Geoff Brown & Associates Ltd

TECHNICAL REVIEW OF ALLOWABLE REVENUE FOR SYSTEM MANAGEMENT FOR 1 JULY 2013 TO 30 JUNE 2016

Prepared for

ECONOMIC REGULATION AUTHORITY

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DISCLAIMER

This report has been prepared for the Economic Regulation Authority to assist it in its review of System Management's proposed allowable revenue and forecast capital expenditure for the period 2013/14 to 2015/16. 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.

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EXECUTIVE SUMMARY

Governance

System Management is subject to a governance framework which is reasonably robust in terms of external budget preparation and reporting processes, although not as robust as the framework in place for the Independent Market Operator (IMO). System Management's governance structure is driven by the governance framework within Western Power. We have already commented on governance processes in place within Western Power in our AA3 access arrangement review and those comments are applicable to the historical governance of System Management. However System Management is now implementing Western Power's new improvement portfolio governance model (IPGM) for managing the information technology (IT) related investment elements of the AR3 proposal, and we believe that this framework, if fully integrated into the business, will provide significant investment efficiency improvements. System Management does not appear to have developed a formal strategic plan for its IT investment although elements of one can be seen in the rationale underpinning its AR3 proposal.

Forecast Preparation

The operational expenditure (opex) and capital expenditure (capex) forecasts have been developed using what appear to be sound forecasting principles, taking the 2011/12 actual expenditure as a base year and adding/removing incremental expenditure items. In particular:

- the forecasting methodologies are soundly based and reflect a transparent and readily adjustable base for changing assumptions;

- the escalation assumptions in the proposal appear to be reasonable. System Management is proposing to adjust its allowable revenue in future years in the light of variations between actual and forecast CPI to ensure that there are no escalation based cross subsidies between System Management and Western Power. It will be up to the Authority to determine whether or not this adjustment proposal is accepted; and

- costs appear to have been allocated between Western Power and System Management consistent with the AA3 access arrangement and Western Power's ring fencing standard and its cost reflective allocation methodology (CRAM).

Opex and Capex Efficiency

We have considered the expenditure line items incorporated within System Management's allowable revenue and forecast expenditure proposal in terms of the services they provide in the light of the Authority's requirement to ensure that the approved expenditure includes only costs that would be incurred by a prudent provider who acts efficiently and seeks to achieve the lowest practicably sustainable cost of delivering the services. In considering this aspect we have taken the Authority's approved 2011/12 expenditure, adjusted for abnormal and non-recurring items, as being efficient and examined the manner in which recurrent expenditures have been forecast and the nature of any step expenditure changes.

We consider that:

- the recurring costs included in the forecast are reasonable;

- System Management has adequately considered step changes and these step changes reflect efficient forecast costs;

- System Management should consider using a five-year timeframe for depreciation of the System Management automated real time systems (SMARTS) and other IT capex to make the timeframes more consistent with likely economic life (particularly in the case of SMARTS) and also consistent with the asset lives proposed by the IMO.

- the capex that System Management places in the category of "supporting market development" through the MEP is speculative in that it is uncertain in terms of both timeframe

and scope. We consider that this capex should be excluded from the approved capex forecast and that other mechanisms provided for within the Market Rules should be used as the basis for specific capex approval in the event that specific projects in this category of sufficient magnitude materialise. However, if System Management is able to provide demonstrably firm timings and more accurate (not +/-50%) estimates for specific capex items identified as supporting market development, then such items should not be considered speculative and could be included in the capex approved by the Authority.

- It is not possible for us to form a firm opinion on the information available to us as to the efficiency of the historical capex, especially that associated with the SMARTS system. The project was unique and not one that can be readily benchmarked. We note that, in developing the project, System Management produced a substantive cost benefit options document that provided significant detail on options available. We recognise that there were delays in the final implementation of the balancing and LFAS markets from the timeframes originally scheduled but we also recognise that, given the described scope of the work elements required, the timeframe for implementation of the required IT systems was very optimistic. As a result there were probable inefficiencies in the overall development of the project. However, the Market Rules relevant to the operation of the new markets were not finalised until February 2012, even though the market trial was due to commence in April 2012. Any inefficiency in project implementation was not necessarily a consequence of specific actions by System Management, but perhaps more reflective of an optimistic timeframe set down when planning market commencement. Consequently a more considered overall planning process incorporating realistic contingency based timeframes may have resulted in lower cost outcomes and a similar delivery timeframe of the same market systems solution.

1 INTRODUCTION

Geoff Brown & Associates Ltd (GBA) has been engaged by the Economic Regulation Authority (Authority) to provide technical advice and assistance in assessing the efficiency and appropriateness of the proposed operating and capital expenditure for System Management[1] for the period 1 July 2013 to 30 June 2016. This advice is provided in this report.

System Management is the division within Western Power responsible for the real time operation of Western Power's transmission and distribution network. System Management (Markets) is the section within the wider System Management division that is responsible for carrying out System Management's functions as set out in the Market Rules. This report is concerned only with the operation of System Management (Markets) as the remainder of the System Management division within Western Power is funded through the AA3 revenue cap. In this report, any reference to System Management refers only to System Management (Markets) unless otherwise indicated.

Under clauses 2.22.3 and 2.23.3 of the *Wholesale Electricity Market Rules* (Market Rules), the Authority is required to determine the allowable revenue for the Independent Market Operator (IMO) and System Management, for each review period. Since the commencement of the Wholesale Electricity Market (WEM) in Western Australia in September 2006, the Authority has determined the allowable revenue for the IMO and System Management for two review periods. The first review period covered the period 1 July 2007 to 30 June 2010 while the second covered the period from 1 July 2010 to 30 June 2013. For ease of reference in this report we will refer to the upcoming review period as AR3, to the second review period as AR2 and the first review period as AR1.

As a result of a rule change, the Authority's determination under clauses 2.22.3 and 2.23.3 of the Market Rules has been expanded for AR3 to include the forecast capital expenditure (capex) of both the IMO and System Management.

Subclauses 2.22.3(a) and 2.23.3(a) of the Market Rules require the IMO and System Management to each submit a proposal for its allowable revenue and forecast capex to the Authority by 30 November of the year prior to the start of the review period. System Management has submitted its proposal for AR3 and this proposal is the subject of this report.

The purpose of the Authority's review of System Management's proposal and its subsequent determination of System Management's allowable revenue for AR3 is to ensure that System Management only recovers the costs of a prudent and efficient provider that incurs the lowest practicably sustainable costs of delivering the services set out in the Market Rules. As part of the Authority's review, we have been engaged to assess System Management's proposed expenditure for AR3 from a technical perspective, and advise the Authority on the extent to which it meets this objective.

Our report incorporates, but is not limited to, an examination of the following aspects of System Management's proposal:

- the key factors driving the proposed expenditure;
- the appropriateness of major items of expenditure proposed;
- the appropriateness of a number of specific items of expenditure that have been identified by the Authority;

[1] Western Power includes a System Management division, part of whose responsibilities incorporate the performance of certain functions related to the operation of the WEM and specified in the Market Rules. This function of System Management is referred to as System Management (Markets) and is funded from System Management's AR3 allowable revenue. Any references to System Management in this report refer only to System Management (Markets) unless explicitly stated otherwise.

- the governance processes used by System Management to manage historical capital expenditure (capex) and operating expenditure (opex) and forecast its capex and opex requirements for AR3;

- the appropriateness of methodologies used to estimate expenditure, including the calculation of items such as depreciation and the escalation of expenditure over time; and

- the efficiency of proposed expenditure assessed within the context of the levels of service that is provided by the IMO.

In undertaking our review we have not carried out any audits of information provided by System Management. We have relied on the accuracy of the information in System Management's proposal and of the supporting information that System Management has provided. Nevertheless, in undertaking our review we have sought further clarification where we considered information was inconsistent, could be inaccurate or where we required further details. However, where we considered that the information provided to us was reasonable, we took it at face value and did not seek additional evidence to corroborate its accuracy.

2 EXPENDITURE FORECASTS

2.1 OVERVIEW

The most significant recent impact on System Management's operations in recent years has been the implementation of the Market Evolution Program (MEP), which commenced in 2010, following the 2009 market participant endorsed Market Rules Evolution Plan and the Government-commissioned Verve Energy review. The main outcome of the MEP was the introduction of the new balancing and load following ancillary service (LFAS) markets, which were designed to allow market participants to bid for generation dispatch in near real-time and allow market participants other than Verve Energy to provide balancing and load following services[2]. System Management refers to the new markets as competitive balancing and load following (CBLF) markets in its proposal.

