



INDEPENDENT
MARKET
OPERATOR

Final Report: Maximum Reserve Capacity Price for the 2016/17 Capacity Year

January 2014



DISCLAIMER

The Independent Market Operator (IMO) has prepared this report under section 4.16 of the Wholesale Electricity Market Rules (Market Rules) to describe the process it followed in arriving at a proposed revised value for the Maximum Reserve Capacity Price.

Although all due care has been taken in preparing this report, the IMO makes no guarantee that it is completely accurate and accepts no liability for any errors.

COPYRIGHT NOTICE

The IMO is the owner of the copyright and all other intellectual property rights in this publication. All rights are reserved. This publication must not be re-sold without the IMO's prior written permission. All material is subject to copyright under the *Copyright Act 1968* (Cth) and permission to copy it, or any part of it, must be obtained in writing from the IMO.

EXECUTIVE SUMMARY

Each year, the Independent Market Operator (IMO) is required to determine the Maximum Reserve Capacity Price in accordance with the *Market Procedure: Maximum Reserve Capacity Price* (Market Procedure).¹

The Maximum Reserve Capacity Price (MRCP) sets the maximum bid price that can be made in a Reserve Capacity Auction and is also used as the basis to determine an administered Reserve Capacity Price if no auction is required.

The MRCP aims to establish the marginal cost of providing additional Reserve Capacity in each Capacity Year. The MRCP is established by undertaking a technical bottom-up cost evaluation of the entry of a 160 MW Open Cycle Gas Turbine (OCGT) generation facility entering the Wholesale Electricity Market (WEM) in the relevant Capacity Year.

This Final Report details the outcome of the determination of the MRCP for the 2014 Reserve Capacity Cycle. The value used for the 2014 Reserve Capacity Cycle will be effective from 1 October 2016 through to 1 October 2017 (the 2016/17 Capacity Year).

The methodology for determining the MRCP is specified in the Market Procedure and includes a technical costing of the following components:

- the capital cost of a 160 MW OCGT power station with inlet cooling, located within the South West interconnected system (SWIS);
- the land cost associated with developing and constructing the power station;
- the cost associated with connection of the power station to the transmission system;
- the cost associated with building liquid fuel storage and handling facilities for the power station to accommodate 24 hours of operation;
- the fixed Operational and Maintenance (O&M) costs associated with the power station and the transmission facilities listed above;
- a margin for legal, approval, financing and insurance costs and contingencies; and
- the Weighted Average Cost of Capital (WACC).

The broad methodology (valuing the cost of entry of a 160 MW OCGT power station) employed this year for determining the MRCP is identical to that used for the last two years.

MRCP outcome

The 2014 MRCP proposed by the IMO in this Final Report is \$176,800 per MW per year, approximately 12.6% higher than the MRCP of \$157,000 determined for the 2013 Reserve Capacity Cycle.

¹ The Market Procedure is available at <http://www.imowa.com.au/market-procedures>.

Changes since 2013 MRCP

Table A shows the impact of changes in the input parameters since the 2013 MRCP (for the 2015/16 Capacity Year).

Table A: Impact of changes in input parameters

	Impact (\$)	Impact (%)	MRCP (\$)
2014 MRCP			157,000
Escalation factors	+ 4,800	+ 3.1%	161,800
Power Station Cost	+ 2,900	+ 1.8%	164,700
Margin M	+ 1,100	+ 0.8%	165,900
Fixed Fuel Cost	+ 200	+ 0.1%	166,000
Land Cost	-	-	166,000
Transmission Cost	+ 2,900	+ 1.8%	168,900
WACC	+ 10,100	+ 6.4%	179,000
Fixed O&M	- 2,200	- 1.4%	176,800
Combined impact	+ 19,800	+ 12.6%	176,800

The most significant changes since the 2013 MRCP are explained below.

- The WACC has increased from 5.95% to 7.01%, contributing more than half of the total increase. This has been predominantly driven by an increase in the yields of Commonwealth Government bonds since last year.
- Sinclair Knight Merz (SKM) predicts higher cost escalation rates over the period of cost escalation. This is particularly the case for copper and steel, which suffered price falls in the year to 30 June 2013 but are forecast to recover in the coming years.
- The Power Station Cost is 5.9% higher than last year, driven primarily by the weakening of the Australian dollar versus the Euro.
- The Transmission Connection Cost has increased by 23.3% since last year as a result of movement of the projects within the five-year weighted average calculation and the use of the shallow connection cost estimate for the latest offer year.²

² The shallow connection cost estimate is used in the transmission connection cost calculation for a year in which no project data is available. Western Power has advised that this shallow connection cost estimate is higher than the capital contributions for facilities within the five-year window.

Changes since Draft Report

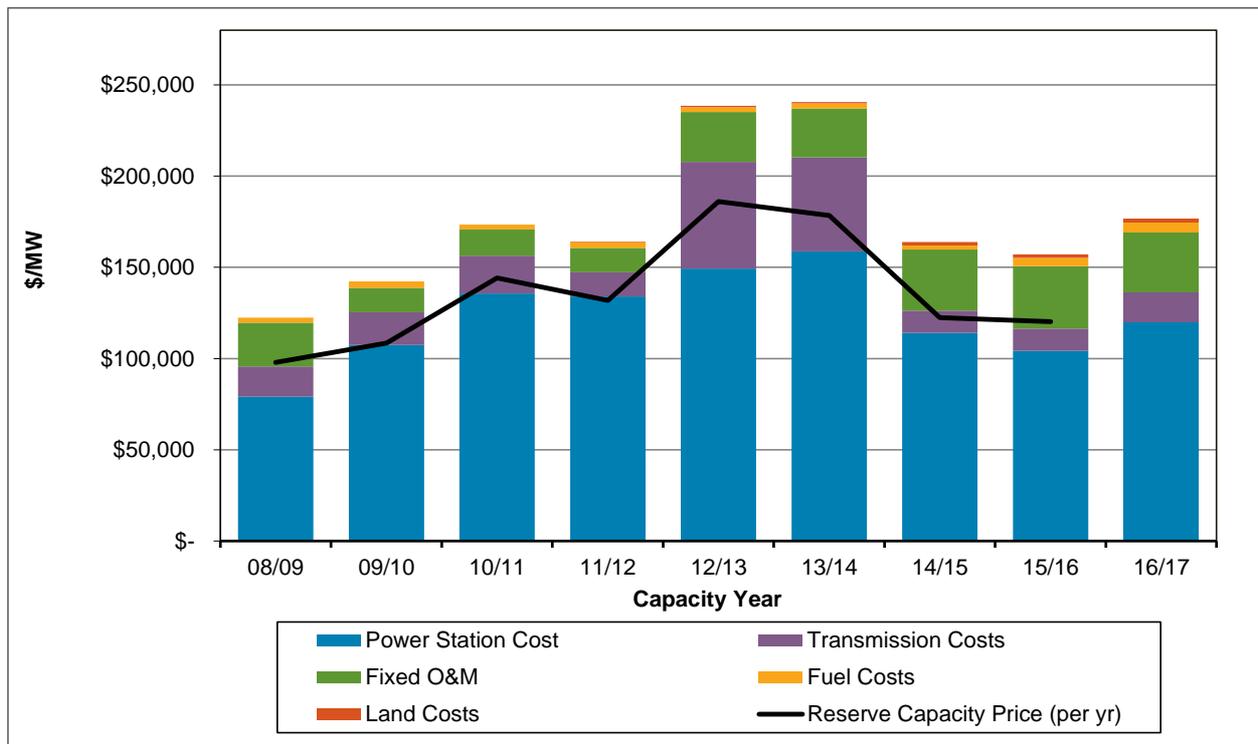
The proposed MRCP is 1.0% higher than the proposed value of \$175,100 in the Draft Report. The following components have changed since the Draft report:

- Diesel excise costs of 8.52 c/L have been included in both the Fixed Fuel Cost and the allowance for start-up costs in Margin M. This change was made in response to a submission by Merredin Energy.
- The commissioning test requirements have been reviewed in response to a submission by Merredin Energy, leading to an increase in the start-up allowance in Margin M.
- The volatile WACC parameters (risk free rate, inflation and debt risk premium) have been updated, leading to an increase in the WACC from 6.92% to 7.01%.

