | 54 | - | - | - | - | **54** |
| Depreciation | - | - | 91 | 179 | 331 | **601** |
| **Total** | **87** | **39** | **91** | **179** | **331** | **727** |

### 2.5.1 Comment and Conclusion

Under clause 1.20 of the WEM Rules AEMO is required to conduct its operations on the basis that the planned market reforms will be implemented before 1 July 2020. On this basis, we agree with its decision to build a new standalone system, rather than modify the existing system as a temporary short term solution pending confirmation of the reforms, given this is the lower cost option if it is assumed that the market reforms will proceed.

In any case, this program is now committed and must be implemented by 1 October 2017. While we are not able to comment on the efficiency or reasonableness of AEMO's planned expenditure, we note that more than $2.6 million of the $3 million capital expenditure is planned to be spent by 30 June and can therefore be considered either sunk or committed. At this point, it is therefore too late for AEMO to modify its approach to achieve a more cost-effective implementation and difficult to know what a decision by the Authority to reduce the allowed expenditure to less than AEMO's forecast would achieve.

Depreciation is calculated on a straight-line basis over a ten-year period, and the depreciation shown in Table 2.5 covers the depreciation requirement to the end of the AR4 regulatory period. This depreciation profile is reasonable.

We recommend the forecast capital expenditure and allowable revenue be approved.

# 3. ALLOCATION OF PROGRAM COSTS

## 3.1 PROGRAM COSTS

AEMO's program or overhead costs that are to be allocated to the market reform program and recovered through the expenditure forecast in the supplemental document are shown in Table 3.1.

**Table 3.1: Total Allocated Program Costs ($000)**

| | Actual (to Dec 2016) | 2017 | Total |
|---|---|---|---|
| **Allocated to Capital Expenditure** | | | |
| Salaries | 562 | 936 | **1,498** |
| Consultancy | 2 | - | **2** |
| Borrowing costs | - | 149 | **149** |
| **Total** | **564** | **1,085** | **1,649** |
| **Not Capitalised and Allocated to Operational Expenditure** | | | |
| Travel and training | 17 | - | **17** |
| Planning | 639 | - | **639** |
| **Total** | **656** | **-** | **656** |

Salary costs are for 4.5 full time equivalent (FTE) staff in 2017, approximately one FTE lower than in 2016. Planning costs are not justified in detail in the supplemental document but are costs associated with planning for the development and implementation of the market reform programme.

Capitalised program costs are allocated to direct capital expenditure line items incurred during the same period in a pro-rata basis. During 2017, allocated overheads amount to around 15% of direct capital expenditure. For the second half of 2016 this allocation is much higher at 39% of direct capital expenditure, primarily because of the reduced level of capital expenditure that occurred over this initial six-month period.

For the second half of 2016 allocated overhead operational expenditure amounts to 163% of direct operational expenditure. While AEMO has pro-rated this expenditure over the different expenditure categories, this is not strictly necessary from an accounting perspective, as operational expenditure is recovered directly in the year in which it was incurred.

### 3.1.1 Comment and Conclusion

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 programme 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 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. We therefore see no basis for any of the 2016 operational expenditure to be capitalised against the cost of the market reforms, which could have deferred recovery to AR5.