In order to facilitate the CBLF markets, System Management was required to make substantial changes to its operations and IT systems. The IT systems and certain manual processes that had been in place since Western Power's disaggregation in 2006 could not support real-time bidding and competitive balancing. As a result System Management implemented its new System Management automated real time systems (SMARTS) during AR2. This was a major investment. At the time of the Authority's AR2 allowable revenue review, there was no provision for introducing the MEP or, in particular, for financing the development and introduction of SMARTS.

Nevertheless, introducing the MEP and developing SMARTS have been significant contributors to the System Management's overall expenditure during AR2. They will also have a significant impact on the required expenditure during AR3, as a result of the increase in the scope and scale of System Management's activities[3] and the recovery of the associated capital expenditure during AR2.

The expansion of the Authority's determination under clauses 2.22.3 and 2.23.3 of the Market Rules to include forecast capex means that, in the normal course of events, projects such as MEP and SMARTS will now be subject to the Authority's review and approval in the process of approving System Management's allowed expenditure for a particular regulatory period.

In this section we overview System Management's forecast opex and capex requirements for AR3 and compare them with the System Management's actual and expected[4] expenditures during AR2. For economy of wording, the actual expenditures in 2010/11 and 2011/12 and the expected expenditure in 2012/13 are collectively referred to as "actual" AR2 expenditure.

In submitting its allowable revenue and capex proposal, System Management is seeking approval from the Authority for the allowable revenue and forecast capex set out in Table 1 below.

Table 1: System Management's Proposed Allowable Revenue and Capex ($'000, real as at 30 June 2013)

	2013/14	2014/15	2015/16	TOTAL
Allowable Revenue	11,889	14,203	16,998	**43,090**
Forecast CAPEX	2,417	1,738	1,045	**5,200**

Source: Revised Revenue Spreadsheet Model Provided by System Management[5]

2 Prior to the introduction of the new markets, Verve Energy was the sole supplier of balancing services (required to manage variations in forecast scheduled generation requirements) and load following ancillary services (designed to maintain system frequency within operational tolerances due to short term random changes in net system generation and load)

3 These impacts are discussed in detail in section 5 of this report

4 2012-13 figures are expected values as this financial year is not yet complete.

5 System Management provided an updated revenue model to the Authority on 26 February 2013 and the values are slightly different due to incorrect labour escalation values initially being applied to capex.

Nominal values are set out in the table below:

Table 2: System Management's Proposed Allowable Revenue and Capex ($'000, nominal)

	2013/14	2014/15	2015/16	TOTAL
Allowable Revenue	12,186	14,922	18,305	**45,413**
Forecast CAPEX	2,477	1,826	1,126	**5,429**

Source: Revised Revenue Spreadsheet Model Provided by System Management[5]

Clause 2.23.12 of the Market Rules requires that the allowable revenue be sufficient to cover the forward looking costs of providing the relevant services in accordance with the following principles:

i. recurring expenditure requirements and payments are to be recovered in the year of expenditure;

ii. capex is to be recovered through the depreciation and amortisation of the assets acquired by the expenditure in a manner that is consistent with good accounting principles;

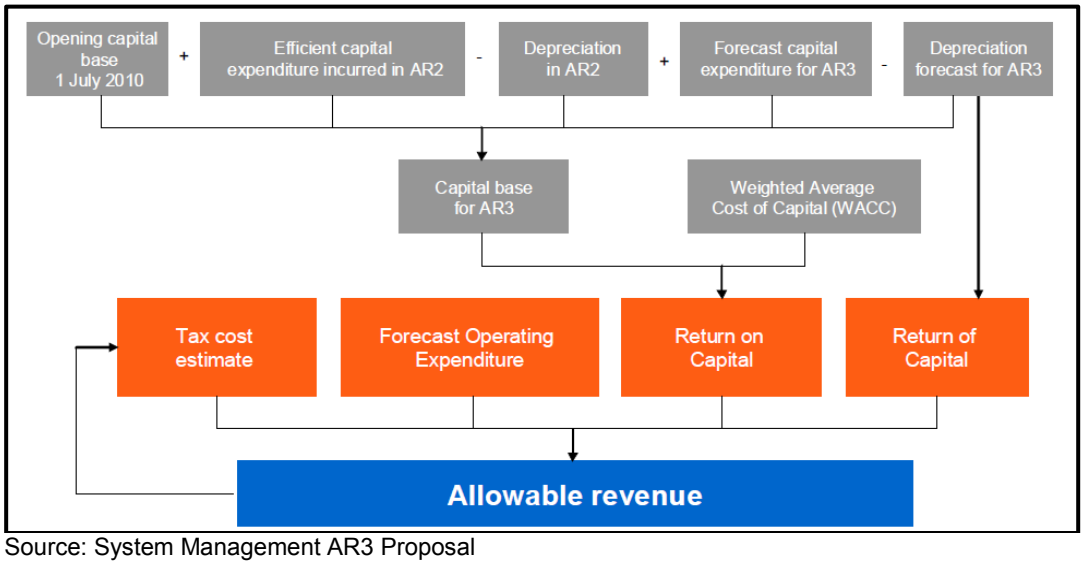
iii. costs that are related to market establishment, as designated by the Minister, are to be recovered over a period determined by the Minister from "energy market commencement"; and

iv. notwithstanding (i), (ii) and (iii), expenditure incurred and depreciation and amortisation charged in relation to any "declared market project" are to be recovered over the period determined for that declared market project.

2.2 BUILDING BLOCK APPROACH

In proposing the allowable revenue for AR3, as set out in Table 1, System Management has adopted an approach that calculates the allowable revenue utilising a building block methodology, the key building block elements of which are depicted diagrammatically in Figure 1 below.

Figure 1: System Management's Proposed Revenue Building Block Elements



Source: System Management AR3 Proposal

This proposed building block approach to determining the allowable revenue for AR3 is different from the approach used in developing System Management's allowable revenue for AR1 and AR2. In these proposals System Management sought compensation for:

- direct operating costs (labour, functional, legal and insurance costs and other specific operating expenses);
- recovery of capital costs through depreciation and amortisation; and
- borrowing costs incurred to fund operating and capital expenditure activities

While it is not within the scope of this report to consider the merits of changing to the building block methodology (as this is essentially a policy decision), the change does impact the manner in which we carry out our analysis. In approving the allowable revenue for AR3, the Authority may choose to agree with the System Management proposal as submitted, adopt a modified version of the submitted building block approach or revert to the previous AR1 and AR2 approach. We note that in its AR3 submission, System Management also proposes to use real values as the basis for its allowable revenue and adjust during AR4 for any changes in escalation that differ from the forecast escalation values.

Clause 2.13.12 of the Market Rules requires System Management's allowable revenue to be sufficient to cover the forward-looking costs of performing its functions and obligations under the Market Rules in accordance with the principles set out in Section 2.1. In proposing a weighted average cost of capital (WACC) related rate of return, System Management notes that it is a business unit of Western Power and this approach is fully consistent with the approach taken to funding all capex undertaken by Western Power's other business units including the wider System Management division. Clause 2.2.1 of the Market Rules appears to make Western Power accountable for System Management (Markets)' functions, although it requires Western Power to perform this role though a "segregated" business unit.

We suggest that the Market Rules lack clarity as to the extent to which System Management (Markets) should be segregated from Western Power, the ring fencing arrangements that should apply and how shared overhead costs should be allocated to the segregated business unit. While it is normal for all business units within an organisation to be funded in a similar way, this does not have to be the case. Alternative funding mechanisms that apply only to System Management (Markets) could be developed. For example, ring fencing arrangements could be implemented that require System Management (Markets) to be funded entirely by debt funding (as is the case with the IMO). Alternatively, an allowance could be made for funding costs to be allocated to System Management (Markets) as if it was a standalone entity in a manner similar to the manner in which System Management (Markets) has identified the insurance costs associated with System Management (Markets)' operations.

Given that System Management (Markets)' responsibilities include administration of the Market Rules, and that Western Power as the network operator is a separate rule participant under clause 2.28.1 of these rules, we think it desirable that System Management (Markets) be segregated from the remainder of Western Power[6]. This would minimise the potential for a conflict of interest to arise. However, if segregation is to be transparent, we think documented ring fencing arrangements should be approved following stakeholder consultation[7]. Such a consultation and approval process would be reasonable, given that it is clearly the intent of the Market Rules that System Management's operations be funded through a levy on market participants rather than through the access arrangement revenue cap.

