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25 November 2009

Mr Lyndon Rowe
Chairman
Economic Regulation Authority
Level 6, 197 St Georges Terrace
PERTH WA 6000

Dear Lyndon

Allowable Revenue Application – System Operation Services

As required by clause 2.23.3(a) of the *Wholesale Electricity Market Rules* (**Market Rules**), System Management is pleased to submit to the Economic Regulation Authority its forecast costs for the second Review Period, for the three year period commencing 1 July 2010.

System Management is keen to assist the Economic Regulation Authority to pursue a constructive and informed assessment process. Any queries in relation to System Management's application should be directed towards Alistair Butcher on 9427 5787.

Yours sincerely

Ken Brown
General Manager, System Management
Western Power

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System Management

Allowable Revenue Application

1 July 2010 to 30 June 2013

30 November 2009

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1 Purpose

1.1 Introduction

System Management is a segregated business unit of the Electricity Networks Corporation (**Western Power**) and has the function of operating the South West interconnected system (**SWIS**) in a secure and reliable manner.

The Wholesale Electricity Market (**WEM**) began on 21 September 2006, with the commencement of the majority of the *Wholesale Electricity Market Amending Rules (September 2006)* (**Market Rules**).

Clause 2.23.3 of the Market Rules requires that, by 30 November prior to each Review Period, System Management is to submit a proposal of the costs of undertaking its functions in the WEM to the Economic Regulation Authority (**Authority**) for approval. These services are termed “System Operations Services” in the Market Rules.

This document is submitted to satisfy System Management’s obligations under clause 2.23.3 of the Market Rules. This document:

- provides an overview of the role, functions and powers of System Management;
- provide an overall analysis of how System Management’s actual costs compares to budgeted costs determined in the First Review Period;
- describes the various components and drivers of the allowable revenue that System Management must recover under clause 2.23 of the Market Rules; and
- provides a detailed substantiation of System Management’s system operation service forecast costs for the Second Review Period.

1.2 This review period

This submission provides information concerning expenditure incurred (and expected to be incurred) by System Management in the period 1 July 2007 to 30 June 2010 (**First Review Period**), and detailed substantiation of the costs forecast to be incurred from 1 July 2010 to 30 June 2013 (**Second Review Period**).

It is the Second Review Period which is the subject of this application.

By 31 March 2010 the Authority must determine the allowable revenue of System Management for the Second Review Period, taking into account the requirements of clause 2.23 of the Market Rules.

2 System Management

2.1 Role, Functions and Powers

Western Power is established under section 4(1)(b) of the *Electricity Corporations Act 2005* and has the functions conferred under section 41 of that act.

Part 9 of the *Electricity Industry Act 2004* makes provision for a wholesale electricity market and provides for the establishment of Market Rules.

One of the core functions undertaken by Western Power is the management of the electricity transmission and distribution networks. Regulation 13(1) of the *Electricity Industry*

(Wholesale Electricity Market) Regulations 2004 provides that the Market Rules may confer on an entity the function of operating the SWIS in a secure and reliable manner.

Clause 2.2 of the Market Rules confers this responsibility upon the segregated ("ringfenced") business unit of Western Power known as System Management. Fundamentally, System Management plays a crucial role in the market in maintaining system security and reliability, in dispatch and outage management.

Specifically, the functions of System Management are to:

- schedule and dispatch Verve Energy facilities and issue dispatch instructions to other market participants;
- procure adequate ancillary services where Verve Energy cannot meet the ancillary service requirements;
- setting requirements for planning emergency load reduction and system restart;
- assist the IMO in the processing of applications for participation and for the registration, de-registration and transfer of facilities;
- develop market procedures, and amendments and replacements for them, where required by the Market Rules;
- conduct tests of equipment;
- release information required by the Market Rules;
- monitor rule participants compliance with the Market Rules relating to dispatch and power system security and power system reliability;
- provide regular reports to the IMO and other market participants; and
- facilitate any other functions or responsibilities conferred, and perform any obligations imposed on it, under these Market Rules.

In addition, System Management conducts short and medium term system planning (short and medium term projected assessment of system adequacy) and outage scheduling, as set out in chapter 3 of the Market Rules.

It is important that these functions are appropriately recognised and provision made, as supported in the recent Oates Review:

> *System Management's responsibility and authority for reliability and security should be affirmed, enhanced and appropriately funded, in particular for the management of emergency situations*.[1]

[1] Verve Energy Review Paper August 2009 Page 8 - http://www.energy.wa.gov.au/cproot/1571/14895/Verve%20Energy%20Review%20Final%20Report%20August%202009.pdf

3 Context of this Application

3.1 System Management's performance in the First Review Period

As can be seen from this application, System Management's forecasts of its costs have largely proved accurate.

System Management's 2006 allowable revenue application was based on a best estimate of the anticipated costs involved. The application was made very soon after the commencement of the market in late September, and absent experience in the likely cost of performing market functions.

The relative "newness" of the regime, and the implicit uncertainty of the costs of performing functions, was recognised by the Authority in its decision in March 2007.

Complicating matters further has been the difficulty in ensuring that accounts allow the correct allocation of expenses across market and network functions, in all circumstances. System Management has been proactive in seeking to identify and correct misallocations.

Importantly, misallocations which have represented a "profit" to System Management have been returned to the market pursuant to the "unders and overs" mechanism in clause 2.23.7 of the Market Rules. However, the nature of how they arose is directly attributable to the infancy of the system in place. Steps have been taken to ensure that these issues do not occur in future years.

3.2 Segregation of Accounts

System Management's cost of performing system operation services is recovered from market participants via system operation fees. In comparison, System Management's network functions are funded through the standard Western Power budget process funded via the Access Arrangement.

System Management has made significant efforts to provide assurance that costs arising from performing either function are appropriately allocated. This includes the development of a ring-fencing policy and supporting work practices manual.

System Management is currently in the process of finalising this formal ring fencing policy and manual which will include cost allocation measures. The formal ring fencing policy and manual includes a requirement that:

1. the accounts and records of the System Management market entity must be maintained separately from accounts relating to Western Power; and

2. the accounts and financial records for the System Management market entity must be maintained in accordance with a documented methodology.