Historical variation of MRCP

Figure A indicates that the MRCP has been relatively stable aside from the 2010 and 2011 MRCPs (for the 2012/13 and 2013/14 Capacity Years), which are outliers. This graph shows the MRCPs for the Capacity Years from 2008/09 to 2016/17, including the contribution of the various component costs. Please note the individual cost components include the impact of the WACC.

Figure A: MRCPs for 2008/09 to 2016/17 Capacity Years



As shown in the graph, the higher MRCPs for the 2012/13 and 2013/14 Capacity Years were largely driven by higher estimates of Transmission Connection Costs, which are provided by Western Power. The IMO notes that the method used by Western Power changed for the 2012/13 Capacity Year following discussions between the IMO and Western Power. The IMO

considered that estimates provided by Western Power for previous years lacked detail and transparency. However, the IMO notes that the 2012/13 estimate provided by Western Power for the shared connection cost at the cheapest location was more than 350% higher than the indicative value provided for the 2011/12 Capacity Year.

As part of the five-yearly review of the MRCP, assisted by the Maximum Reserve Capacity Price Working Group and finalised in 2011, SKM reviewed the methodology employed by Western Power. In its analysis, SKM highlighted that the method used for the 2012/13 and 2013/14 Capacity Years required a broad range of assumptions that can lead to significant inaccuracies and year-to-year volatility.

An amended methodology for estimating the Transmission Connection Costs was implemented following this review³, based on a weighted average of actual contribution costs charged by Western Power. Western Power applied the new methodology for the first time for the 2014/15 Capacity Year. The Transmission Connection Costs estimated using this methodology have been significantly lower than the estimates provided by Western Power for 2012/13 and 2013/14, suggesting that the higher cost estimates provided for those years were not reflective of the capital contributions actually being charged to project developers that have either secured connection or been provided with an Access Offer.

Outside of the 2012/13 and 2013/14 Capacity Years, the Transmission Cost component of the MRCP has been relatively stable with estimates falling within 25% of the mean for the remaining years.⁴

The IMO notes that the current methodology for estimating the Transmission Costs uses several years of data in a weighted average calculation. This method is expected to result in lower volatility than occurred under the previous methodology employed by Western Power for 2012/13 and 2013/14.

The IMO also notes that the Power Station Cost increased by 101% from 2008/09 to 2013/14, driven by significant increases in commodity prices and WA labour costs. The introduction of inlet cooling into the design of the theoretical power station, following the five-yearly MRCP methodology review, moderated this increase and was the predominant reason for the reduction in the Power Station Cost from 2013/14 to 2014/15. This change was implemented as it reflects current market practice. All OCGT generation facilities constructed in the SWIS since the commencement of the WEM have incorporated inlet cooling.

ERA Review of MRCP Methodology

The ERA is required under clause 2.26.3 to review the methodology for setting the MRCP no later than the fifth anniversary of the first Reserve Capacity Cycle. It published a Consultation Paper on 24 June 2013 and has completed the public consultation process. The Final Report has yet to be published.

³ See Procedure Change PC_2011_06 (http://www.imowa.com.au/pc_2011_06).

⁴ This analysis excludes the effect of the WACC.

TABLE OF CONTENTS

1.	Introduction.....	8
2.	Escalation of Costs.....	11
3.	Input Parameters to the Maximum Reserve Capacity Price Calculation.....	13
4.	Maximum Reserve Capacity Price Calculation	25
5.	Stakeholder Input	27
6.	Conclusion.....	38

1. INTRODUCTION

The Maximum Reserve Capacity Price (MRCP) sets the maximum allowable bid that can be made in a Reserve Capacity Auction and is used as the basis to determine an administered Reserve Capacity Price if no auction is required.

Each year, the Independent Market Operator (IMO) is required to determine the MRCP in accordance with the *Market Procedure: Maximum Reserve Capacity Price* (Market Procedure).⁵ The proposed value for the MRCP is published in the form of a Draft Report, which is published on the IMO website (<http://www.imowa.com.au/mrcp>) for public consultation.

Following the public consultation process, the IMO must consider submissions and propose a final revised MRCP value and submit that value, along with a final report produced in accordance with clause 4.16.7 of the Wholesale Electricity Market Rules to the Economic Regulation Authority (ERA) for approval.

This Final Report presents the updated component costs as determined for the 2014 Reserve Capacity Cycle. The IMO uses publicly available information, together with advice from independent engineering and economics consultants and Western Power, to update the various input parameters that are used in calculating the MRCP.

This Final Report is produced in accordance with clause 4.16.7 of the Wholesale Electricity Market Rules (Market Rules).

1.1 Reserve Capacity Cycle timing

This Final Report has been prepared for the 2014 Reserve Capacity Cycle and the MRCP will be effective from 1 October 2016 through to 1 October 2017.

1.2 General costing methodology and structure of this Final Report

The yearly determination of the MRCP requires the IMO to develop estimates of the following constituent costs:

- the capital cost of a 160 MW Open Cycle Gas Turbine (OCGT) power station with inlet cooling, located within the South West interconnected system (SWIS);
- the land cost associated with developing and constructing the power station;
- the cost associated with connection of the power station to the transmission system;
- the cost associated with building liquid fuel storage and handling facilities for the power station;
- the fixed Operational and Maintenance (O&M) costs associated with the power station and the transmission facilities listed above;
- a margin for legal, approval, financing and insurance costs and contingencies; and

⁵ The Market Procedure is available at <http://www.imowa.com.au/market-procedures>.

- the Weighted Average Cost of Capital (WACC).

In determining the proposed MRCP, the IMO has sought advice from various consultants and agencies. Table 1 lists these organisations and the input parameters for which they have provided advice, which are identical to last year.

Table 1: Consultants and agencies

Organisation	Cost estimate(s) provided
Sinclair Knight Merz (SKM)	Power station capital cost Margin for indirect costs and contingencies Fixed Fuel Cost O&M costs
Landgate	Land cost
Western Power	Transmission connection cost
Pricewaterhouse Coopers (PwC)	Debt Risk Premium

1.3 Public Consultation

Following publication of the Draft Report on 29 October 2013, the IMO invited public submissions until the submission deadline of 27 November 2013. The IMO received three submissions from the following parties:

- Community Electricity;
- Alinta Energy; and
- Merredin Energy.

A summary of the submissions received and the IMO's response to each of the issues raised is included in Section 5 of this report. The full details of the submissions are available on the IMO website at <http://www.imowa.com.au/mrcp>.

1.4 MRCP outcome for the 2014 Reserve Capacity Cycle

In accordance with clause 4.16.7 of the Market Rules and having considered the submissions received, the IMO proposes a final revised value of the MRCP of \$176,800 per MW per year for the 2014 Reserve Capacity Cycle.

This is an increase of 12.6% from the 2013 MRCP of \$157,000 per MW per year.

A detailed analysis of the changes since the 2015/16 MRCP are discussed in this report.

1.5 ERA Review of MRCP Methodology

The ERA is required under clause 2.26.3 to review the methodology for setting the MRCP no later than the fifth anniversary of the first Reserve Capacity Cycle. It published a Consultation

Paper on 24 June 2013 and has completed the public consultation process. The Final Report has yet to be published.

1.6 Supporting Documents

The following related documents are available on the IMO website at <http://www.imowa.com.au/mrcp>:

- *Draft Report: Maximum Reserve Capacity Price Review for the 2016/17 Capacity Year*,
- MRCP Calculation Spreadsheet, Final Report version;
- WACC parameter calculation spreadsheet (risk free rate and inflation), Final Report version;
- SKM report, dated 18 December 2013, *Review of the Maximum Reserve Capacity Price 2014* (Final Report version);
- PwC letter, dated 5 December 2013, *Estimated debt risk premium using the ERA's bond yield methodology* (Final Report version);
- MRCP Calculation Spreadsheet, Draft Report version;
- SKM report, dated 25 October 2013, *Review of the Maximum Reserve Capacity Price 2014*;
- PwC letter, dated 8 October 2013, *Debt risk premium using the ERA's debt yield methodology* (Draft Report version);
- WACC parameter calculation spreadsheet (risk free rate and inflation), Draft Report version;
- Letter from Landgate, dated 11 September 2013, *Land Values for Reserve Capacity Price*; and
- Western Power report, dated 29 October 2013, *Total Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2015/16*.