Any ring fencing arrangements could specify that different capex funding arrangements apply to System Management (Markets) than apply to the remainder of Western Power. We think a good case could be made that the capex funding arrangements that apply to System Management (Markets) and to the IMO should be similar, since the roles of the

[6] Consideration needs to be given not only to the segregation between System Management (Markets) and the other divisions of Western Power but also the segregation between System Management (Markets) and the remainder of the wider System Management division.

[7] Western Power submitted a document setting out its ring fencing guideline in mid March 2013, just prior to the completion of this review. However, this was an internal document (DM 9173024) that, to our knowledge, has not been subject to formal stakeholder consultation.

two operations under the Market Rules are so closely aligned. This alignment is reflected in the current framework for approval of System Management (Markets)' allowable revenue and capex, which is separate from the expenditure approval process that applies to Western Power's other network management operations and which closely parallels that applying to the IMO.

For the balance of this report we have confined our analysis to consideration of the proposed opex, capex and depreciation cost components of System Management's AR3 proposal. We note however that System Management is a division of Western Power which, unlike the IMO, is a profit making corporation. The proposed building block approach is very similar to the approach Western Power uses to determine its proposed revenue cap for the provision of network services under the Electricity Networks Access Code 2004.

2.3 OPEXFORECAST

System Management's key opex line items are set out in Table 3, which shows actual AR2 and proposed AR3 opex in real terms[8].

We consider each of the main opex line items in this section and also in section 5.

Table 3: Comparison of Key Expenditure Items between AR2 and AR3 ($'000, real as at 30 June 2013)

	AR2 Actual				AR3 Proposed				Increase for AR3	
	2010/11	2011/12	2012/13	Total	2013/14	2014/15	2015/16	Total	$'000	%
Labour costs	3,591	3,744	4,119	11,453	5,240	5,366	5,369	15,975	4,522	39.5%
Functional costs	715	878	1,572	3,165	791	984	1,003	2,778	(387)	(12.2%)
Legal costs	190	137	200	526	200	200	200	600	74	14.0%
Insurance costs	-	-	-	-	386	386	386	1,159	1,159	
Business support	-	-	916	916	560	581	619	1,760	845	92.3%
IT Support[9]	701	1,778	1,544	4,023	1,092	1,092	1,092	3,277	(746)	(18.5%)
Total Costs	**5,196**	**6,537**	**8,350**	**20,082**	**8,270**	**8,609**	**8,670**	**25,549**	**5,466**	**27.2%**

We also present the opex in nominal terms as shown in Table 4.

Table 4: Comparison of Key Expenditure Items between AR2 and AR3 ($'000, nominal)

	AR2 Actual				AR3 Proposed				Increase for AR3	
	2010/11	2011/12	2012/13	Total	2013/14	2014/15	2015/16	Total	$'000	%
Labour costs	3,446	3,635	4,119	11,199	5,371	5,637	5,782	16,790	5592	49.9%
Functional costs	686	853	1,572	3,110	811	1,034	1,081	2,925	(185)	(6.0%)
Legal costs	182	133	200	515	205	210	215	631	116	22.5%
Insurance costs	-	-	-	-	396	406	416	1,218	1218	
Business support	-	-	916	916	574	611	667	1,851	936	102.2%
IT Support[10]	673	1,726	1,544	3,943	1,120	1,148	1,176	3,443	(499)	(12.7%)
Total	**4,986**	**6,346**	**8,350**	**19,682**	**8,476**	**9,045**	**9,336**	**26,858**	**7176**	**36.5%**

The proposed expenditure is over 27% higher AR3 than in AR2 in real terms with the main differences being:

- labour costs increasing by 39.5%;

[8] Real values are referenced to values as at 30 June 2013
[9] Includes a small amount of borrowing costs in 2010/11 and 2011/12
[10] Includes a small amount of borrowing costs in 2010/11 and 2011/12

- business support costs being included in for the whole of AR3, whereas these were only allocated to System Management for the final year of AR2; and

- inclusion of insurance costs which were previously not included in AR2 opex.

The major opex line items from Table 3 are discussed briefly below:

2.3.1 Labour Costs

Labour costs include costs associated with the employment of permanent staff that perform market-related System Management activities. Labour costs proposed for AR3 represent 62.5 % of total AR3 real opex, compared to 57% of total AR2 opex.

2.3.2 Functional Costs

Functional costs incorporate direct costs incurred on items such as consultants and contractors (non-IT related), travel, staff development and auditing. Functional costs represent 10.9% of the total real opex for AR3, down from 15.8% in AR2.

2.3.3 Business Support Costs

Western Power provides a number of business support services (e.g. finance, regulation, IT and human resources) that are utilised by System Management. The AR3 proposal allocates a share of Western Power's business support costs to System Management. System Management has advised that the allocation is in accordance with Western Power's ring fencing standard and its cost reflective allocation methodology (CRAM). The first such allocation was made in 2012/13 and continues into the AR3 period. System Management has indicated that the costs included in the AR3 period are consistent with the costs excluded from Western Power's recent access arrangement revenue cap for the period 2012/13 to 2016/17 (AA3 period).

Business support costs for AR3 represent 6.9% of the proposed real opex spend.

2.3.4 Insurance Costs

System Management states that insurance costs were incurred by Western Power in the first two years of AR2, but none of those costs were allocated to System Management. Its AR3 allowable revenue proposal seeks to allocate a share of the insurance costs to System Management during AR3, with the allocation based on an independent assessment of the insurance costs that System Management would be likely to pay as a standalone entity. We understand that the allocation is consistent with the insurance costs allocation to System Management that was excluded from Western Power's AA3 access arrangement revenue cap. The amount included represents 4.5% of the total proposed AR3 real opex.

2.3.5 IT Support Costs

IT support costs include costs associated with software licensing, software maintenance and other costs related to the direct provision and support of IT services that are not part of the IT capex provision.

These costs represent 12.8% of total proposed AR3 real opex, compared to 20% of its actual AR2 opex.

2.3.6 Key Opex Factors

System Management's core functions, as defined in the Market Rules, have been expanded as a result of the implementation of the MEP and, in particular, the introduction of the CBLF market. This has both a direct and indirect impact on the required opex and capex forecasts for AR3.

Section 4 of this report details the forecasting methodology while section 5 considers some of the step changes that contribute to the AR3 proposed opex in more detail. However, in summary, the key drivers of the proposed increase in the opex requirement for AR3 are:

- additional staff to support the CBLF market, which also requries extended hours of operation;
- additional staff to support the operation of System Management's SMARTS system and other new IT systems;
- additional costs to maintain the software licences and hardware for SMARTS; and
- the allocation of insurance and busienss support costs from Western Power.

2.3.7 Major and Specific Expenditure Items

The major opex line item is labour costs, which we consider in more detail in sections 4.1 and 5.1 of this report.

The next most significant opex component relates to IT support costs. We reviewed the step changes in these costs from 2012/13 onwards and requested a further disaggregation of the costs from System Management. This set out costs that are predominantly of a licensing and/or support/maintenance nature and, having examined these, we consider them reasonable.

2.4 CAPEX

AR3 is the first period for which the Authority is required to approve System Management's capex forecast. As detailed in section 4.2 of this report depreciation represents a significant component of the allowable revenue for AR3, reflecting the recovery of prior period capex through market fees.

All System Management's proposed capex for AR3 is for information technology (IT). The forecast capex is derived by project, with each project being separately estimated and costed.

The projects have been grouped by into categories reflecting the following investment objectives as shown in Table 5:

1. consolidating support for the MEP;
2. improving internal processes and systems; and
3. supporting market development.

Table 5: Proposed AR3 Capex by Category and Project ($'000, real as at 30 June 2013)

Category Grouping and Project	2013/14	2014/15	2015/16	Total AR3
Consolidating support for the MEP:	**533**	**289**	**-**	**822**
SMARTS security assessment	149	-	-	149
SMARTS test environment	216	115	-	331
IMO outbound data	168	174	-	342
Improving internal processes and systems:	**1,094**	**729**	**502**	**2,325**
Lodgement and approval for commissioning	232	84	-	316
Customer portal user management phase 1	85	-	-	85
Customer portal user management phase 2	-	282	291	573
FTP replacement	251	206	50	506
Disaster recovery	376	-	-	376
Capitalised labour	151	156	161	469
Supporting market development:	**800**	**752**	**572**	**2,125**
Outage management phase 1	469	274	-	743
Outage management phase 2	107	144	238	489
Improvements to balancing	46	47	-	93
30 minute gate closure	0	159		159
Emissions intensity index	63	-	-	63
Spinning reserve market	115	127	334	577
Total capital expenditure	**2,427**	**1,769**	**1,075**	**5,271**

Source: System Management AR3 proposal[11]

2.4.1 Key Capex Factors

System Management has stated that its proposed capex investment will:

- embed the transition to the SMARTS platform by providing greater security and a more robust test environment;
- improve specific systems and processes through targeted initiatives aimed at improving efficiency and reducing risk; and
- support the development of the market by positioning System Management (Markets) to support the enhancements planned for the AR3 period by the IMO.