The cost allocation measures contained within the formal ring fencing policy and manual will significantly reduce and limit the risk of any cost misallocation errors occurring in the future.

3.3 Summary of variances during First Review Period

Variances occurred between the approved Allowable Revenue and actual expenditure during the First Review Period due to the following:

- the original application was prepared and submitted in November 2006, very soon after market commencement. This meant that forecasts were based on best estimates;
- accounting processes (subsequently rectified) which led to temporary allocation errors between the market and network component of Western Power;
- discrepancies in actual payments as compared to budget amounts which arose from the method of calculating system operation fees detailed in the Market Rules; and
- the need for greater than anticipated IT expenditure, principally because of changes to the Market Rules.

3.4 System Management's approach in determining Second Review Period expenditure

As required under clause 2.23.1 of the Market Rules, System Management is to submit its forecast costs for the provision of system operation services, services which are necessary to fulfil System Management's functions and obligations under the Market Rules.

In determining the expected expenditure, System Management has utilised the following methodology:

- ascertain the reason for variations between actual and forecast amounts in the First Review Period;
- ascertain whether existing assumptions continue to hold in the Second Review Period; and
- identify new functions or new expenditure items to be incurred.

Importantly, System Management has based its estimates of the costs to be incurred in performing system operation services on the Market Rules as they currently exist. To the extent that there is a significant redesign of the market framework during the Second Review Period this is likely to mean that assumptions underpinning the forecasts will need to be revisited. If this is the case, any variation must be dealt with pursuant to the requirements of clauses 2.23.7, 2.23.8 or 2.22.13 of the Market Rules.

It is also necessary to note that recovery of forecast costs included in this submission does not represent an immutable allocation. Rather if actual costs vary from forecast, a number of mechanisms exist within the Market Rules to ensure System Management only recovers amounts from market participants which reflect the cost of system operation services.

4 Allowable Revenue

System Management's aggregate costs for system operation services for the Second Review Period have been extracted in the table which follows:

Table 1 – System Operation Services

Costs ($'000)	2010/2011	2011/2012	2012/2013
Labour costs	3,888	4,370	4,823
Functional costs	486	526	556
Legal costs	375	385	400
Insurance costs	210	221	232
IT Capital expenditure (IT CAPEX)	1,090	750	690
IT Operating costs (IT OPEX)	445	468	497
Windfarm Forecasting Software Tool – Operational Capital Asset	420	120	120
Dispatch Decision Support Simulator (DDSS) – Operational Capital Asset	797	193	202
Dispatcher Training Simulator (DTS) – Operational Capital Asset	-	1,014	1,035
Allowable Revenue	**7,711**	**8,047**	**8,549**

Note: IT CAPEX represents recovery of capital expenditure, through the amortisation of information technology software assets, in a manner which is consistent with generally accepted accounting principles. Accordingly, this satisfies clause 2.23.12(a)(ii) of the Market Rules.

5 Labour Costs

5.1 First Review Period

System Management's forecast and actual labour expenditure during the First Review Period is set out in the following table:

Table 2 – Labour costs : First Review Period

Labour costs ($'000)	2007/08	2008/09	2009/10
Labour forecast amount	2,890	3,063	3,247
Labour actual expenditure	2,401	3,003	3,247 est
Variance	489	60	-

System Management's forecast and actual labour FTE's during the First Review Period is set out in the following table:

Table 3 – Labour FTE: First Review Period

Labour FTE	2007/08	2008/09	2009/10
Labour FTE forecast	19.1	19.1	19.1
Labour FTE actual	18.17	19.82	21.76 est
Variance	0.93	(0.72)	(2.66)

Variances from the forecast occurred for the following reasons:

- temporary allocation errors which occurred during 2007/08 are predominantly responsible for the variation in this year;
- changes to the on-cost percentage occurred within the First Review Period, as a result of changes to the relevant calculation method; and
- acquisition of new staff, including an additional Senior System Operation Controller, to cater for market functions and associated increase in responsibilities.

5.2 Second Review Period

5.2.1 Summary

In the Second Review Period, System Management has determined that the following budget and associated FTE numbers will be required:

Table 4 – Labour: Second Review Period

Labour costs ($'000)	2010/11	2011/12	2012/13
Labour forecast amount	3,888	4,370	4,823
Labour FTE	23.83	25.83	26.83

5.2.2 General Drivers

The forecasts above are based on:

- accumulated understanding of labour requirements during the First Review Period; and
- an assessment of System Management's likely functions based on current Market Rules in the Second Review Period, particularly to cater for the need to improve dispatch transparency and forecasting of intermittent generation.

System Management has escalated direct labour costs by 5% in years one and two of the Second Review Period, and by 7% in the final year. This escalation factor reflects System Management's assessment of likely general increases in staff costs.

5.2.3 Labour on-costs

The method adopted by Western Power for estimating the liability for on-costs is based on historical budget data. This estimate is in line with recognition of employee benefits under Accounting Standard AASB 119 – Employee Benefits.

Rates utilised in the First Review Period were as follows:

- 2007/08 - 28.83%;
- 2008/09 - 24.23%; and
- 2009/10 - 24.15%.

A rate of 25% has been adopted for the Second Review Period, estimated on the above historic rates. This is based on the best available information and is used as a guide to estimate the expected future liability for the on-costs related to employee benefits.

The on-cost rate includes allowances for:

- Long Service Leave;
- Payroll Tax;
- Retrospective Pay;
- Superannuation; and
- Workers Compensation.

6 Functional Costs

6.1 First Review Period

In the First Review Period, System Management indicated that the following budget would be required:

Table 5 – Functional (Budget): First Review Period

Functional Costs (Budget) ($'000)	2007/08	2008/09	2009/10
Total Functional costs	350	300	320

The abovementioned total functional cost was proposed to cover expenditure related to:

- Power System Operating Procedures;
- monitoring and compliance;
- updating ancillary service requirements;
- ancillary service contracts;
- corporate governance;
- audit; and
- Consultants.

In reconciling expenditure for the first Allowable Revenue Period, System Management provides the following breakdown:

Table 6 – Functional (Actual): First Review Period

Functional (Actual) ($'000)	2007/08	2008/09	2009/10
Total Functional costs	105	483	490 est

*Note: Functional costs for 2008/09 and 2009/10 includes IT contractor costs. These costs were originally capitalised in the 2007/08 financial year.