2. ESCALATION OF COSTS

The Market Procedure describes a number of escalation factors that are applied to various costs within the MRCP. These escalation factors are used to estimate the changes in costs from the time at which price estimates are derived to the time at which, for the purpose of the MRCP, the capital is assumed to be outlaid.

The calculation for the 2014 MRCP is based on a theoretical power station that would commence operation on 1 October 2016. In line with the Market Procedure, capital costs are escalated to 1 April 2016 and O&M costs have been escalated to 1 October 2016. The various input costs have been provided to the IMO at different dates, which are provided in Chapter 3 of this report.

The IMO proposes to use the escalation factors summarised in Table 2.

Table 2: Escalation Factors

Escalation Factor	Financial Year				
	2013/14	2014/15	2015/16	2016/17	2017/18
CPI	2.75%	2.50%	2.25%	2.50%	
Power Station Capital Cost	5.92%	4.22%	4.03%	4.11%	3.82%
Connection Asset O&M Cost	4.32%				
Power Station O&M Cost	3.60%	3.60%	3.60%	3.60%	
Transmission Connection Cost	-1.74%				

Where possible, cost escalation factors are based on forecast price movements. Labour costs are projected based on long-run historical cost escalation, observed in labour price indices published by the Australian Bureau of Statistics.

The following escalation factors have been determined for use in the MRCP:

- The Consumer Price Index (CPI) escalation rates are determined from the forecasts of the Reserve Bank of Australia (RBA)⁶ as described in the Market Procedure. The mid-point of the RBA's target range of inflation is used beyond the period of the forecasts, resulting in a constant escalation rate from the 2016/17 financial year onwards.
- The power station capital cost escalation factors have been determined by SKM and are published in its report. SKM has calculated these escalation factors by weighting historical and forecast movements of specific input cost drivers such as steel, copper and labour costs. The weighting of each input cost driver relates to its contribution to the total capital cost of the power station.

⁶ Published in the Statement on Monetary Policy, November 2013. Please note that these values are updated since SKM's report, which is based on the August 2013 statement.

- Escalation factors for connection asset O&M costs have also been calculated by SKM. SKM has noted in previous years that fixed O&M costs for these assets are dominated by labour costs, so the labour cost escalation rates are used to escalate these O&M costs. The labour cost escalation factors are determined from the 10-year average movement in Labour Price Indices, so a single escalation rate has been applied in the MRCP calculation.
- Escalation factors for power station O&M costs have also been determined by SKM. These escalation factors are derived by weighting labour escalation rates and CPI.
- The transmission connection cost escalation factor is determined from the average annual change in Western Power cost estimates for a fixed transmission connection scope, as described in Section 2.4 of the Market Procedure. This has been provided in Western Power's report.

The escalation factors for the power station capital cost are higher than for the 2013 MRCP. SKM has noted that the costs for copper and steel fell in the year to 30 June 2013. The higher escalation factors reflect a recent recovery in prices for these commodities.

The remainder of the escalation factors are similar to last year.

The CPI escalation factors have changed since the Draft Report, following the release of RBA's November 2013 Statement on Monetary Policy.

Further detail on the development of these escalation factors can be found in the applicable supporting documents on the IMO website at <http://www.imowa.com.au/mrcp>.

3. INPUT PARAMETERS TO THE MAXIMUM RESERVE CAPACITY PRICE CALCULATION

3.1 Power Station Capital Costs (PC)

As with the 2013 MRCP determination, the IMO commissioned SKM to provide estimates of generation plant capital costs for a 160 MW OCGT power station located within the SWIS. This is the seventh year in which SKM has provided this estimate to the IMO. The scope provided to SKM was identical to last year.

SKM developed the capital cost estimate for a generic 160 MW OCGT power station (including procurement, installation and commissioning) using Thermoflow GT Pro[®]/PEACE[®] and benchmarked the costs of equipment and labour against actual projects.

SKM has altered its approach since last year for estimating the capital cost of the generic 160 MW OCGT power station. SKM notes that the nameplate capacity of the reference OCGT, the Siemens SGT5-2000E, has increased further above 160 MW since last year.⁷ Consequently, SKM considered it appropriate to scale the capital cost and expected Capacity Credit allocation to better represent a nominal 160 MW generator. SKM had previously also considered the Alstom GT13E2 turbine, but the nameplate capacity of this machine has recently increased to approximately 200 MW.

For the capital cost, SKM has identified the component costs that are likely to be scalable with generator size and those components that are likely to be fixed. It has adjusted only the scalable costs in estimating the capital cost for a nominal 160 MW generator.

For the expected Capacity Credit allocation, SKM has estimated this for a nominal 160 MW generator by scaling the expected performance of the Siemens turbine at conditions of 41°C and 30% relative humidity. This value is reported in Section 4.3.

For the purposes of the 2014 MRCP:

PC = A\$878,792.83 per MW

This price represents an increase of 5.9% from the corresponding value for the 2013 MRCP and is unchanged from the value in the Draft Report. The key drivers of this change have been:

- the weakening of the Australian dollar relative to the Euro in the year to 30 June 2013, which increases the costs of equipment that is manufactured in Europe; and
- higher civil works and building costs as the Siemens SGT5-2000E requires more physical space than the Alstom GT13E2, which was considered in last year's estimate.

These increases are slightly offset by the lower cost (on a \$/kW basis) of the Siemens SGT5-

⁷ SKM also notes that this is now the only OCGT model in active production with a nameplate capacity of close to 160 MW.

2000E compared with the Alstom GT13E2.

3.2 Legal, financing, insurance, approvals, other costs and contingencies (M)

The parameter M is defined as a margin to cover legal, financing, insurance, approvals, other costs and contingencies. SKM was commissioned to provide an estimate of these costs for 2014. This is the sixth year in which SKM has provided this parameter for the IMO.

The margin M is estimated from the costs associated with recent comparable developments, excluding any abnormal costs that may be particular to individual projects. Costs are scaled for a 160 MW power station where relevant. M is added as a fixed percentage of the capital cost of developing the power station.

The allowance for start-up costs has been increased since the Draft Report from 2% to 2.75% as a result of two issues raised by Merredin Energy in its submission:

- the cost of diesel fuel has been increased by 8.52 c/L to 92.18 c/L to include diesel excise costs; and
- the commissioning test duration has been increased to account for more stringent testing requirements.

For the purposes of the 2014 MRCP:

M = 20.10%

This value has risen from the corresponding value of 18.87% for the 2013 MRCP.

In addition to the increase of 0.75% since the Draft Report, the cost scaling approach introduced by SKM led to an increase of 0.48% since the 2013 MRCP. SKM has advised that many costs included under M, such as engineering design, project management and legal costs are fixed in nature. The cost scaling approach has led to a lower power station capital cost⁸, so these fixed costs represent a higher percentage of PC.

3.3 Transmission Connection Costs (TC)

For the 2014 MRCP, Western Power has calculated the transmission connection cost estimate as part of its obligations under the Market Procedure.

The Transmission Connection Cost estimate provided for this MRCP determination is based on actual connection costs and Access Offers that have been determined by Western Power. As the connection costs for individual projects are confidential to Western Power and the project developer, Western Power has provided an audit report verifying the connection cost data used in the calculation.

The Transmission Connection Cost calculation uses actual connection costs for projects within

⁸ \$116.3M, compared with \$121.7M for the 2013 MRCP.

a five-year window, and weights each connection cost according to the year that the facility commenced, or is expected to commence, operation. For any year for which no project data is available, Western Power estimates the shallow connection cost consistent with the Market Procedure. Western Power has advised that this shallow connection cost estimate is higher than the capital contributions for facilities within the current five-year window.

This methodology for estimating the Transmission Connection Cost was implemented following the five-yearly review of the MRCP, assisted by the Maximum Reserve Capacity Price Working Group (MRCPWG) and finalised in 2011, and was applied by Western Power for the first time for the 2012 MRCP. In analysis for the MRCPWG, SKM highlighted that the method employed by Western Power for the 2010 and 2011 MRCPs (for the 2012/13 and 2013/14 Capacity Years) required a broad range of assumptions that can lead to significant inaccuracies and year-to-year volatility.