As each project has been separately estimated the specifc drivers for each have been considered in the development of System Management's proposed AR3 capex and are documented in System Management's AR3 proposal.

2.4.2 Major and Specific Expenditure Items

There are no major projects incorporated in the AR3 capex forecast, which comprises a number of small projects. Hence the forecast is substantially less than the actual AR2 capex, which totalled $15.2 million (real) over the three years of the regulatory period.

We have examined the forecast AR3 capex in the "supporting market development" category. For reasons outlined in section 5.2, we believe that these costs should be excluded from the approved AR3 capex.

[11] Note the values are slightly different to those that were revised in an updated revenue model provided to the Authority on 26 February 2013 but the variations are not material to our analysis

While we have not carried out a detailed review of the other individual projects, the descriptions provided in System Management's AR3 proposal lead us to believe that they are reasonable. We would expect that after a major investment such as SMARTS, some manual workarounds and inefficient system solutions would be in place and that these would need further investment to increase compliance, reduce risk and increase efficiencies.

3 GOVERNANCE REVIEW

3.1 INTRODUCTION

This section reviews the governance processes for the control of System Management's expenditure, including the policies, processes and procedures that it has in place to plan and manage both its capex and opex.

This includes the policies and processes that System Management uses to:

- set expenditure budgets and develop annual operating plans;
- formulate new projects and programs and approve them for implementation;
- control the actual cost of approved projects and programs; and
- forecast its capex and opex requirements for the AR3 period.

Particular consideration is given to:

- the alignment of the policies, procedures and processes for the management of expenditure with System Management's overall business objectives;
- the extent to which System Management's policies and procedures are consistent with good practice;
- the extent to which System Management's policies and procedures are implemented in practice;

In considering how well governance principles are applied, we have examined the key projects and programs, taken from those implemented during the AR2 regulatory period and those proposed for AR3.

3.2 GOVERNANCE FRAMEWORK

Governance establishes the processes, systems and controls that ensure that all investment decisions are made consistent with corporate objectives and also with good industry practice. It embraces clarity of roles and accountabilities, accurate/timely information and clear processes/criteria to support decision making, and the ongoing review and monitoring of business process and outcomes.

This section looks at the framework that System Management has established for expenditure governance and looks at the documented plans, policies, procedures and processes that are considered by System Management to be key inputs into the framework underpinning its AR3 allowable revenue proposal and the management of its actual expenditure.

System Management is subject to a governance framework that is quite robust in terms of external budget preparation and reporting processes as set out in the Market Rules. We note that the governance structure within System Management is driven by the governance structures and processes within Western Power. We have commented on these governance processes within Western Power in our AA3 access arrangement review and those comments are applicable to historical governance within System Management for investment of a similar nature.

3.2.1.1 Market Rules

The Market Rules govern the operation of the WEM, and have legislative authority conferred by section 123 of the Electricity Industry Act 2004. Section 2.23 of the Market Rules sets out the process requirements for determining the revenue required to fund System's Management's operations. In particular, Market Rules 2.23.3, 2.23.4, and

2.23.12 deal with the process requirements regarding the submission of an allowable revenue and forecast capex proposal to the Authority. The approved revenue and forecast capex, which must be approved by the Authority prior to the start of each three-year regulatory period, forms the basis for the preparation of System Management's annual budgets.

Section 2.23 of the Market Rules also deals with the annual budget formulation process. Specifically, Market Rules 2.23.2, 2.23.5, and 2.23.6 to 2.23.11 deal with the process for determining System Management's annual budget. Market Rule 2.23.10 requires that the budget must be reflected in Western Power's Statement of Corporate Intent and be consistent with the segregation of System Management from Western Power. System Management must submit each year to the IMO a budget that is consistent with the allowable revenue and forecast capex.

Section 2.24 of the Market Rules is concerned with the annual budgetary process as it deals with the arrangements for determination of system operation fees as part of overall market fees, being the revenue required to fund System Management's normal operations.

3.3 BUDGET REPORTING PROCESSES

System Management has identified a number of Western Power policies and procedures, supporting the review of System Management's budgetary performance.

We note that System Management has provided an extensive comparison of actual AR2 expenditure and the expenditure approved by the Authority. The detail provided in explaining the variances that are incorporated in the AR3 submission is evidence of a robust reporting framework. While the variances are significant in some cases, they can all be explained by the extensive additional work in AR2 associated with the MEP (which was not allowed for in the approved AR2 expenditures) either through direct MEP costs or through a requirement to divert resources from planned activities to MEP projects and MEP support.

3.3.1 Annual Reporting Process

There are no specific requirements for System Management to provide an annual report on financial performance as part of its Market Rules obligations although, as a division of Western Power, its financial performance is included in Western Power's performance as disclosed in the Western Power annual report. As a ring fenced, separately funded division of Western Power, transparency would be increased if System Management was required to produce an annual report relating only to its ring fenced operations.

However, we note that System Management is subject to:

- external audits as part of Western Power;
- internal audits; and
- market audits, which cover compliance by System Management with the Market Rules.

3.3.2 Budget Reporting Assessment

The processes and procedures outlined above, combined with our review of sample reports provided by System Management, lead us to believe that System Management has sound procedures, processes and practices in place to manage its budget expenditure.

3.4 PROJECT APPROVALS AND MANAGEMENT

3.4.1 IT Strategy

System Management does not appear to have a formal IT strategy document (commonly referred to as an IT roadmap) that documents the strategic objectives of its IT investment. While it is clear from the detail included with its tactical projects that System Management has an IT strategy moving forward, we believe that a formal documented strategy would provide transparency and improve the overall governance of System Management's IT investments.

3.4.2 IT Project Management

In its submission, System Management describes Western Power's improvement portfolio governance model (IPGM) as being the main governance mechanism that it uses to manage its investment in IT systems and projects.

3.4.2.1 IPGM

Western Power describes its IPGM as a framework for managing non annual works program projects within Western Power's improvement portfolio, whilst applying an appropriate level of governance to ensure ongoing strategic alignment of initiatives. System Management proposes to utilise this framework as part of its improved governance processes moving forward through AR3, noting that it was not used for the SMARTS project.

The IPGM is described as being based on industry best practice project management methodologies such as PMBOK[12] and PRINCE2[13]. The framework is characterised by seven phases and six gates as outlined in the figure below:

Figure 2: Graphical Overview of IPGM Phases and Gates

Source: *Improvement Portfolio Project Governance Model Guidelines - Non-AWP Projects, Version 3.2*, Western Power November 2011,

The IPGM is stated to be scalable and able to cater for small to complex projects. There are minimum mandatory governance deliverables required of all projects at each gate, whilst certain deliverables are only required for larger projects.

We have reviewed the IPGM guidelines in detail and agree that the effective implementation of the IPGM as part of System Management's overall governance provides a good framework for improved and efficient investment outcomes.

3.4.3 Review of SMARTS Investment

As part of our review of governance we examined the process surrounding the management of the SMARTS investment. The findings are presented in Appendix A. SMARTS was established prior to the implementation of the IPGM framework and was not used in the development and management of the SMARTS project.

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12 The Project Management Body of Knowledge (PMBOK) is a collection of processes and knowledge areas generally accepted as best practice within the project management discipline.

13 PRINCE2 (an acronym for **pr**ojects **in c**ontrolled **e**nvironments, version **2**) is a project management methodology. It was developed by a UK government agency and is used extensively within the UK government as the de facto project management standard for its public projects.

3.5 CONCLUSION

We consider that, with the introduction of IPGM, System Management now has a strong governance framework in place to manage its expenditure. We note that the IPGM is relatively new and is only just being implemented within System Management. We also recommend that System Management produce an IT strategy document as part of its governance processes.