Actual functional costs for 2007/08 were understated due to temporary allocation errors.

Actual functional costs incurred by System Management during the First Review Period related to:

- AustraClear. This is required by the IMO to receive System Operation Fees as required by clause 9.22 of the Market Rules;
- information from the Bureau of Meteorology to fulfil System Management's obligations in providing System Load forecast as required by Market Rule 7.2.1;
- obligations in the Market Rules relating to governance, audit and Ancillary Services;
- contractors to fulfil obligations relating to information provision, outage planning and IT services; and
- as part of obligations towards the MAC Working Group on Renewable Energy, and Ancillary Services procurement, System Management employed consultants to provide detailed modelling on the effects of increased penetration of intermittent generation.

6.2 Second Review Period

System Management has forecast the expenditure related to performing specific functions under the Market Rules for the Second Review Period.

As permitted under clause 2.23.12(a)(i) of the Market Rules, System Management has allocated these costs for the year of the forecast expenditure.

All costs have been forecast consistent with the requirements of clause 2.23.12(b) of the Market Rules.

Table 7 – Functional: Second Review Period

Functional Costs ($'000)	2010/11	2011/12	2012/13
Total Functional costs	486	526	556

Expenditure under the "Functional costs" category relates to:

- Monitoring and compliance

System Management is required, pursuant to clause 2.13.6 of the Market Rules, to monitor Rule Participants' behaviour for compliance with the provisions listed in clause 2.13.9. In addition, System Management may need to conduct investigations into SWIS incidents.

While the bulk of System Management's functions in this regard will be undertaken using internal resources and expertise, it is anticipated that some external assistance will be necessary.

- Updating ancillary service requirements

System Management has a responsibility under clause 3.11.2 of the Market Rules to update the ancillary service requirements each year. There are also requirements under clause 3.11.11 to prepare a report for the IMO on an annual basis on ancillary services and may be a need to respond to the IMO's audit of ancillary service requirements (clause 3.11.12 of the Market Rules).

- Ancillary service contracts

Clause 3.11.8 of the Market Rules affords System Management the option to enter into ancillary service contracts with market participants should it be unable to meet the ancillary service requirements with Verve Energy's registered facilities, or if another option presents a less expensive alternative.

While Verve Energy currently provides the bulk of the ancillary services required in the market, it is likely that competition for the provision of ancillary services will arise as more generating facilities connect to the system. With greater competition amongst likely suppliers of ancillary services, System Management will be required to enter into appropriate contractual arrangements.

- Corporate governance

System Management is required to be "ringfenced" (segregated) from the remainder of Western Power, by virtue of regulation 13 of the *Electricity Industry (Wholesale Electricity Market) Regulations 2004* and clause 2.2.1 of the Market Rules.

In order for the requirement for segregation to have practical effect, it is necessary for System Management to develop and implement a number of processes and systems which are independent to those which apply to Western Power as a whole.

- Audit

Clause 2.14.6 of the Market Rules provides that the IMO must, at least annually, audit System Management's compliance with the Market Rules each year. The Authority must also annually review the effectiveness of System Management in performing its market functions.

It is anticipated that System Management will incur costs in responding to an audit or effectiveness review, including provision for contracted internal audit services.

- External analysis

System Management anticipates that several studies per year will be required in order to ascertain outcomes from significant variations to current operating or legislative conditions. For example, the impact of increasing penetration of intermittent generation, or changes to the Market Rules.

- Travel and staff development

An amount to support the development of staff, and to allow System Management to research the provision of system operation services in other jurisdictions, has been incorporated.

- Contractors and Consultants

Costs of specialist contractor and consultant services are incorporated within Functional Costs. These are related principally to specialist engineering advice and services and document control and management. Contractor costs relating to the maintenance of effective IT infrastructure is included within the IT OPEX area.

7 Legal Costs

7.1 First Review Period

System Management's forecast and actual expenditure on legal services during the First Review Period is set out in the following table.

Table 8 – Legal: First Review Period

Legal Costs ($'000)	2007/08	2008/09	2009/10
Legal Forecast Expenditure	300	330	363
Legal Actual Expenditure	292	339	363 est
Variance	8	(9)	-

Legal expenditure incurred during the First Review Period was consistent with the amounts forecasted in the first Allowable Revenue Application in November 2006. Expenditure has been incurred with external legal providers principally to perform the following tasks:

- interpretation and advice concerning market functions and obligations;

- dispute resolution;
- governance and ringfencing;
- procurement advice; and
- preparation of tender material and contracts.

This expenditure represents the amount that was necessary to support the performance of system operation functions within the new market framework.

7.2 Second Review Period

Legal expenditure for the Second Review Period is forecast as follows.

Table 9 – Legal: Second Review Period

Legal Costs ($'000)	2010/11	2011/12	2012/13
Forecast Legal costs	375	385	400

System Management has derived the above forecast expenditure amounts from its experience in the First Review Period.

System Management anticipates that continued legal expenditure will be necessary, given the nature of the market (embodied in a complex legal instrument) and the potential financial exposure of market participants.

8 Insurance Costs

8.1 First Review Period

8.1.1 Discussion

Prior to the commencement of the First Review Period, System Management obtained insurance coverage under Western Power's combined liability and professional indemnity insurance policy.

Consequently, System Management did not make provision for self insurance as initially proposed in the first Allowable Revenue Application, nor did System Management, as a stand-alone entity obtain suitable insurance to cover its potential risks associated with carrying out functions within this unique wholesale electricity market. In addition, it was System Management's view that the Market Rules effectively functioned to preclude self-insurance, with clause 2.23.7 providing that where revenue earned for the purposes of providing system operation services in the previous financial year exceeds or is less than System Management's expenditure for that financial year, the current year's budget must be adjusted accordingly.

As a segmented entity, System Management was satisfied that through contributing a portion of Western Power's annual premium, there was appropriate coverage in place for identified exposures. Western Power sought opinion from its risk advisors regarding its additional risk exposure resulting from its market operation activities during the First Review Period, and insurance premiums were adjusted accordingly.