The Transmission Connection Costs estimated using this methodology are significantly lower than the estimates provided by Western Power for the 2010 and 2011 MRCPs, suggesting that the higher cost estimates for those years were not reflective of the capital contributions actually being charged to project developers that have either secured connection or been provided with an Access Offer.

For the purposes of the 2014 MRCP:

TC = A\$141,910 per MW

This value is 23.3% higher than the corresponding value in 2013. This increase is due to the movement of projects within the five-year weighted average calculation and the use of the shallow connection cost estimate for the latest offer year.

The IMO notes that, outside of the 2010 and 2011 MRCPs, the Transmission Connection Cost component of the MRCP has been relatively stable with estimates falling within 25% of the mean for the remaining years.⁹

For further information regarding the costing provided by Western Power, please refer to the Western Power report¹⁰ published on the IMO website at <http://www.imowa.com.au/mrcp>).

3.3.1 Easement Costs

To assist Western Power in its determination of the transmission connection cost estimate, the IMO provides an estimate of easement costs for the direct connection scope described in step 2.4.2 of the Market Procedure.

The IMO has estimated the easement cost on the same basis as last year.

⁹ This analysis excludes the effect of the WACC.

¹⁰ See Western Power report *Total Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2016/17*.

- The easement is assumed to be 2km long and 60m wide (an area of 12 hectares).
- The IMO has assumed that a project developer may not be required to purchase the full portion of land and could instead secure easement rights for some or all of the land. As such, the IMO has estimated the easement costs to be 50% of the purchase value of the land, consistent with the 2013 MRCP.
- The purchase price per hectare has been estimated by dividing the average cost of the land parcels (as valued by Landgate and including transfer duty) by three hectares. Note that this cost estimate is as at 30 June 2013.

To meet the requirements for the transmission connection cost estimate (Section 2.4 of the Market Procedure), the IMO has escalated the resulting value forward to 30 June 2014 using the CPI escalation factor for the 2013/14 financial year. Further escalation of this cost to 1 April 2016 occurs within the transmission connection cost estimate methodology where required.

For the purposes of the 2014 MRCP:

Easement Cost = A\$5.233 M

The IMO has estimated that this easement cost as at 30 June 2014 is up 1.7% from the 2013 value of A\$5.147M, predominantly due to increases in the cost of land at Pinjar and Kwinana.

This value is unchanged since the Draft Report.

3.4 Fixed Fuel Costs (FFC)

Fixed Fuel Costs for the determination of the 2014 MRCP have been estimated by SKM. This is the second year in which SKM has provided this estimate to the IMO. The scope provided to SKM was identical to last year.

SKM has provided its cost estimate as at 30 June 2013, which has been escalated to 1 April 2016, using the CPI escalation rates from Table 2. SKM has estimated the Fixed Fuel Costs based on the same scope as the previous estimates provided by GHD. SKM has developed its estimate with the benefit of recent project experience in Western Australia.

In its submission, Merredin Energy pointed out that the net excise charges paid by generators should be included in the fuel cost component of the MRCP. SKM reviewed the recent changes to the excise regime and has included an allowance for excise of 8.52 c/L for this Final Report.

For the purposes of the 2014 MRCP:

FFC = A\$ 7.206 M

This price represents an increase of 1.9% from the corresponding value for the 2013 MRCP, and 1.2% higher than the value in the Draft Report.

3.5 Land Costs (LC)

The IMO commissioned Landgate to update the land cost estimates to be used in the MRCP determination. This is the sixth year in which Landgate has provided these estimates to the IMO.

These estimated land valuations are based on guidelines outlined in the Market Procedure. Valuations were conducted for seven locations in regions where development of a power station within the SWIS would be reasonably likely. The regions included were:

- Collie Region;
- Kemerton Industrial Park Region;
- Pinjar Region;
- Kwinana Region;
- North Country Region (both Geraldton and Eneabba); and
- Kalgoorlie Region.

Land sizes and costs were determined in accordance with the Market Procedure. Three hectare sites were used for all locations except Kemerton, for which the smallest available lot is five hectares. This approach is identical to that used in the 2013 MRCP.

Landgate has provided its estimate of the cost of each land parcel as at 30 June 2013, excluding transfer duty (previously known as stamp duty). The IMO has added the applicable transfer duty to each land parcel cost, determined by the online calculator provided by the Office of State Revenue.¹¹ In accordance with the Market Procedure, the IMO has calculated the mean of the seven valuations. This average Land Cost has been escalated to 1 April 2016, using the CPI escalation rates from Table 2.

For the purposes of the 2014 MRCP:

LC = A\$2.733 M

This price represents an increase of 1.4% from the corresponding value for the 2013 MRCP. This increase in a relatively small component of the MRCP is predominantly due to an increase in the estimated land costs at Pinjar and Kwinana.

This price is 0.1% higher than the value in the Draft Report due to the updated forecasts of CPI growth.

¹¹

https://rol.osr.wa.gov.au/Calculators/faces/Calculators?_afLoop=482854060468439&_afWindowMode=0&_adf.ctrl-state=1bjwmsfw6_4

3.6 Weighted Average Cost of Capital (WACC)

For the 2014 MRCP determination the IMO commissioned PwC to calculate the Debt Risk Premium (DRP) and has calculated the remaining WACC components itself from publicly available information.

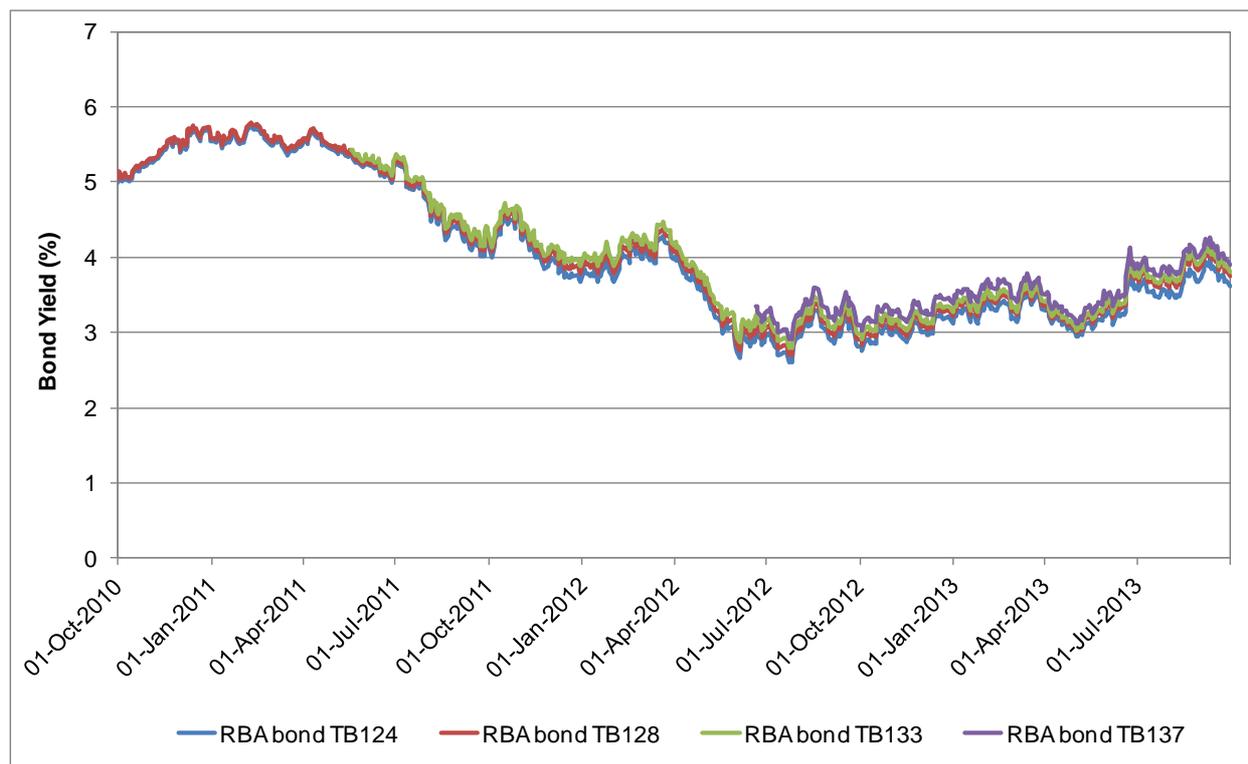
The calculations of the risk free rate and inflation are provided in a spreadsheet that is published on the IMO website at <http://www.imowa.com.au/mrcp>. The corporate tax rate is determined to be 30%, consistent with last year.