4 FORECAST METHODOLOGIES

In reviewing the proposed expenditures, we consider the methodologies used by System Management to prepare and estimate the forecast expenditures.

4.1 FORECASTING METHODOLOGY

System Management describes its forecast opex as providing fit-for-purpose methods for each of three cost types, viz:

1. recurrent costs;
2. non-recurrent costs; and
3. business support costs.

System Management's forecasting methodology for AR3 reflects the differing cost drivers of each cost type. For non-recurrent and business support costs, System Management used bottom-up forecasts to take into consideration the nature of the works program and the effect of factors other than scale. Recurrent opex forecasts were based on System Management's actual 2011/12 costs.

In forecasting recurrent costs for AR3 System Management:

- used actual 2011/12 costs as the efficient base year costs;
- removed non-recurring 2011/12 costs that were not expected to continue into AR3;
- adjusted for relevant step changes related to known future changes in its practices, functions, obligations and operating environment . These were identified through the 2012/13 budget process and a review of future requirements; and
- applied input cost escalation to adjust for movements in the market price of labour.

System Management claims that the recurring costs incurred during 2011/12 reflected an efficient recurrent cost base because:

- 2011/12 was the latest completed financial year in the AR2 period;
- operating activities were planned and carried out in accordance with good electricity industry practice, whilst seeking to achieve the lowest practicably sustainable costs;
- following 2011/12, System Management's operations have changed significantly (and as such step changes associated with change in operations were able to be added to this base year);
- the costs associated with the SMARTS program in the base year were able to be readily backed out of the cost base, as required to establish the recurrent base year costs; and
- other capital investments focussed on enhancements to the existing IT environment, and represented 'business as usual' projects for System Management.

4.1.1 Step Change Adjustments

System Management has adjusted for step changes related to known future changes in its practices, functions, obligations and operating environment. These are costs that were incurred in the base year (2011/12) that will not be incurred in the AR3 period (negative step changes) and also costs that will be incurred in the AR3 period that were not incurred in the base year (positive step changes).

The recurrent cost base setting process involved examining actual 2011/12 costs to identify recurrent and step changes in operating activities.

Many of the step changes arise out of:

- changes in obligations due to the implementation of the MEP; and
- changes in the operating environment and practices due to the forecast capex program over AR3.

These factors have given rise to two forms of required forecast adjustment:

- step changes to the 2011/12 base year to account for known changes in recurrent costs between 2011/12 and 2012/13 and those expected in the AR3 period; and
- one-off adjustment in costs for short-term variances in recurrent activities.

System Management has incorporated a detailed summary of then step changes (amounts and reasons) in its AR3 proposal and these are not reproduced herein for expediency. We reviewed the step changes in detail and examined their line item inputs in the capex and opex spreadsheet models provided by System Management. We believe that they are well documented and all appear to be reasonable to the extent that we are able to offer an opinion on certain specialist areas. The dominant step change is in labour operating costs amounting to $1.2 million, which are discussed further in section 5.

4.2 COST ALLOCATION

The issue of cost allocation is relevant to considerations of the allocation of Western Power's business support and insurance costs to System Management. We note the costs have been allocated between Western Power and System Management consistent with the AA3 access arrangement and Western Power's own ring fencing guideline (as discussed in section 2.2) and its CRAM cost allocation methodology.

In its forecasts System Management has made an allowance for one additional FTE to carry out capex work during AR3. It is intended that this position be filled by allocating two existing staff to this work on a part time basis. In the event that the capex does not proceed or was not approved, there would be no change in opex as System Management had made an allowance within opex for the one FTE allocated to capex to be backfilled.

4.3 DEPRECIATION

Historically (AR1 and AR2) System Management has used the straight-line approach over the life of the asset to determine the depreciation based on a general economic life of 2.5 years, given that its assets are IT based.

System Management has proposed using a four-year life for the SMARTS platform and other IT systems for AR3, based on the perceived economic life of these assets. It considers that four years is the appropriate timeframe given changing technologies and the continued evolution of the Market Rules over time. System Management commissioned an expert report as part of its process of making the 4 year assessment, but we note that report provided a recommended economic life of 3 to 5 years.

System Management has included the following levels of depreciation in its proposal:

Table 6: Proposed Depreciation for AR3 ($'000 real, as at 30 June 2012/13)

	2013/14	2014/15	2015/16
Depreciation	3,766	4,125	4,387

Source: System Management AR3 proposal[14]

We consider that System Management should consider using a five year life for depreciation of the SMARTS system capex and other IT capex to make the timeframes more consistent with likely asset economic life (particularly in the case of SMARTS) and also consistent with the IT asset lives proposed by the IMO. System Management indicated that it was continuing to build on the SMARTS investment for future MEP enhancements. Nevertheless we see no reason why the economic life of the market software used by system management should differ from that used by the IMO.

We note that the adoption of a five year asset life would result in a reduction of approximately 20% in depreciation recovery over AR3 (noting 2012/13 incorporates some 4 year deprecation amounts already). This represents around a $2.5 million reduction in depreciation over AR3.

4.4 ESCALATION

System Management has applied escalation to its real forecast expenditures as set out in this section. Nominal figures were derived from 2011/12 base year costs escalated in accordance with the following approaches:

4.4.1 Specific Escalation Factors

Where specific escalation factors are known in advance (e.g. via specific contract provisions) these are applied to 2011/12 costs.

4.4.2 Labour Escalation Factor

System Management has proposed to apply the labour escalators proposed by Macromonitor[15] for Western Power for its recent AA3 access arrangement proposal to escalate the forecast labour costs. These escalation factors were developed specifically for the Western Australian electricity, gas, water and waste sector and System Management believes that its overall workforce is subject to similar factors as the rest of Western Power in the area of labour pressures and constraints.

The labour escalation factors that have been applied are set out in Table 7 below:

Table 7: Forecast Labour Escalation and Inflation for AR3

	2012/13	2013/14	2014/15	2015/16
Labour Escalation (above inflation)	1.5%	2.2%	2.4%	2.0%
Assumed Inflation	3.0%	2.5%	2.5%	2.5%
Applied Total Labour Escalation	4.5%	4.8%	5.0%	4.5%

We note that the key economic forecasts included in the Western Australian State Budget 2012-13 Overview Paper incorporate Wage Price Index (WPI) increases of 4.5% over each year of the AR3 period. This is consistent with the proposed escalation factors. Furthermore, the IMO is proposing escalation of 5.5% per annum for specialist staff and 4% for other staff. On a weighted average basis the proposed IMO and System Management labour escalations are similar.

[14] Note the values are slightly different to those that were revised in an updated revenue model provided to the Authority on 26 February 2013 but the variations are not material to our analysis

[15] *Forecasts of Labour Costs – Electricity, Gas, Water and Waste Services Sector, Western Australia, Report prepared for Western Power*, Macromonitor, July 2011.

4.4.3 Inflation

In formulating its forecasts and establishing historical real expenditure estimates System Management has used:

- actual CPI data published by the Australian Bureau of Statistics for the June quarter, where available.
- forecast CPI data from the Reserve Bank of Australia's Statement on Monetary Policy.

Actual inflation for 2012/13 was not available at the time the submission was provided so forecast CPI was used instead. The inflation values are shown in Table 7.

In its proposal, System Management has tried to ensure that Western Power and customers are held financially neutral in the event of a variation between forecast and actual inflation and has proposed that the capital base at the commencement of the next review period (AR4) be adjusted to correct for any variations.

4.4.4 Conclusion

We consider that the escalation assumptions are reasonable. We note that System Management proposes to adjust the allowable revenue in future years in the light of variations between actual CPI and forecast CPI to ensure that there are no escalation based cross subsidies between System Management and Western Power. We have reviewed the capex and opex models used by System Management and found that escalation has been applied as described in its AR3 proposal.

5 EFFICIENCY OF PROPOSED EXPENDITURE

The objective of the Authority's approval of System Management's allowable revenue and capex forecast is to ensure that only costs that would be incurred by a prudent provider that acts efficiently and seeks to achieve the lowest practicably sustainable cost of delivering the services are approved. Assessments of service efficiency are often carried out by benchmarking approaches. We note that the Authority does not wish to benchmark System Management's forecasts against the costs of providing similar services in other jurisdictions, as contemplated by sub-clauses 2.22.12(c) and 2.23.12(c) of the Market Rules, as it considers that there are no directly comparable entities to the IMO and System Management in other jurisdictions, in terms of the scale of operations, the structure of the businesses and the nature of activities.