System Management worked with the Western Power Treasury department to consider System Management's risk exposure and has provided contributions to the Western Power insurance policies, commensurate with its risk.

Table 10 – Insurance premiums: First Review Period

Insurance Premiums ($'000)	2007/08	2008/09	2009/10
Insurance approved amount	100	100	100
Insurance actual expenditure	150	165	200
Variance	(50)	(65)	(100)

8.1.2 Primary Risk Exposures

From an insurance perspective, the risk exposures faced by Western Power and System Management differ significantly. Western Power's primary risks are bushfire and personal injury, whilst System Management's primary risks include non-compliance with Market Rules and liability to Market Participants for financial loss.

Although Western Power's insurance program is structured around transferring financial liability associated with bushfire and personal injury, it also extends to cover System Management's specific risk exposures.

A risk assessment conducted by AON Insurance Brokers in late 2006 and early 2007 identified 19 risk exposures associated with System Management's operations. System Management has considered the likelihood, mitigation controls and the severity of each exposure.

8.1.3 Underwriting Factors

Based on key budgeted underwriting information, such as Revenue and Payroll, for both Western Power and System Management, the insurance premium was determined for the First Review Period as follows:

Table 11 – Insurance: First Review Period Insurance Premiums for Western Power and System Management

Insurance Premiums ($'000)	2007/08	2008/09	2009/10
Western Power	3,194	4,514	8,250
System Management	150	165	200

The main underwriting factors are noted below:

- based on the differences in exposure, there is no common premium rate to determine the premium for System Management;
- regardless of revenue or payroll, an insurer covering System Management's risks under a stand-alone insurance program would demand a minimum premium amount. It is not possible to estimate the exact amount, however, the risks associated with the business and the insurer's return on investment would be major considerations. The insurance market was also in a "hardening" phase, with rate

increases being applied across the industry. Insurers and reinsurers also sought to protect their profitability by restricting the terms of cover;

- System Management's revenue and payroll was budgeted to increase since inception;
- premium contributions from System Management did not take into account related costs including insurance broker services, marketing, claims management activities and cost of capital for self-insured losses; and
- despite a significant increase in Western Power's liability premium over the course of the First Review Period (158%), System Management's budgeted contribution rose by just over 10%.

8.2 Second Review Period

System Management believes it is prudent and more commercially reasonable to maintain its insurance cover under Western Power's corporate insurance program, utilising insurers rated by Standard & Poor's at "A+"[2] and the provision of broad coverage under terms and conditions of the Western Power policy.

Western Power analysis conducted for forecasting premium allocations for all insurance classes, including the combined liability and professional indemnity cover, is based on the underlying methodology followed when determining System Management's annual insurance premiums in the First Review Period. The underlying methodology is a reasonably reliable basis for determination as the following considerations still hold:

- primary risk exposures for the Second Review Period will at a minimum remain the same but would be expected to rise as more sophistication is introduced into the wholesale electricity market;
- there have been no claims made in the First Review Period;
- financial status of the insurance market;
- insurance market's risk appetite for Western Power's primary risk exposure;
- Western Power's own risk appetite; and
- loss history.

Based on these factors, Western Power's liability insurance premium is estimated to increase by approximately 15% per annum, subject to a "moderate" loss history (eg. one bushfire event per year).

The estimate for System Management's premium contribution is based on similar factors; although the financial impact of the primary risks are considered to be less severe than those of Western Power's as a whole. Therefore, the most significant factor in estimating the premium contributions for System Management is the increased exposure associated with growth in the network, and the continuing hardening of the insurance market.

Assuming a neutral loss history, the premium contribution is estimated to increase by 5% per annum. It is noted that a significant loss will impact on the premium contribution for subsequent years.

[2] QBE Insurance (Europe) Ltd. Financial Strength Rating "A+/Stable" as at 08 September 2009.

The following table shows risk-based assumptions and forecasted insurance premium estimates for System Management over the next three years:

Table 12 – Insurance: Second Review Period Liability Premiums for Western Power and System Management

System Management ($'000)		2009/2010	2010/11	2011/12	2012/13
Item	Assumptions	Actual	Forecast		
Public Liability & Professional Indemnity insurance	System Management's exposure to risk is expected to increase in line with the growth of the network and demand on the SWIS. The insurance market is also expected to continue to harden, increasing premium requirements by insurers. System Management's premium contribution is projected to increase by approximately 5% per year, subject to a neutral loss history. A significant loss will result in a greater increase in premium contribution for the following years. For comparison, it is noted that Western Power's premium is estimated to increase by approximately 15% per year.	200	210	221	232

Notably, these are estimates only and are subject to change based on internal and external factors, some of which may be out of Western Power or System Management's control such as global financial markets, insurance markets, or changes in legislation.

Actual historical underwriting information will be considered each year of the Second Review Period to effectively assess the reasonableness of System Management's budgeted share of its insurance premium payable to Western Power.

9 IT Costs

9.1 Summary

Prior to the commencement of the Wholesale Electricity Market, System Management engaged in a program of work designed to implement the minimum IT systems and processes required to fulfil legislative obligations in the new wholesale electricity market.

The goal for the First Review Period was to build upon and enhance the IT systems in service at Market Commencement, as well as redevelop and replace existing legacy IT systems not suitable for the new market environment, noting that many of these systems were retained as an interim measure only.

The goal for the Second Review Period is to cement and improve upon those systems. In particular, operations within the First Review Period identified several areas where automation is required to ensure the secure and reliable operation of the SWIS, and ensure that System Management and Participants can comply with the Market Rules.

9.2 First Review Period

9.2.1 Expenditure

Actual expenditure during the First Review Period is detailed in the following table.

Table 13 – IT CAPEX Costs: First Review Period

IT CAPEX Costs ($'000)	2007/08	2008/09	2009/10
Approved IT CAPEX forecast	760	520	250
Actual IT CAPEX	767	803	592 est
Variance	(7)	(283)	(342)

As can be seen, there were budget exceedences in each year. This is largely due to unforeseen system requirements and importantly, the variation from forecast is often necessitated by changes to the Market Rules.

A further description of the works undertaken follows.