The WACC is determined according to the Capital Asset Pricing Model (CAPM), with bond yields considered in both the costs of equity and debt. The nominal risk free rate is determined from observed yields of Commonwealth Government bonds, while the DRP is derived from observed yields of corporate bonds.

The IMO notes that the WACC used for the determination of the MRCP has been volatile in recent years. This volatility has reflected turbulence in global financial markets, largely as a result of concerns over sovereign debt levels in Europe and the slow rate of economic recovery in the United States. Financial market volatility led investors to prefer lower risk investments such as government and high quality corporate bonds, including RBA bonds.

However, RBA bond prices have eased, and yields have increased, since the 2013 MRCP. This is illustrated in Figure 1, which shows indicative daily yields of Commonwealth Government securities with maturity dates approximately 10 years from now.

Figure 1: Reserve Bank of Australia bond yields, Nov 2010 to Sep 2013¹²



This observation is consistent with other economic indicators during the last 12 months. The ASX 200 index has risen by approximately 10% since the end of 2012, the AUD-USD exchange rate has eased below parity, while GDP and CPI growth have been stable.

A detailed calculation of the WACC is provided in Appendix A.

For the purposes of the 2014 MRCP:

WACC = 7.01%

This is significantly higher than the WACC of 5.95% determined for the 2013 MRCP. This increase is predominantly driven by an increase in the nominal risk free rate, which has increased from 3.13% to 4.23%. This parameter has been calculated from RBA bond yields using the same method as last year. A lower value for inflation, down from 2.57% to 2.50%, has also contributed to the higher WACC.

These increases have been partially offset by a reduction in the DRP, which has reduced from 2.71% to 2.03%. For 2014 the DRP has been calculated using the ERA's 'bond-yield approach', consistent with the 2013 MRCP. The selection of DRP methodology is explained in Section 3.6.1.

The WACC has increased slightly from the value of 6.92% determined in the Draft Report due to

¹² Bond yield data sourced from RBA Statistical Table F16, available from <http://www.rba.gov.au/statistics/tables/>.

an increased risk free rate.

3.6.1 Debt Risk Premium (DRP)

The Market Procedure requires that “*The IMO must determine the methodology to estimate the DRP, which in the opinion of the IMO is consistent with current Australian accepted regulatory practice.*”

The IMO notes that Australian regulatory practice in relation to the DRP diverged in the years since the Global Financial Crisis, as the availability of bond market data declined. Australian regulators have yet to converge on a common methodology.

For the 2015/16 MRCP, the DRP was determined using the ERA’s bond-yield approach for the first time.¹³ The ERA had applied this methodology in its *Final decision on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distribution System*. The methodology was appealed to the Australian Competition Tribunal (ACT) and was upheld in June 2012, leading the IMO to consider that the methodology represented current accepted regulatory practice in Australia. The IMO applied this methodology using only bonds with a credit rating of BBB.

The ERA has applied the bond-yield approach in its subsequent decisions, including the *Determination on the 2013 Weighted Average Cost of Capital for the Freight and Urban Railway Networks* (dated 9 July 2013)¹⁴ and the *Inquiry into the Efficient Costs and Tariffs of the Water Corporation, Aqwest and the Busselton Water Board* (Revised Final Report dated 28 March 2013).¹⁵

The ERA published its *Rate of Return Guidelines (Meeting the Requirements of the National Gas Rules)*¹⁶ on 16 December 2013, in which it proposed to continue the use of the bond yield approach.

The IMO notes that the Australian Energy Regulator (AER) has also published its *Better Regulation: Rate of Return Guideline*¹⁷ on 17 December 2013. The AER proposes to continue utilising a third party data service provider (such as Bloomberg) as the source of benchmark cost of debt estimates. In recent decisions (prior to the release of the *Rate of Return Guideline*), the AER has continued to use the 7-year Bloomberg BBB fair value curve, extrapolated to a 10 year term.

¹³ For previous MRCP’s, the DRP was calculated using Bloomberg fair value curves.

¹⁴ See <http://www.erawa.com.au/cproot/11491/2/Rail%20WACC%20-%202013%20-%20update%20for%20BR,%20PTA%20and%20TPI%20-%20ERA%20Notice.docx.pdf> for further information.

¹⁵ See <http://www.erawa.com.au/cproot/11248/2/20130328%20D104647%20-%20Inquiry%20into%20the%20efficient%20costs%20and%20tariffs%20of%20the%20water%20corp%20aqwest%20and%20cusselton%20water%20-%20revised%20final%20report.pdf> for further information.

¹⁶ Available at <http://www.erawa.com.au/access/gas-access/guidelines-for-the-rate-of-return-for-gas-transmission-and-distribution-networks>.

¹⁷ Available at <http://www.aer.gov.au/node/18859>.

For the 2014 MRCP, the IMO considers it appropriate to calculate the DRP using the bond-yield approach, consistent with the 2013 MRCP. As noted above, the bond-yield approach has been applied in numerous decisions by the ERA since 2011 and was upheld by the ACT. Further, the ERA has proposed to continue the use of the bond-yield approach. Consequently, the IMO considers that this methodology represents current accepted Australian regulatory practice.

The IMO will continue to monitor regulatory practice in relation to the DRP for future MRCP determinations.

3.7 Capital Costs (CAPCOST)

The term CAPCOST refers to the total capital cost expressed in millions of Australian Dollars for the 160 MW OCGT power station. This is calculated by using the following formula:

$$\text{CAPCOST} = ((\text{PC} \times (1+\text{M}) + \text{TC}) \times \text{CC} + \text{FFC} + \text{LC}) \times (1+\text{WACC})^{1/2}$$

For the purposes of the 2014 MRCP:

CAPCOST = A\$196.691 M

3.8 Fixed Operation & Maintenance Costs (ANNUALISED_FIXED_O&M)

3.8.1 Generation

For the 2014 determination, SKM has determined the fixed O&M costs for the generator assets using the same methodology as last year. This is the eighth MRCP for which SKM has provided the estimate of these costs.

An annuity is calculated taking the first 15 years of O&M costs provided by SKM. The SKM report¹⁸ details the total fixed O&M costs of the OCGT to year 15 as A\$31.347 M in June 2013 terms. This cost is annualised and then escalated forward by 3¼ years, to 1 October 2016 (the point at which these costs are assumed to commence), using the power station O&M escalation factors.

For the purposes of the 2014 MRCP:

Generation Fixed O&M Costs = A\$15,579.62 per MW per year

This cost, unchanged since the Draft Report, represents an increase of 5.6% from the corresponding value for the 2013 MRCP. This increase is driven by the scaling approach introduced by SKM, which has led to a lower expected Capacity Credit allocation for the nominal 160 MW facility.

3.8.2 Switchyard and Transmission

For the 2014 determination, SKM provided the fixed O&M costs of the switchyard and

¹⁸ See Table 3-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2014*.

transmission line assets using the same methodology as last year. This is the eighth MRCP for which SKM has provided the estimate of these costs.

An annuity is calculated taking the first 15 years of O&M costs provided by SKM. The SKM report¹⁹ details the total fixed O&M costs for the switchyard and transmission line assets as at 30 June 2013. This cost is annualised and then escalated forward by 3¼ years, to 1 October 2016 (the point at which these costs are assumed to commence), using the connection asset O&M escalation factor.

For the purposes of the 2014 MRCP:

Transmission Fixed O&M Costs = A\$470.32 per MW per year

This cost, unchanged since the Draft Report, represents an increase of 10.6% from the corresponding value for the 2013 MRCP. This increase is driven by escalation of O&M costs of approximately 4.3% and the scaling approach introduced by SKM (discussed in Section 3.1 of this report), which has led to a lower expected Capacity Credit allocation for the nominal 160 MW facility.