Therefore we have considered the efficiency of the proposed expenditure in comparison to recurring costs for the System Management base year of 2011/12, with additional consideration of the capex that underlies the depreciation and amortisation components of the allowable revenue. The Authority may wish to extend the benchmarking to the AR1 period but we believe that, given the change in market circumstances since AR1, System Management's proposal to use 2011/12 as an efficient base year as set out in section 4.1 of this report is reasonable.

5.1 OPEX EFFICIENCY

Table 8 compares the actual AR2 expenditure with the Authority's approved amount for each line item (adjusted in real terms). System Management has provided a very detailed description of the variances as part of its AR3 submission and we are unable to detect any major inefficiencies associated with the variances. As a result we consider that the step changes that have resulted in the variances are reasonable and to the extent that these recur in AR3, these are again reasonable.

Table 8: Comparison of AR2 Allowable Revenue with AR2 actual ($'000 real as at 30/6/2012

Category	2010/11		2011/12		2012/13		Total AR2	
	ERA Approved	Actual	ERA Approved	Actual	ERA Approved	Actual	ERA Approved	Actual
Labour (permanent employees)	3,847	3,591	3,994	3,744	4,149	4,119	11,990	11,453
Functional costs	506	715	542	878	556	1572	1604	3165
Legal costs	391	190	397	137	400	200	1,187	526
Business support costs	-	-	-	-	-	916	-	916
IT operating expenditure	464	282	482	410	497	177	1,443	869
Insurance costs	-	-	-	-	-	-	-	-
IT Support Costs								
Wind forecasting tool	125	-	124	79	120	0	369	79
Dispatch decision support simulator	175	-	180	121	183	60	538	181
Dispatch training simulator	-	-	309	0	321	321	630	321
PASA redevelopment	-	-	-		-	-	-	-
Interest expenses	50	-	99	25	74	74	223	99
MEP and SMARTS	-	419	-	1,142	-	912	-	2,473
Total	**5,558**	**5,196**	**6,126**	**6,537**	**6,300**	**8,350**	**17,984**	**20,082**

Source: Adapted from System Management AR3 submission

The benchmarking we have undertaken is broadly based on a direct comparison of costs of a recurrent nature, whilst factoring changes in any additional cost drivers emanating from sources such as such as scale and inflation impacts. In the case of step changes,

we have considered these in the light of any changes in scope or service delivery mechanisms.

To this end we have reviewed:

- the forecast models used by System Management;
- the description of step changes provided in the System Management proposal;
- bottom up forecasts for non-recurring items; and
- the impact of changes in scope including those set out in Table 9 below.

Table 9: Summary of changes in System Management Operational Activities arising out of the CBLF Market

Impact area	Operations pre-CBLF	Operations post-CBLF
Rule Obligations	57 obligations	74 obligations
Forecasting	2 forecasts issued daily (day ahead).	48 forecasts issued daily (5 minutes to a day ahead).
Planning & Scheduling	Market closure = 22 Hours. 18.5 - 42.5 hour time horizon. Once per day: • receive resource plan data • review load forecast • create Verve Energy dispatch plan and gas nomination	Balancing gate closure = 2 hours. 2 – 42.5 hour time horizon. Pre-dispatch security assessment. Ex-ante dispatch advisories on constraint. 48 times per day: • receive resource plan data • review load forecast • create Verve Energy dispatch plan and gas nomination • receive updated balancing merit order Once per day: • Full pre-dispatch plan for all facilities
Dispatch Instructions/ Dispatch Advisories	37 dispatch instructions per month by phone. 8 dispatch advisories per month (ex-post).	1,600 dispatch instructions per month. 15 dispatch advisories per month (ex-ante and real time).
Dispatch	• Controller, supported by comparative historic (similar day) forecast and SCADA system data. • Manage non-scheduled generation, forced outages and commissioning test manually • Dispatch Verve Energy plant to plan • Manually monitor compliance to resource plan • Issue dispatch instructions to independent power producer as required • Control of Verve Energy via automatic generator control load following ancillary service	• Creation and support of automated dispatch systems. Controller monitors and intervenes as necessary. • Mixed manual/auto management of real time operations • Continuous security assessment • Issue dispatch advisories in real time on forced outage • All balancing facilities dispatched automatically • Automated monitoring of dispatch compliance • Commission automated balancing control availability for most facilities • Commission automatic generation control for all load following ancillary serviceproviders
Systems	Predominantly standalone systems maintained and supported at branch level by subject matter experts	Integrated business systems supported centrally under full change control with full offsite disaster recovery facilities
Support rosters	Weekday coverage 7am – 4pm and 3 hours/day on weekends	7 day coverage 6am-8pm

Source: System Management AR3 proposal

In considering the efficiency of the proposed opex, we note that System Management provides very specialised services and as such we are not able to definitively conclude that the step changes in expenditure that System Management is proposing in relaton to the increase in service levels that they are now providing is efficient. Nevertheless the

additonal staffing levels proposed in the System Management AR3 proposal (and as summarised in Table 10) appear to be reasonable,given the increase in work activity. As such we are inlcined to a view that the proposed AR3 opex levels reflect resonable efficiencies.

Table 10: Summary of FTE Staffing Level Changes in AR2 and AR3

Investment Area	Step increase in FTEs			
Section	2012/13	2013/14	2014/15	2015/16
Permanent Employees				
Support for MEP				
Market Operations Planning	1.00	-	-	-
System Operations Control Engineering	0.25	-	-	-
System Operations Planning	-	1.00	-	-
Sub total	**1.25**	**1.00**	**-**	**-**
Dispatch training				
SCADA Branch	1.00	-	-	-
System Operations Control Engineering	0.10	-	-	-
Sub total	**1.10**	**-**	**-**	**-**
Market systems support				
SCADA Branch	-	4.50	-	-
Sub total	**-**	**4.50**	**-**	**-**
Governance improvements				
Market Strategic Development	-	1.00	-	-
Sub total	**-**	**1.00**	**-**	**-**
Succession planning				
System Operations and Control	-	0.50	-	(0.50)
Sub total	**-**	**0.50**	**-**	**(0.50)**
Total increase in permanent employees	**2.35**	**7.00**	**-**	**(0.50)**
Contractors				
Support for MEP				
System Operations Planning	2.00	(1.50)	-	-
Market Operations Planning	1.00	(1.00)	-	-
Sub total	**3.00**	**(2.50)**	**-**	**-**
Market systems support				
SCADA		(3.00)	-	-
System Operations Planning		0.30	-	-
Sub total	**-**	**(2.70)**	**-**	**-**
Total increase in contractors	**3.00**	**(5.20)**	**-**	**-**
Total Step Change	**5.35**	**1.80**	**-**	**(0.50)**

Source: Adapted from System Management's AR3 submission

5.2 CAPITAL EXPENDITURE EFFICIENCY

We have considered the efficiency of the capex forecast or AR3. It is not possible to carry out a comprehensive assessment of the capex efficiency without examining the business case for each project, which is not possible given the timeframe available for our review. However, we consider that, if the projects have been developed strictly in accordance with the IPGM governance framework as stated in System Management's proposal, then the projects should reflect efficient outcomes.

We note that the projects grouped in the category of "supporting market development" have only been estimated as preliminary estimates (+/-50%) in accordance with the strategic alignment phase of the IPGM, due to the uncertainty surrounding the Market Rules and associated details of these projects. In essence, System Management has made a "provision" for future uncertain MEP projects. In discussions with System Management it was indicated that, by providing a provision within the forecast capex for AR3, the approval processes for capex will be reduced and the timeframe for implementation of Market Rule changes will be more rapid. While this may be the case, we do not consider it consistent with the intent of the Market Rules for us to recommend approval of "provisions" for significant one-off projects that may well turn out not to be required, particularly when other mechanisms are available to deal with such situations when they arise[16]. We also have concerns that making such a provision for uncertain projects may not be efficient and as such not consistent with the requirements of clause 2.23.12(b) of the Market Rules.

In our view, the capex that System Management places in the category of "supporting market development" through the MEP is sufficiently uncertain in terms of timeframe and scope to not be included in the forecast capex. We consider this component of the capex forecast is speculative and think the need for this expenditure should be more clearly defined if the provision is to remain in the approved forecast. The exclusion of these projects from the approved capex for AR3 would result in a reduction of capex totalling $2.1 million or 40% of the total proposed AR3 capex forecast.