9.2.2 Replacement of Notice of Intended Works (NOIW) application

The Notice of Intended Works (**NOIW**) system was System Management's main planning tool used to coordinate and approve transmission network circuit outages, Independent Power Producer and Verve Energy generation machine outages.

NOIW functionality had evolved many times over since its original implementation and purpose, and the application had been developed on ageing technology that is now no longer supported. As an interim measure the new System Management Market IT Systems (**SMMITS**) had been interconnected with the existing NOIW, to ensure that System Management could perform outage scheduling at the market start, but it was recognized that this was not a viable long-term solution.

The implementation of the NOIW replacement in June 2009 included substantial expansion of the existing Market Participant Interface Administration Console (**MPI-Admin**) and a new dedicated Network Operator Interface (**NOI**) application. Together these served to retire the existing NOIW and provide significant improvements to works and outage management:

- the implemented applications embody an aggregation of individual transmission plant works packages and transmission network circuit outage management, not previously possible with the NOIW;
- the network operator is now able to reduce the number of transmission network outages, by aggregating multiple transmission network maintenance events and/or capital works activities into a single outage;
- transmission network outage definitions now more completely describe the work being carried out by supporting multiple permit types, links to all associated network work definitions (network tasks) and by providing support for more narrative information;
- System Operation Planning Engineers will no longer have to model and consider every transmission network task as an individual outage, improving the efficiency of the outage acceptance/approval process;

- power system security assessment is improved by incorporating validation of equipment and points of isolation against datasets from Western Power's Supervisory Control and Data Acquisition (**SCADA**) system;
- all outage modifications are now captured as separate records which more completely supports the recreation of historical circumstances and provides a complete audit trail;
- the retirement of NOIW and the modern technologies used for its replacements provide a more cost effective, maintainable and secure suite of applications to allow System Management to perform outage scheduling for the market; and
- alongside the new NOI application and the enhancements of the existing MPI-A application there were numerous enhancements of the Market Participant Interface (**MPI**) application achieved by leveraging the functionality of the other SMMITS applications (eg. Graphical outage schedule and improved outage search options).

During the development of these replacement applications it was determined that the original estimates had been overly optimistic, particularly in regard to time and hence cost. This and other development delays resulted in the NOIW replacement not being completed in the originally planned timeframe. In order to ensure that the application developments did not extend into the 2009/10 financial year, additional resources were used to expedite the development with a subsequent increase in expenditure. The replacement applications were finalised during June 2009, following significant development and testing effort, and the existing NOIW application and associated database has now been retired.

9.2.3 Redevelopment of Short and Medium Term PASA Study Tools

System Management has a number of study tools that allow the availability of generation facilities to be modeled against the forecasts of system load. These study tools are used by System Operation Planning Engineers to evaluate requests for outages received from market participants and to maintain a schedule of all accepted and approved outages. The main source of data for the current Projected Assessment of System Adequacy (**PASA**) study tools was the NOIW application and its database. As the NOIW application and database was being retired, these tools had to be redeveloped to ensure compatibility with the new Market IT Systems and the replacement database.

The replacement of the NOIW system provided an opportunity to enhance some of the outage related data and this has had some benefits for the redeveloped PASA study tools:

- "what-if" style analysis is improved with generation, load and transmission outage emulation capability; and
- a complete audit trail of every outage modification more completely supports the recreation of historical circumstances, for comparative analysis (as well as audit).

The redevelopment of the PASA study tools was finalised during June 2009, following significant development and testing effort of both the NOIW replacements and the redeveloped study tools, themselves.

9.2.4 ELB Finalisation

The Electronic Log Book (**ELB**) is a support tool used by System Operations Control Centre staff to view market data supplied by the Independent Market Operator (**IMO**) and to log market related data that will be sent to participants and the IMO. The ELB is one of many decision support, monitoring and control tools used by control room staff with the main tool being the Supervisory Control and Data Acquisition (**SCADA**) system.

The current electronic log book is a windows based application that runs on a standard desktop PC in the control room, unlike most of the other tools used by the control room staff which use SCADA system functionality. The current electronic log book was created as an MS-Access based application as an interim measure, and needs to be redeveloped in a more robust fashion that allows it to be integrated more fully with other Market IT Systems, and the SCADA system itself.

Due to the delays in the development of the NOIW replacement and previously unforeseen Market demands that have become apparent, the ELB redevelopment did not commence as intended. However, the business requirements and functional design for the entire application have been completed and in May 2009 the development of the new application commenced. The final scope of the ELB redevelopment has also exceeded that originally envisaged in the first Allowable Revenue application, and is now planned to incorporate:

- Commissioning Test plans captured as validated data stored in the SMMITS database, as opposed to only being defined within documents (including any outage associations);
- 'Facility Notifications' to support the capture of communication between participants and System Management in a more formal and auditable manner (particularly that between the Balancing Generator and System Management); and
- dispatch review, curtailment assessment and load shedding determination support facilities to improve the efficiency of processes required at the end of each trading day, currently undertaken manually by System Management staff.

This ELB redevelopment along with the associated changes in both the MPI and MPI-Admin applications is now expected to be finalised during April 2010, following substantial development and testing.

9.2.5 Dispatch Plan Modeling Tool (DPMT)

The Market Rules oblige System Management to dispatch generation around both the Dispatch Merit Order and numerous constraints outlined in Chapter 7 of the Market Rules. These dispatch related constraints coupled with the physical requirements of the power system, impact upon the dispatch process.

A sophisticated modelling tool has been implemented to automate the creation of an overall dispatch plan and the Verve Energy Dispatch Plan required by Market Rule 7.6A.2 for each trading day.

This modelling tool reduces the workload of System Management staff, provides enforceable, repeatable processes for the calculation of dispatch plans, requires the consistent application of discrete and identifiable business rules which serves to remove elements of discretion from dispatch decisions and provides a record of dispatch planning outcomes for audit substantiation.