3.8.3 Network access charges

Western Power's Price List provides the various charges for network access and related services that apply for generation facilities. It is assumed that the power station is connected to the transmission system, so reference Tariff TRT2 is used for the purpose of the MRCP.

The IMO has determined the network access charges based on the 2013/14 Price List approved by the ERA.²⁰

As the use of system charge varies by location, the IMO has considered the list of locations nominated in step 2.7.1 of the Market Procedure and has used the unit price for the most expensive of these locations. In the 2013/14 Price List, Bluewaters has the highest price among power stations located in the regions listed in the Market Procedure.

For the purpose of the MRCP, the costs are assumed as at 1 July 2013 and have been escalated forward to 1 October 2016. The CPI escalation factor has been used as required by step 2.5.6(c) of the Market Procedure.

For the purposes of the 2014 MRCP:

Fixed Network Access Costs = A\$11,383.40 per MW per year

This cost represents a decrease of 16.8% from the corresponding value for the 2013 MRCP due to the reduction of approximately 18% in Western Power's use of system charges since last

¹⁹ See Tables 4-1 and 4-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2014*.

²⁰ http://www.erawa.com.au/cproot_download/11473/2/20130626%20D108124%20-%20Western%20Power%20-%202013-14%20Price%20List%20-submitted%2014%20June%202013.PDF

year. However, it has increased by 0.1% since the Draft Report due to the updated forecasts for CPI growth.

3.8.4 Insurance costs

The Market Procedure requires that the Fixed O&M component of the MRCP includes annual insurance costs in respect of power station asset replacement, business interruption and public and products liability insurance as required under network access arrangements with Western Power. This is the third year that these costs have been included in the MRCP.

The IMO's preference would be to procure a publishable report from a reputable company that can provide insurance cost estimates, however this has proven to be challenging. The IMO notes that insurance companies and brokers, who derive no benefit from providing information to the IMO, prefer to remain anonymous as they do not wish to harm their competitive position. Engineering companies, such as SKM, are not willing to provide insurance cost estimates and there is no central insurance industry body.

This year, the IMO has sought updated advice from two insurance brokers which provided advice last year. However, the IMO did not receive a response in relation to its enquiries. Consequently, the estimates in this Draft Report are based on the estimates from the 2013 MRCP, which were based on advice received from two insurance brokers.

The insurance premiums have been estimated as follows:

- Asset replacement and business interruption insurance is estimated as A\$713,446 per year as at 1 April 2016, calculated as 0.29% of the limit of liability at that date. The limit of liability has been determined as the sum of the capital construction cost, value of fuel and the potential refund liability during the period of re-construction.

For the purpose of asset replacement insurance, the capital construction cost and value of fuel are calculated as:

$$PC \times (1 + M) \times CAP + FFC$$

where

PC is the Power Station Capital Cost (see Section 3.1 of this report);

M is margin M (see Section 3.1 of this report);

CAP is the expected Capacity Credit allocation (see Section 4.3 of this report); and

FFC is the Fixed Fuel Cost (see Section 3.4 of this report).

For business interruption insurance, the IMO has included the potential refund liability for the facility for two years. While a construction period of one year is assumed in the application of the WACC in the MRCP calculation, a period of time would be required prior to the commencement of any reconstruction works following a loss event (for example, for procurement of services, building approvals and any demolition or clearing works). The weighting of capacity refunds to peak demand periods means that a Market Participant may be required to refund two years' worth of capacity payments in a

period of less than 15 months.

- Public and products liability insurance is estimated as A\$120,000 per year as at 30 June 2013, based on a limit of \$50 M for any one occurrence.
- A cost of \$20,000 per year as at 30 June 2013 has been included to cover the cost of an annual insurance site survey.

Based on the information considered by the IMO, the premium rates are consistent with the following assumptions:

- a newly constructed generation facility with on-site diesel storage;
- location in a rural region of the SWIS, outside of any cyclone risk;
- inclusion of coverage for machinery breakdown; and
- deductibles of \$500,000 for property damage, \$100,000 for liability and 60 days for business interruption insurance.

The premiums above have been estimated to include the 2% terrorism levy and 10% stamp duty.

The insurance costs have been escalated forward to 1 October 2016 (the point at which these costs are assumed to commence), using the CPI escalation factor.

For the purposes of the 2014 MRCP:

Insurance Costs = A\$5,804.67 per MW per year

This cost is 7.8% higher than the corresponding value in 2013. This increase is driven by:

- the higher MRCP, which increases the limit of liability in respect of business interruption insurance; and
- the scaling approach introduced by SKM, which has led to a lower expected Capacity Credit allocation for the nominal 160 MW facility.

In addition, the cost is 0.6% higher than the value in the Draft Report, driven by increases in Margin M and the Fixed Fuel Cost.

3.8.5 Total Fixed Operation & Maintenance Costs

For the purposes of the 2014 MRCP:

ANNUALISED_FIXED_O&M = A\$33,238.01 per MW per year

Total fixed operation and maintenance costs have decreased by 2.9% compared to last year, but are 0.1% higher than in the Draft Report.

4. MAXIMUM RESERVE CAPACITY PRICE CALCULATION

4.1 Annualised Capital Costs (ANNUALISED_CAPCOST)

The annualised capital cost is determined using:

- the capital cost of A\$196.691 M, as determined in Section 3.7;
- the WACC of 7.01%, as determined in Section 3.6; and
- a term of 15 years, as required by the Market Procedure.

For the purposes of the 2014 MRCP:

ANNUALISED_CAPCOST = A\$21.608 M per year

4.2 Annualised Fixed Operation & Maintenance Costs (ANNUALISED_FIXED_O&M)

The total annualised fixed O&M costs are outlined in Section 3.8.5. For the purposes of the 2014 MRCP:

ANNUALISED_CAPCOST = A\$33,238 per MW per year

4.3 Expected Capacity Credit Allocation (CC)

SKM has provided its estimate of the output of the reference facility at 41°C, which represents the expected Capacity Credit allocation for the facility. As noted in section 3.1, SKM has this year scaled the expected performance of the reference Siemens OCGT to represent a nominal 160 MW generator.

For the purposes of the 2014 MRCP:

CC = 150.5 MW

4.4 Calculation

The MRCP is calculated using the following equation as required by the Market Procedure:

$$\text{MRCP} = (\text{ANNUALISED_FIXED_O\&M} + \text{ANNUALISED_CAP_COST} / \text{CC})$$

Using the values determined by the IMO and presented in previous sections, the MRCP for the 2014 Reserve Capacity Cycle is determined to be A\$176,812.70, which is rounded to:

MRCP = A\$176,800 per MW per year

An MRCP of A\$176,800 per MW per year is proposed by the IMO. This represents a 12.6% increase from the 2013 MRCP of \$157,000.

The impact of changes in the input parameters since the 2013 MRCP (for the 2015/16 Capacity Year) is shown in Table 3 below.

Table 3: Impact of year-on-year changes in input parameters

	Impact (\$)	Impact (%)	MRCP (\$)
2013 MRCP			157,000
Escalation factors	+ 4,800	+ 3.1%	161,800
Power Station costs	+ 2,900	+ 1.8%	164,700
Margin M	+ 1,100	+ 0.8%	165,900
Fixed Fuel Cost	+ 200	+ 0.1%	166,000
Land Cost	-	-	166,000
Transmission Cost	+ 2,900	+ 1.8%	168,900
WACC	+ 10,100	+ 6.4%	179,000
Fixed O&M	- 2,200	- 1.4%	176,800
Combined impact	+ 19,800	+ 12.6%	176,800

The 2014 MRCP computation has been included in Appendix B and a comparison between the 2013 and 2014 MRCPs can be found in Appendix C.

Appendix D shows the variation in the MRCP and its constituent costs since the 2008/09 Capacity Year.