We are unable to form a firm opinion, given the information available to us, on the efficiency of the historical capex, especially that associated with the SMARTS system. The project is unique and not one that can be readily benchmarked. We note that, prior to the development of the SMARTS proposal, System Management prepared a substantive cost-benefit analysis that provided significant detail on the different options available. We recognise that there were delays in the final implementation of the balancing and LFAS markets from the original timeframes but we also recognise that, given the described scope of the work elements required, the timeframe for implementation of the required IT systems was very optimistic. As a result, in hindsight, there were no doubt efficiencies that could have been made in the project development and implementation. However, the Market Rules relevant to the operation of the new markets were not finalised until February 2012 even though the market trial was due to commence in April 2012. Any inefficiency was therefore not necessarily a consequence of specific actions by System Management but perhaps more reflective of the optimistic timeframe set down when planning the overall implementation of the CBLF markets. A more considered overall planning process incorporating realistic contingency based timeframes may have resulted in lower cost outcomes and a similar delivery timeframe of the same market systems solution with more efficient expenditure outcomes.

Details of our review of the capital expenditure on the SMARTS are presented in Appendix A.

[16] For example, System Management is able to recover the costs of projects deemed by the IMO to be "Declared Market Projects in accordance with clause 2.22.13 of the Market Rules.

APPENDIX A: REVIEW OF SMARTS PROJECT INVESTMENT

A.1.1 INTRODUCTION

System Management described the introduction of the CBLF market as the most fundamental change to its operating environment since the commencement of the WEM in 2006. In undertaking a study into the requirements of the CBLF market in order to better understand the impact on its systems, processes and resourcing requirements, System Management concluded that it would require significant upgrade of its existing IT systems and manual processes.

In May 2011 System Management launched its SMARTS program to deliver the IT systems, procedures and processes required to meet the requirements of the CBLF market. It worked with the IMO and key stakeholders to scope and develop the new system. The IMO developed the Market Rule changes required for the introduction of CBLF in tandem with the SMARTS development, and issued a revised 'go-live' date of 1 July 2012. The revisions to the Market Rules were finalised in February 2012 and market procedures finalised in June 2012.

The timing of the introduction of the CBLF meant that the AR2 revenue approved by the Authority did not include expenditure for SMARTS. As a result, resources for some AR2 projects were reallocated to delivery of SMARTS and in many cases the projects outlined in the 2009 AR2 submission were either postponed or revised so that they could be accommodated as part of the SMARTS solution in the future.

System management states that while SMARTS was designed to be scalable, expenditure in the AR2 period has been limited to only deliver the functionality immediately required to support the introduction of the CBLF market. Other elements will be integrated in the future and some of these integrations form part of the AR3 capex forecast.

The SMARTS project was not developed using System Management's latest IPCG governance model and appears to have been established in its current form predominantly out of a business case developed after analysing the requirements of the CBLF market[17].

A.1.2 OPTIONS ANALYSIS

In developing the SMARTS solution as finally implemented, System Management carried out a business case evaluation that identified the options set out in the table below as a means of meeting the system requirements of the proposed CBLF market.

[17] *Business Case -Implementation of Competitive Balancing & Load Following in System Management*, Western Power, October 2011

Table 11: Summary of System Management Option Analysis for Implementing CBLF Solutions (figures are in $ million)

Evaluated Option	Nominal Investment Cost[18]	PV of Investment Cost	PV of Industry Benefits[19]	WEM Compliant?	Comments
Do nothing	-	-	-	No	Non-compliant with the new WEM competitive balancing rules. Forecast industry benefits of competitive balancing would not be realised. Not recommended.
Modify existing systems	33.4	25.6	Limited	High risk of non-compliance	Existing tools were not able to be modified to meet the full requirements of the CBM, particularly automated real time dispatch. Would need additional 24/7 controllers to undertake complex calculations in short duration. Hence there was a higher risk of non-compliance and non-efficient market outcomes. Not recommended.
Turnkey solution – off the shelf	43.1	33.0	36.0	Yes, although would delay CBM start.	Off the shelf systems are generally built/targeted for larger more complex markets than the new WEM and thus would require extensive effort to design, adapt and implement, and were believed to have a higher ongoing operational cost. Often these systems were associated with a particular SCADA system resulting in integration issues. Existing reusable systems would become redundant. Not recommended.
Turnkey solution – bespoke	43.2	30.3	36.0	Yes, although would significantly delay CBM start.	This was likely to take a long time to implement with limited opportunity to stage delivery. Management of cost/quality/risk would require clear project definition upfront. Support options limited and relatively costly. Not recommended.
Select point solutions[20]	20.0	19.9	36.0	Yes	This is the preferred option as will be least cost to implement competitive balancing requirements whilst reducing risks by allowing appropriate control over the implementation and selection of product solutions through a program office and system integrator. The specialised systems selected were also expected to offer more flexibility in the manner in which a solution could be developed and implemented. Recommended option.
Existing system operator system	33.9	27.8	36.0	Yes, although would delay CBM start.	System operators not generally set up to sell or support IT and system would require substantial modification to reflect WEM requirements. Not recommended

Source: Adapted from Business Case -*Implementation of Competitive Balancing & Load Following in System Management*, Western Power, October 2011

The costs of the preferred option (which evolved into SMARTS) are summarised in Tables12 and 13 below:

[18] Figures do not include finance charges

[19] Based on the benefits identified in the IMO's business case for the implementation of the CBLF market – refer to http://www.imowa.com.au/f3849,1210362/Combined_MAC_Meeting_37_Papers.pdf

[20] Involves establishment of program office, utilises selected vendor applications and retains/enhances reusable current systems and assimilates using a system integrator and this effectively became SMARTS

Table 12: Summary of CAPEX estimated for SMARTS ($million, nominal)

Cost Type	2011/12	2012/13	2013/14	2014/15	2015/16	Total
Labour/Contractors	8.1	2.7	0.0	0.0	0.0	10.7
Materials/Equipment	0.7	0.2	0.0	0.0	0.0	0.9
Contingency	1.0	0.3	0.0	0.0	0.0	1.4
Escalation Allowance	0.0	0.2	0.0	0.0	0.0	0.2
Finance Charge	0.4	1.1	0.9	0.5	0.2	3.0
Totals	**10.1**	**4.5**	**0.9**	**0.5**	**0.2**	**16.2**

Source: Adapted from Business Case - *Implementation of Competitive Balancing & Load Following in System Management*, Western Power, October 2011

Table 13: Summary of OPEX estimated for SMARTS ($ million, nominal)

Cost Type	2011/12	2012/13	2013/14	2014/15	2015/16	Total
Labour/Contractors	1.4	1.4	1.4	1.4	0.0	5.7
Materials/Equipment	0.0	0.0	0.0	0.0	0.0	0.0
Contingency	0.2	0.2	0.2	0.2	0.0	0.8
Escalation Allowance	0.0	0.1	0.2	0.2	0.0	0.5
Finance Charge	0.1	0.3	0.3	0.1	0.0	0.8
Totals	**1.7**	**2.0**	**2.1**	**2.0**	**0.0**	**7.7**

Source: Adapted from Business Case - *Implementation of Competitive Balancing & Load Following in System Management*, Western Power, October 2011

The capex and opex figures in Tables 12 and 13 include an allowance for financing charges of $3.8 million that is not reflected in Table 11.

System Management notes that when the initial cost benefit study into the CBFL market was undertaken the cost estimates fed into the study (in January 2011) were based on a much simpler competitive balancing market design than the one finally arrived at. Thus the initial System Management costs that were fed into that study ($2.9 million implementation and $1.9 million annually going forward) were significantly less than those identified when the detailed business case study was undertaken. As a result System Management requested the IMO to have the cost benefit study reviewed with the much higher projected System Management costs included. The study still showed a significant positive cost benefit even with the much higher estimated costs.