9.2.6 Rule and Market Changes – IT Cost Contingency

Significant development resulting from several Market Rule changes and IMO system changes was required during the First Review Period:

- Rule Change varying gate closure for submission of Forced Outages [RC_2007_15];
- Varying of ex-post delivery of Forced Outages to the IMO (to suit above) [RC_2007_15];
- Rule Change varying sending of Dispatch Instructions to the IMO [RC_2007_18];

- Rule change varying the outage impact reported to the IMO to recognize the Reserve Capacity Obligation Quantity [RC_2007_16];
- Rule change varying the consideration within the Projected Assessment of System Adequacy for Demand Side Management [RC_2007_03]; and
- Rule change varying the gate closure for submission of Day Ahead Opportunistic Maintenance applications [RC_2009_20].

In addition to the specific rule and market circumstance variations above, further Market IT System changes were required:

- SMMITS application user interfaces were modified to display both Western Standard Time and Western Daylight Savings Time where time display was required and an indication of an outage definition overlapping a period where DST applied was added to outage search results lists [CR7 (see Office of Energy website)];
- specific functionality was developed within SMMITS to support On-The-Day Opportunistic Maintenance; and
- to facilitate compliance monitoring an automated tool was developed to undertake a regular scheduled check of the output from resources of Independent Power Producers and compare it with the resource plan.

9.2.7 Other Items

Other items not originally foreseen in the prior Allowable Revenue Submission are worthy of mention, and are outlined below.

9.2.7.1 High Availability and Disaster Recovery Planning

During the First Review Period, it was identified that there were significant implications for the Market should SMMITS become unavailable. Subsequently, System Management sought advice from an external auditor as to the requirements to ensure that Market implications could be avoided in the event of a disaster.

In addition to the introduction of several process improvements, System Management commissioned the development of a Disaster Recovery Plan for the East Perth Control Centre (**EPCC**) with a particular focus on ensuring the availability of SMMITS.

Also in this period, System Management has undertaken extensive testing to prove the establishment, by Western Power IT infrastructure, of a High Availability environment for the SMMITS components that communicate with other systems and organisations.

9.2.7.2 Resource Plan Driven Dispatch (via SCADA)

During the First Review Period System Management commenced competitive procurement of Ancillary Services, which was not only earlier than originally intended but also not included in the first Allowable Revenue Submission.

In order for non-balancing facilities to provide Ancillary Services for Load Following and Spinning Reserve, the facilities must be controllable via the Supervisory Control and Data Acquisition (**SCADA**) system's automatic generation control (**AGC**) facilities.

The current SCADA system was not designed to control multiple facilities around one or many facilities constrained to a "resource plan". In order to achieve the necessary control and compliance with a "resource plan", consideration is currently being given to modifications required to substantially modify the SCADA system.

9.3 Second Review Period

9.3.1 Summary

The forecast IT CAPEX costs for the Second Review Period is set out in the table below.

Table 14 – IT CAPEX costs: Second Review Period

IT CAPEX costs ($'000)	2010/11	2011/12	2012/13
IT CAPEX forecast cost	1,060	450	450

The forecast IT CAPEX recovery for the Second Review Period is set out in the table below.

Table 15 – IT CAPEX recovery: Second Review Period

IT CAPEX recovery ($'000)	2010/11	2011/12	2012/13
IT CAPEX forecast recovery	1,090	750	690

It is noted that all costs have been calculated in accordance with the Western Power IT&T estimation process and using the published Western Power IT&T resource rates.

Western Power's software capitalisation and depreciation policy is set up to conform with the National Tax Equivalents Regime and *The New Business Tax System (Capital Allowances) Act 2001*. Under this policy Western Power is required to capitalise software at the date it is commissioned or is installed ready for use. The initial software replacement which commenced during the First Review Period is required to be depreciated in accordance with generally accepted accounting principles.

Consequently, System Management has recovered each year's IT program expenditure over two and a half years, commencing in the year of initial capital expenditure. System Management has determined to recover half a year's capital expense in the year of initial capital spend, with the remainder being recovered in the two years which follow.

It is noted that this above method is consistent with the method approved by the Authority in the First Review Period. Notably a method consistent with the requirements of clause 2.23.12(a)(ii) of the Market Rules.

A further description of the outstanding capital expenditure amounts to be recovered during the Second Review Period follows.

9.3.2 Recovery for SMMITS 1 capital expenditure in the Second Review Period

The SMMITS 1 capital expenditure project was required to replace legacy IT systems existing at the commencement of the Wholesale Electricity Market and to implement IT systems sufficient to satisfy legislative obligations imposed upon System Management.

Prior to the commencement of the Wholesale Electricity Market, the Minister for Energy approved System Management's proposal to recover $2.5 million evenly over five years to finance the SMMITS 1 information technology capital expenditure project.

However as the market only commenced in September 2006, System Management recovered three quarters of the intended recovery proposed for the 2006/07 financial year ie. $375,000.

The SMMITS 1 capital project was completed in 2007/2008 where total costs equated to $2.2 million. Therefore, having recovered $1.5 million in the First Review Period, only $325,000 remains to be recovered in the first year of the Second Review Period.

9.3.3 Recovery for SMMITS 2 capital expenditure in the Second Review Period

The SMMITS 2 capital expenditure project, is being developed in stages over a three year period from 2007/08 to 2009/10.

In accordance with the previously mentioned recovery method, expenditure incurred in 2008/09 and being incurred in 2009/10 financial years will be recovered during the Second Review Period according to the recovery schedule.

9.3.4 Program of work – 2010/11 Financial Year

9.3.4.1 Expenditure

The proposed expenditure in the 2010/11 financial year is targeted at cementing and improving upon current systems, particularly the Projected Assessment of System Adequacy.

Table 16 – IT CAPEX Costs: Second Review Period for 2010/11 Financial Year

IT CAPEX Costs ($'000)	2010/11
Reporting	300
PASA redevelopment	410
SCADA Ancillary Service Enhancements	100
Market Rule/System Changes	250
Total IT program costs (10/11)	**1,060**

9.3.4.2 Reporting

During the First Review Period, it became evident that further reporting options were necessary. The lack of these options meant that System Management expended significant effort providing information to Participants (including the IMO), and was forced to rely on manual processes to meet many obligations.

System Management has identified and investigated several options for the provision of internal and external reports. The two options that will be progressed are:

- real-time report engine within SMMITS; and
- use of Western Power data warehousing tool.