5. STAKEHOLDER INPUT

5.1 Public Submissions

The IMO published the Draft Report and supporting documents for the 2013 MRCP on its website and initiated a consultation process on 29 October 2013. The IMO directly advised Rule Participants and other industry stakeholders on the following day and published announcements in the West Australian and the Australian Financial Review on 30 October 2013 and 1 November 2013 respectively. The submission deadline was 27 November 2013.

During the public consultation period the IMO received responses from:

- Community Electricity;
- Merredin Energy; and
- Alinta Energy.

A copy of each submission can be found at <http://www.imowa.com.au/mrcp>. A summary of issues raised in submissions and IMO responses is given in the following pages.

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
1	Community Electricity	General	Community supports the draft report and the proposed draft 2014 MRCP of \$175,100 per MW per year. We consider that the draft report complies with the requirements of the Market Procedure - Maximum Reserve Capacity Price.	The IMO notes Community Electricity's support.
2	Community Electricity	WACC – Debt Risk Premium	We expressly support use of the ERA's Bond Yield approach to estimating the Debt Risk Premium on the grounds that this approach is advocated by the ERA as best regulatory practice and it is the ERA that is to approve the draft report.	The IMO notes Community Electricity's support.
3	Community Electricity	Power Station Capital Cost	We note that in Section 3.1 the reference OCGTs have been changed by their respective manufacturers to the point that they no longer represent the standard 160MW unit. We suggest that the choice of the standard size needs to be reconciled with actually available machines.	<p>The IMO considers that the scaling approach applied by SKM represents the best application of the current Market Procedure, which requires that the MRCP be representative of an industry standard liquid-fuelled OCGT power station, but also have a nominal nameplate capacity of 160 MW.</p> <p>However, the IMO agrees that the MRCP methodology should be based on actual plant available in the market. The IMO considers that this element of the Market Procedure should be reviewed during the next five-yearly review of the MRCP methodology under clause 4.16.9 of the Market Rules, which is expected to commence in 2015. The IMO has included this issue in the issues register that it is maintaining in preparation for that review.</p>
4	Community Electricity	Fixed O&M – Insurance	We note that in Section 3.8.4 an insurance cost of \$120,000 per year is assumed based on a limit of \$50 million in accordance with Western Power's network access arrangements. While we support the IMO's approach, we consider that Western Power's requirement for \$50 million cover is arbitrary and should be made fit-for-purpose. In particular, we perceive this figure to arise from Schedule 5 of	<p>The IMO notes that the \$50M is the minimum amount that applies under the Electricity Transfer Access Contract (ETAC). The appropriateness of the requirement in the standard ETAC is outside the scope of this process.</p> <p>The IMO also notes that this issue was raised by</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			<p>the Electricity Transfer Access Contract, which requires insurance in the amount of the higher of \$50 million and the figure that applies under clause 19.5. Clause 19.5 provides for different liabilities applying to different facilities, whereby a power station of any size connected to the transmission system is liable for damages up to \$11 million aggregate for wind and solar, and \$22 million aggregate otherwise – be it a 35MW gas turbine or the largest base-load station on the SWIS (330MW). Equally, on the face of it, a 1kW behind-the-meter PV installation is liable for \$1.2 million aggregate. On the face of it, it would seem that the \$50 million requirement could readily be halved, and perhaps even further reduced. Noting that the apparent excess of \$53,000 per year unnecessarily increases the capacity price and that the increase applies to all certified capacity, we estimate that Market Costs are unnecessarily increased by around \$2 million per year.</p>	<p>Dr Steve Gould at the 11 December 2013 meeting of the Market Advisory Committee (MAC) and that Western Power has agreed to look into the standard requirement. The IMO anticipates that Western Power will report back to the MAC in early 2014.</p>
5	Alinta	WACC	<p>In its submissions on the MRCP for the 2014/15 and 2015/16 Capacity Years, Alinta raised a number of concerns with the year-on-year variations being indicative of a “significant economic event” having occurred since PwC provided advice on the WACC methodology to the MRCPWG in February 2011.</p> <p>Alinta considers that evidence during 2013 continues to support this observation. Economic conditions continue to differ significantly from those which were prevalent in early 2011. While no specific event has occurred that could be described as a “significant economic event”, a significant change in the underlying economic conditions is clearly</p>	<p>The IMO notes Alinta's submission, including the supporting arguments.</p> <p>In response to Alinta's submission for the 2013 MRCP, the IMO concluded that no significant economic event had occurred since the completion of the last 5-yearly review in October 2011.²¹</p> <p>Since that time, there has been little change in key economic indicators (such as GDP, CPI and the unemployment rate), the AUD-USD exchange rate has eased and the ASX200 index has risen by approximately 10% since the end of 2012. Consequently, the IMO does not consider that there</p>

²¹ See Page 39 of *Final Report: Maximum Reserve Capacity Price for the 2015/16 Capacity Year*, available at ([http://imowa.com.au/docs/default-source/mrcp-page/2012-maximum-reserve-capacity-price-\(for-2014-15\)/final-report/2013_mrcp_final_report.pdf?sfvrsn=6](http://imowa.com.au/docs/default-source/mrcp-page/2012-maximum-reserve-capacity-price-(for-2014-15)/final-report/2013_mrcp_final_report.pdf?sfvrsn=6)).

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			demonstrable. It is on this basis that Alinta continues to consider a "significant economic event" has occurred thereby enabling the IMO to exercise its ability to amend the five yearly WACC parameters.	is compelling evidence to suggest that there has been a significant economic event since the last review was completed in 2011.
6	Alinta	WACC – Cost of Equity	<p>The implied nominal return on equity, as determined in accordance with the Market Procedure, remains well below its pre-global financial crisis level. Note that as the MRP and equity beta values are prescribed in the Market Procedure the predominant cause of the reduction has been from changes in the rates for ten year commonwealth government bonds since 2011.</p> <p>Despite the increase in the rates for commonwealth government bonds during the past 12 months which has resulted in an increase in the nominal return on equity, a rational investor would not develop generation assets in the WEM for a return on equity of less than 12%. Consequently Alinta continues to question the appropriateness of the values used in determining the return on equity.</p>	<p>The IMO notes that it remains accepted Australian regulatory practice for the risk free rate to be calculated from the observed yields of Commonwealth Government bonds. Further, both the AER and ERA have indicated in their respective rate of return guidelines that they intend to continue determining the risk free rate in this way. The methodology is prescribed in the Market Procedure.</p> <p>Specifically, the AER considered this issue in its Final Distribution Determination, Aurora Energy Pty Ltd, 2012-13 to 2016-17 (April 2012) expressing their view that at <i>"times of uncertainty, investors are prepared to accept a lower yield on relatively safe assets"</i>. The AER went on to state that <i>"an alternative explanation might be that CGS are currently 'over priced', in the sense that the price of CGS exceeds its fair value, and therefore the yield is 'artificially low', For the AER to make such a conclusion, the AER would, effectively, be saying that it has better information than the market or that it 'knows better' than the many traders in the market whose interactions set the price of CGS. The AER considers there is not a reasonable basis to draw such a conclusion on the evidence before it"</i>. The IMO continues to support this view.</p>
7	Alinta	WACC	More broadly Alinta notes its concern that the WACC used in determining the MRCP is commensurate with funding state network infrastructure development and does not adequately reflect the risks encountered by private investors building	<p>The IMO disagrees with Alinta's submission.</p> <p>The WACC within the MRCP is calculated using the Sharpe Lintner Capital Asset Pricing Model, which</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			generation assets in the WEM. This is a significant oversight which has been raised previously by other Market Participants and needs to be rectified in order to ensure that the capacity mechanism provides the right incentives for private sector investment in generation.	<p>is commonly used by Australian regulators.</p> <p>This model allows for consideration of different risk profiles through consideration of the credit rating of the benchmark entity.</p> <p>For example, the ERA assumed a credit rating of A- when determining the WACC for Western Power's 2013-2017 Access Arrangement (AA3). The ERA also determined the risk free rate from the 5-year Commonwealth Government Securities Yield (linked to the duration of the access arrangement period).</p> <p>By contrast, the MRCP is based on a credit rating of BBB, which results in higher estimates for beta and the DRP. In addition, the risk free rate is calculated for a 10-year term (linked to the maximum duration of a Long Term Special Price Arrangement), which results in a higher risk free rate.</p>
8	Alinta	WACC – Beta	Given the current uncertainty in the operating environment for electricity generation assets in Australia and specifically Western Australia, Alinta considers that the current value for the equity beta is inappropriate and resulting in a “non-real world” WACC outcome. Even at the assumed gearing levels, an equity beta of less than one does not adequately reflect the volatility in expected returns and therefore the relative riskiness faced by a standalone generator in Western Australia. An equity beta of less than one may be appropriate for an existing state owned base load generator however the risk profile is significantly greater for a privately funded new entrant electricity generator. As the MRCP based on the	<p>The beta used in the MRCP is stipulated in the Market Procedure. In addition, Step 2.9.1 of the Market Procedure stipulates that the power station “<i>is assumed to receive Capacity Credits through the Reserve Capacity Auction and be eligible to receive a Long Term Special Price Arrangement</i>”.</p> <p>In its review of the WACC for the MRCPWG²², PwC noted that</p> <p><i>“firms receiving 10 years of contracted revenue under the Reserve Capacity Mechanism will have cash-flow characteristics closer to</i></p>

²² Available at <http://imowa.com.au/reserve-capacity/maximum-reserve-capacity-price/maximum-reserve-capacity-price-working-group>.