A.1.3 IMPLEMENTATION

In arriving at a decision to establish the SMARTS solution, System Management noted the following changes needed to be made to existing systems to meet the requirements of the CBLF market:

Table 14: Summary of Additional Features Required for CBLF Market

System	Prior Capability	Requirement Identified for CBLF
Load Forecasting Develops a forecast of system load to be met by generation largely by weather inputs but modified by actual loads.	Primarily day ahead forecasting tool (Metrix IDR) although used as a reference in real time (adjusted by actual loads).	Enhance existing Metrix tool for 5min through to day-ahead accuracy. BOM data feed changes required.
Wind Forecasting Develops forecast of wind farm outputs largely by weather inputs but modified by actual output.	Primarily day ahead forecasting tool (in house spreadsheet) although used as a reference in real time.	Purchase /implement new wind forecasting tool for 5min through to day-ahead accuracy.
Dispatch Planning / Scheduling Undertakes pre-dispatch planning to determine if any security constraints and optimise plan, manages Verve portfolio, develops dispatch advisories to inform market of security constraints.	Variety of tools (spreadsheets, SCADA, Java-ELB, and SMMITS2) enabled commitment / decommitment of Verve plant and identified need for IPPs. Limited constraint analysis using external tools.	New dispatch planning tool for planning & scheduling market facilities introduced, with ability to undertake generation planning and scheduling for 4-48hrs out, and to conduct initial security assessments during the scheduling day for the trading day. Generation of security constraint violations and dispatch advisories.
Dispatch Execution / Monitoring Real time and close to real time security assessment and determination of generator dispatch instructions (DIs) to resolve security constraints, recording of outcomes.	Variety of tools (spreadsheets, SCADA, Java-ELB, SMMITS2) identified need to dispatch plant (generally Verve). Enabled controllers to monitor plant against dispatched levels and manually take action as required. Constraint analysis performed manually using external tools, interpreted and then manual dispatch to resolve.	New dispatch engine to undertake real time security assessments and automatically generate dispatch instructions (DIs) to generators around the constraints. Monitors compliance to DIs and real time load/outages and takes rectifying action. High availability with "fail over" site.
Communications Interfaces and communications between SM and generators and SM-IMO.	Dispatch done by telephone and formalised by ELB generated emails. System security advisories (rare) generated in ELB. Transfers with IMO were through a simple process not suited to near real-time transfers.	New dispatch interface (sends DIs, receives confirmation, plant availability). IMO-SM interfaces enhanced to enable greater and more common data exchange, including security information and dispatch advisories.
Infrastructure Various hardware, storage and network assets.	Single points of failure as not real time systems. Limited backup.	Duplicated, robust hardware and networks purchased. For efficiency co-location with main/backup SCADA proposed.
Data Layer and database The custom SMMITS2 database and related repositories as well as various application specific databases.	Variety of different systems and platforms used with limited integration.	Central, integrated database that is optimised for near real-time processing with a separate 'duplicated' reporting database and refurbished existing applications.

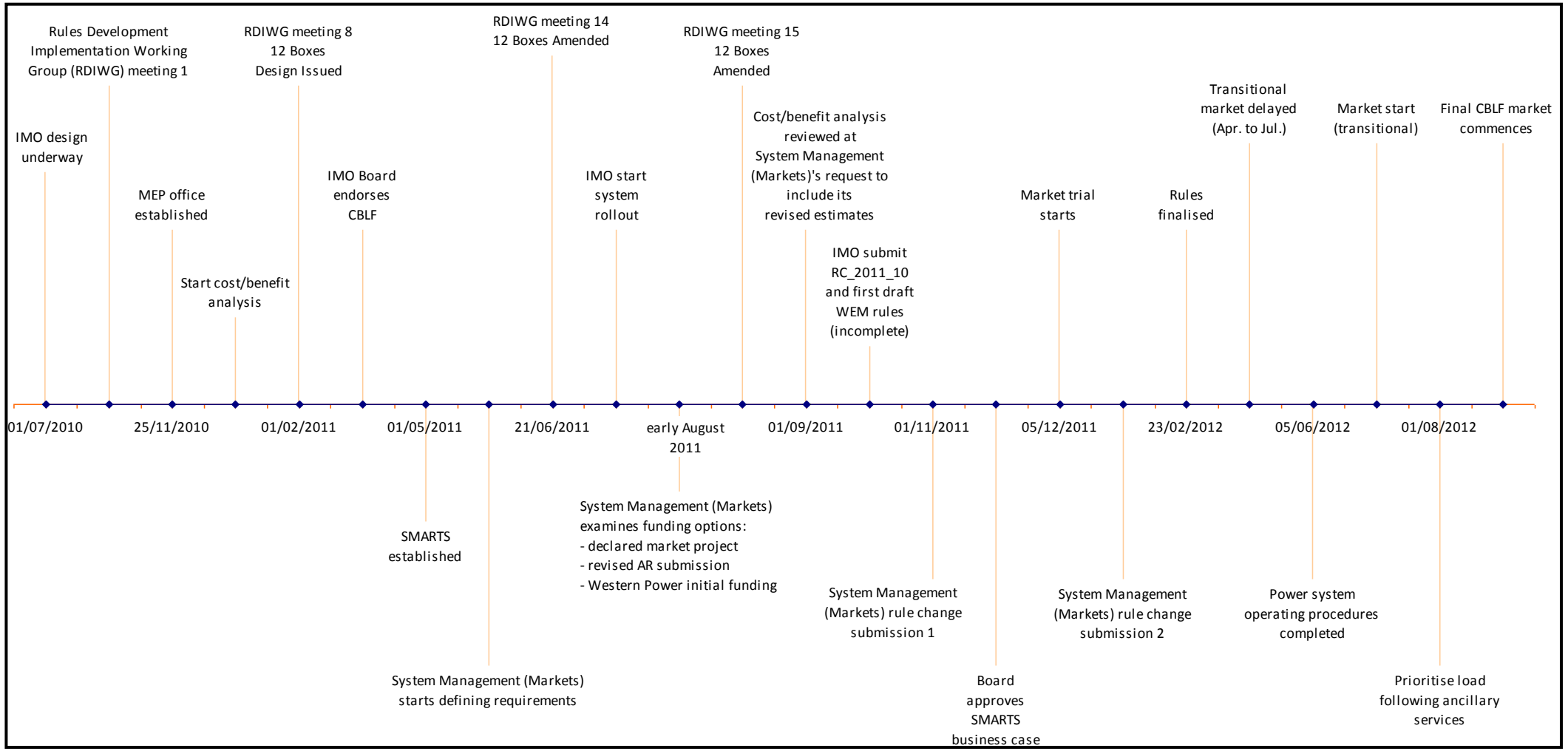
Source: System Management AR3 proposal

As part of the overall development and implementation of SMARTS the timeline set out in Figure 3 sets out key milestones and dates associated with the CBLF market and SMARTS itself.

We note that the market start was delayed as a result of the time taken to implement SMARTS, but in our view the initial timeframes were very optimistic. In separate submissions in November 2011 and January 2012 to the IMO on the proposed Market Rule changes to accommodate the CBLF, System Management indicated that the proposed April 2012 start incorporated a significant amount of risk and advocated a later start date.

Figure 3: Timeline Associated with the Planning and Delivery of SMARTS

(Source: System Management AR3 Submission)



A.1.4 ACTUAL EXPENDITURE

Actual expenditure to date and forecast expenditure including the balance of the 2012/13 financial years on SMARTS and related activities is summarised in the table below:

Table 15: Summary of SMARTS Capex and Opex during AR2 ($'000 real as at 30//6/2012)

	2010/11	2011/12	2012/13 (Forecast)	Total
SMARTS capex	-	6,932	6,420	13,352
MEP and SMARTS opex	419	1,142	912	2,473

Source: Adapted from System Management AR3 submission

We note that the costs to date are such that:

- capex is consistent with the options analysis figures in the business case including contingencies (ignoring any finance costs in the business case); and
- opex to date is less than forecast in the business case, impacted by the delayed start to the CBLF market.

A.1.5 CONCLUSION

In assessing the processes and overall expenditure surrounding the SMARTS project we make the following observations.

- In hindsight, the overall CBLF implementation should have been a declared market project under the Market Rules, but the initially established implementation timeframes appear to have precluded this.
- The original timeframes associated with the implementation of the CBLF were very optimistic, given that the number of system changes required by System Management.
- The governance processes surrounding SMARTS were not ideal. System Management has acknowledged this, but at the time was no doubt influenced by the overall timeframe elements that were initially established.
- The selection of the implemented SMARTS option appears to have been the correct one based on the options analysis provided by System Management and should provide a solid platform for incremental improvements. The business case provided was reasonable in terms of summary level information, but was not sufficient to indicate that all alternatives or part alternatives were properly considered.
- System Management appears to have managed its expenditure well within the business case estimates. However, we are unable to form an opinion as to the efficiency of the chosen solution, compared to potential alternatives, given the specialised nature of the work involved and the limited extent of our analysis.
- We note that the SMARTS business case proposed a post implementation review in February 2013 and we believe that this should proceed consistent with the IPGM framework and that the results of the review should be published.