The cost estimate for this year is to initiate work on both of the above. This will require modification to SMMITS to ensure data security. Expenditure in the following year will be to finalise development of reports.

9.3.4.3 PASA redevelopment

The Projected Assessment of System Adequacy (PASA) is a tool used by the System Operations Planning Engineers staff to determine whether generation outages can be approved in accordance with the Market Rules.

The PASA is a windows based application that runs on a standard desktop PC. Most of the other tools used by the Planning Engineers operate through SCADA or a robust application such as the NOIW re-placement. The current PASA was an interim measure created as an Excel spreadsheet, and needed to be re-developed in a more robust fashion.

In addition to current functionality, it has been determined that a sophisticated scenario modeling tool is required, both to determine possible outcomes, as well as to detail the rationale for past decisions.

9.3.4.4 SCADA Ancillary Service enhancements

With the introduction of competitively procured Ancillary Services, System Management will be required to modify the SCADA system to utilize Resource Plans. Further development and testing will be necessary to ensure a robust and efficient system that allows Participants to provide Ancillary Services while complying with Resource Plans.

9.3.4.5 Expected Market Rule/Market IT Change Contingency

It is expected that the Market Rules will change and evolve over time as market participants (including System Management and the IMO) request and propose changes.

In all likelihood System Management will have to adjust Market IT Systems and business processes as these rule changes take effect. This contingency will allow System Management to fund the necessary changes to Market IT Systems and business processes and fulfill its revised obligations under the Market Rules. The necessity of this provisioning has been demonstrated during the First Review Period.

9.3.5 Program of work – 2011/12 Financial Year

9.3.5.1 Expenditure

The proposed expenditure in the 2011/12 financial year will continue to provide ongoing improvements and streamlining of the interfaces used on a day-to-day basis by both market participants and System Management.

The main components of this program of work are set out as follows.

Table 17 – IT CAPEX Costs: Second Review Period for 2011/12 Financial Year

IT Costs ($'000)	2011/12
Reporting	100
SCADA Ancillary Service enhancements	100
Market Rule/System Change	250
Total IT program costs (11/12)	**450**

9.3.5.2 Reporting

Following the introduction of reporting abilities, System Management and Participants will be able to request information from System Management. These reports will require robust testing to ensure accuracy, consistency, adequacy, and, in particular, that confidentiality and security of data is maintained.

9.3.5.3 SCADA Ancillary Service enhancements

This is a continuation of the IT CAPEX works program described in 9.3.4.4.

9.3.5.4 Expected Market Rule/Market IT Change Contingency

This is a continuation of the IT CAPEX works program described in 9.3.4.5.

9.3.6 Progressed program of work – 2012/13 Financial Year

9.3.6.1 Expenditure

The proposed expenditure in the 2012/13 financial year will continue to provide ongoing improvements and streamlining of the interfaces used on a day-to-day basis by both market participants and System Management.

The main components of this program of work are set out as follows:

Table 18 – IT CAPEX Costs: Second Review Period for 2012/13 Financial Year

IT Costs ($'000)	2012/13
Reporting	100
SCADA Ancillary Service enhancements	100
Market Rule/System Change	250
Total IT program costs (12/13)	**450**

9.3.6.2 Reporting

Following the introduction of reporting abilities, System Management and Participants will request ongoing development of reports from System Management. These reports will require robust testing to ensure accuracy, consistency, adequacy, and, in particular, that confidentiality and security of data is maintained.

9.3.6.3 SCADA Ancillary Service enhancements

This is a continuation of the IT CAPEX works program described in 9.3.5.3.

9.3.6.4 Expected Market Rule/Market IT Change Contingency

This is a continuation of the IT CAPEX works program described in 9.3.5.4.

10 IT Operating Expenditure (IT OPEX) Costs

10.1 First Review Period

System Management's forecast and actual IT Operating Expenditure during the First Review Period is set out in the following table:

Table 19 – IT OPEX Costs: First Review Period

IT OPEX Costs ($'000)	2007/2008	2008/2009	2009/10
IT Operating Support Forecast expenditure	100	110	120
IT Operating Support Actual expenditure	73	98	120 est
Variance	27	12	-

IT Operating expenditure incurred during the First Review Period was relatively consistent with the amounts forecast in the first Allowable Revenue Application in November 2006.

Expenditure incurred in the First Review Period contributed to the recurring maintenance and licensing costs associated with the initial upgrade of the SMMITS capital project at market start, as well as, further support required for ongoing improvements and streamlining of market related interfaces to fulfil System Management's revised obligations under the Market Rules.

10.2 Second Review Period

Amounts of $445,000 (2010/11), $468,000 (2011/12) and $497,000 (2012/13) have been included as an allowance for IT operating expenditure.

A breakdown of these forecast costs is shown in the following table.

Table 20 – IT OPEX Costs: Second Review Period

IT OPEX Costs ($'000)	2010/2011	2011/2012	2012/13
BOM data	30	30	30
IT Operating Support	130	140	150
IT Infrastructure Support	35	35	35
SMMITS Operating Cost	250	263	282
Total IT OPEX costs	**445**	**468**	**497**

This includes estimates of general IT operating support which includes recurring maintenance and licensing requirements for SMMITS. The SMMITS system is built on an IT infrastructure platform which includes the Oracle database, the Web Methods enterprise services platform, the IT&T LAN and a number of different servers, clients, routers, switches and firewalls and their operating systems and base applications. Each infrastructure component brings with it a recurring maintenance and licensing requirement.

Information from the Bureau of Meteorology to meet obligations in providing Load Forecasts has now been included in IT Operational Expenditure, and expenses are relative to the First Review Period.

Initially in the First Review Period there was a dedicated labour component attached to the SMMITS capital project which was capitalised alongside incurred project costs. However, for the Second Review Period, System Management will retain a core group of specialists to carry out essential operating and maintenance of SMMITS. This cost going forward will be treated as an information technology operating expense. Moreover, this core group of specialists is required to provide support to the following IT related applications and interfaces:

- SMMITS database – including improvements to internal database software, the IT interface and the IMO interface;
- SCADA and PI Historian; and
- metrix load forecast applications.

The dedicated SMMITS operating cost has been indexed at 5% in the second year and 7% in the final year of the Second Review Period, where indexation is in accordance with this application's proposed labour escalation percentage.

11 Windfarm Forecasting Software Tool – Operational Capital Asset

In order to maintain Power System Security, System Management is procuring wind forecasting tools. One of these tools, ANEMOS, has a software component that is included as a capital item. In addition, there are associated operating costs incurred to maintain the utility of this software.

System Management will allocate the same core group of specialists proposed to carry out operating and maintenance of the SMMITS software to also provide support to IT applications and interfaces associated with wind forecasting software.

System Management's forecast Windfarm Forecasting Software Tool operational capital expenditure during the Second Review Period is set out in the following table:

Table 21 – Windfarm Output MW Forecasting software Operational Capital Cost

Windfarm Forecasting Software Tool costs (AUD$'000)	2010/11	2011/12	2012/13
Windfarm Forecasting Software Tool purchase & setup Costs	300	-	-
Windfarm Forecasting Software Tool Licence Costs (annual)	120	120	120
Total Windfarm Forecasting Software Tool costs	**420**	**120**	**120**

12 Dispatch Decision Support Simulator (DDSS) – Operational Capital Asset

System Management has forecast an amount to provide for Dispatch Decision Support Simulator operational capital expenditure during the Second Review Period, as set out in the following table:

Table 22 – DDSS Operational Capital Costs

Dispatch Decision Support Simulator costs (AUD$'000)	2010/11	2011/12	2012/13
Initial licence fee	396*	-	-
Maintenance Fees (annual)	79*	82*	86*
Subscription Cost	107*	111*	116*
Implementation Cost	215	-	-
Total Dispatch Decision Support Simulator Costs	**797**	**193**	**202**

*Note: Prices for subsequent years are subject to CPI escalation. An estimated CPI escalation of 4% has been built into these initial DDSS maintenance fees. The exchange rate used for conversion of USD to AUD in this application is 1AUD = 0.70USD. Also note that the above mentioned converted costs are rounded up to the nearest thousand.

In its 2008 report to the Minister of Energy into the effectiveness of the Wholesale Electricity Market the Authority commented on the lack of transparency in the dispatch processes performed by System Management.[3] System Management acknowledges that a lack of transparency is a perennial risk in a power system which is subject to largely manual operation, and due to the simplicity of the tools used by System Management.

[3] Annual Wholesale Electricity Market Report for the Minister for Energy 2008 Page 80- http://www.era.wa.gov.au/cproot/7178/2/20081218%20D0810616%202008%20Annual%20WEM%20Report%20for%20the%20Minister%20for%20Energy%20-%20Public%20Version.pdf

The simplicity means that the tools do not have the capability of recording the considerations involved in the planning, pre-dispatch and dispatch processes, and outcomes of the forward projections which are critical to the dispatch decisions made. A Dispatch Decision Support System (**DDSS)** is a tool to help remove much of the subjectivity which exists in present real time commitment and dispatch decisions and will create more consistency and continuity over varying time periods. Additionally, a DDSS will facilitate the creation of a SWIS Dispatch Plan, as distinct from a Verve Energy dispatch plan which is a requirement of clause 7.6A of the Market Rules.

A DDSS will aid in controlling a power system which now exhibits greater network complexity and has significant increases in the number of independent power producers.

The system will be required to interface to the SCADA and PI historian, the SMMITS data base, the Metrix Load forecast, and the future windfarm forecast system. The costs to integrate the DDSS into the SMMITS and SCADA environments include the following:

- licensing cost for the selected system engine;
- expert assistance from the system engine vendor;
- maintenance costs for the system engine;
- interfacing between the various source data base and the system engine; and
- creating a user interface and presentation layer.

13 Dispatcher Training Simulator (DTS) – Operational Capital Asset

13.1 Benefits

A Dispatcher Training Simulator (**DTS**) is a computer-based training system for operators of electrical power systems. The DTS forms part of the Energy Management System (**EMS**) used to control the electrical power system and uses the EMS model of the power system to allow real time training and simulation.

The management and control of the SWIS is becoming increasingly complex as the network itself and generation connected to it expands. It is no longer possible or desirable to rely upon the experience of engineering and technical staff to ascertain how the system would (or should) respond to adverse events, and increasingly System Management sees the need to operate a DTS to adequately fulfill obligations under the Market Rules. A DTS will provide benefits in simulation for operator training and to allow the simulation of extreme events for refining and proving management plans.

It is also the case that a physically isolated system, such as the SWIS, is at greater risk from adverse incidents due to an inability to import from other power systems.

With the planned changes to purchase black start capability from the market, the black start generators could conceivably change from time to time and thus the details of black start procedures would also need to change. This situation would increase the need for black start simulation and training.

The implementation of a DTS software system is also considered to support a recommendation made in the Oates Review:

> *System Management's responsibility and authority for reliability and security should be affirmed, enhanced and appropriately funded, in particular for the management of emergency situations*.[4]

13.2 Forecast cost

The expenses associated with the use of a DTS are:

- purchase and deployment for a once-off cost of USD$1m; and
- maintenance, enhancement and support, for an indexed sum of AUD$300K per annum, where indexation is in accordance with this application's proposed labour escalation percentage of 5% in the second year and 7% in the final year of the Second Review Period.

Note that the ongoing costs are required to fully realise all of the potential benefits, including the allocation of dedicated information technology specialists to provide ongoing refinement of the model, to maximise the accuracy of frequency response, and further expenditure will be necessary to achieve the benefits detailed.

Table 23 – DTS Operational Capital Costs

DTS Operational Capital Costs (AUD$'000)	2010/2011	2011/2012	2012/13
Initial purchase and deployment cost	-	714*	714*
Maintenance and Support cost	-	300	321
Total DTS Operational Capital costs	**-**	**1,014**	**1,035**

* Note: The exchange rate used for conversion of USD to AUD in this application is 1AUD = 0.70USD. Also note that the above mentioned converted costs are rounded up to the nearest thousand.

[4] Verve Energy Review Paper August 2009 Page 8 - http://www.energy.wa.gov.au/cproot/1571/14895/Verve%20Energy%20Review%20Final%20Report%20August%202009.pdf