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			<p>development of a new 160MW Open Cycle Gas Turbine, Alinta considers it is appropriate to assume the higher risk profile would apply.</p> <p>While the overall impact on the nominal return on equity is as a result of a combination of parameters, including the risk free rate of return and MRP (both discussed in this submission), Alinta considers that the IMO should re-examine the equity beta given that it does not adequately reflect the riskiness of investment in a generator in the WEM.</p>	<p><i>baseload than intermediate/peaking generators”</i></p> <p>and</p> <p><i>“PwC considers that the systematic risk characteristics of a business whose capacity is procured by the IMO will be closer to that of a baseload generator than an intermittent/peaking generator.”</i></p>
9	Alinta	WACC – Beta	<p>Given the evidence that has emerged since the finalisation of PwC's advice in February 2011, Alinta maintains its view presented during previous MRCP consultations that a significant economic event has occurred. This provides the basis for the IMO to exercise its discretion to determine an alternative value for the equity beta in the Market Procedure. Subsequently, Alinta requests that the IMO initiate another review of the Market Procedure to consider the value for this parameter.</p>	<p>See responses 5 and 8 above.</p> <p>Please note that the next 5-yearly review of the MRCP methodology is scheduled to commence in 2015 and will be completed in 2016.</p>
10	Alinta	WACC - Risk Free Rate	<p>Despite the recent increases in the government bond yields Alinta remains concerned that the application of the risk free rate based on the continued low yield on ten year Commonwealth Government bonds remains inappropriately depressed compared with its long run average value. Additionally, Alinta notes that once committed the development of generation assets are naturally long term investment decisions (30-40 years). The development of an asset such as a power station is very costly and requires significant certainty and stability of returns. Investors traditionally look to the capacity price to provide this certainty given the restrictions on bidding in the energy market (i.e. price caps).</p> <p>Alinta requests the IMO to consider whether the observed</p>	<p>See response 6 above.</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			yield on government bond remains an acceptable proxy measure of the risk free rate.	
11	Merredin Energy	Fixed Fuel Cost	In section 5.4.4 of SKM's report, SKM reports the cost of fuel as \$21.65 / GJ and notes that "this cost includes delivery transportation but excludes excise and GST". With the recent changes to excise rebates, power generators now pay a portion of excise. The net excise charges worn by generators should be included in the fuel cost components of the MRCP. We recommend that SKM revise the fuel costs to include the net cost of excise.	<p>The IMO agrees with Merredin Energy's submission.</p> <p>SKM has reviewed the recent changes to the excise regime and has added a net excise rate of 8.521 c/L to the cost of diesel, as reflected in its updated report dated 18 December 2013.</p> <p>This increase has been applied in both the Fixed Fuel Cost) and the allowance for start-up costs within Margin M.</p>
12	Merredin	Margin M	<p>The 2% allowance SKM has made in its estimate for start-up costs appears to be low. As noted above, that allowance should specifically include diesel excise. We would recommend SKM confirms the number of commissioning hours used to derive the 2% and confirm whether that remains appropriate.</p> <p>Merredin Energy consumed \$2m worth of diesel fuel as part of the EPC contractor's responsibilities to commission our recently developed 82MW plant. We consider that volume of fuel consumption typical for an OCGT and expect a 160MW power station to incur fuel costs of around \$4m during commissioning.</p> <p>The IMO and system management would have details of the hours of 'hot commissioning' involving the dispatch of power to the grid during the commissioning of plants. There would need to be an additional allowance for cost of 'cold commissioning' to reflect the costs of running turbines but not exporting power during the early stages of commissioning. We would recommend the IMO's collection of commissioning data be used to assess the reasonableness of SKM's 2%</p>	<p>The IMO agrees with Merredin Energy's submission.</p> <p>The IMO consulted with SKM in relation to the requirements for commissioning tests, including other requirements of the Technical Rules. SKM has reviewed the current requirements and advised that an increased allowance for start-up costs within Margin M is warranted.</p> <p>The increased testing requirements, combined with the inclusion of diesel excise, have resulted in the start-up cost allowance being increased from 2% to 2.75%</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			parameter and revise it appropriately. Based on our recent experience, we are very confident that parameter is substantially understated.	
13	Merredin	Fixed O&M	<p>In order to remain certified, power generators operating in the SWIS are required to undertake:</p> <ul style="list-style-type: none"> • IMO certification test runs twice per annum (summer and winter tests) and • annual emission tests as part of a generator's environmental licence obligations. <p>The operating costs, including diesel consumption, associated with undertaking these tests should be included in the fixed O&M component of the MRCP.</p> <p>Unless SKM can derive a more appropriate estimate, we suggest the IMO determines the hourly cost of these operations by reference to the Alternative Maximum STEM price.</p> <p>The IMO certification tests involve:</p> <ul style="list-style-type: none"> • Engine start and run to load • Two trading intervals at full load • Run down to stop <p>Each test involves operating for at least 2 hours per annum. At the Alternative Maximum STEM price of \$500/MWh, this equates to a six monthly compliance cost of \$160,000 per annum for a 160MW generator.</p> <p>Attached is a copy of the environmental licence for Merredin power station. This licence requires annual testing of the exhaust emissions from both engines as shown in Table 3.2.1 on page 8. To accomplish all of these tests each of Merredin's turbines are scheduled to run at maximum power for a period of 3.5 to</p>	<p>Step 2.1.1 of the MRCP Market Procedure states that "<i>The Power Station upon which the Maximum Reserve Capacity Price is based must have a capacity factor of 2%</i>". This equates to 175 hours per year.</p> <p>The IMO considers that a prudent generator with a 2% capacity factor will schedule its Reserve Capacity Tests and emissions tests during normal market operations.</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			<ul style="list-style-type: none"> 4 hours so around 70,000 to 80,000 litres of diesel is used by Merredin Energy's 82MW plant. For a 160MW plant, the 4 hours of environmental testing adds a further cost of \$320,000 per annum. 	
14	Merredin Energy	Fixed O&M	<p>In our previous MRCP submissions, Merredin Energy has argued that there should be a reasonable allowance for the costs of complying with the IMO's balancing regime and WEM rules. The current balancing rules place a significant administrative burden and software system requirements on generators. We are also compelled to lodge STEM submissions, resource plans, and annual capacity certification submissions.</p> <p>Peaking generators are not compensated for the cost of these functions through the energy market. Balancing submissions must be lodged continuously throughout the year, regardless of whether or not a generator is dispatched. A failure to correctly lodge a submission automatically triggers capacity credit refunds. This is a real and material operating expense. Merredin Energy has previously advised the IMO it had entered into an agreement with Perth Energy to undertake those functions on our behalf and disclosed that cost.</p> <p>The IMO had previously dismissed an allowance for that cost on the basis that, should Merredin Energy have greater economies of scale, we would be able to spread that overhead expense across several assets. Arguably we have obtained the scale benefits by outsourcing the balancing functions to Perth Energy who provides that service to multiple generators.</p> <p>Perth Energy manages submissions for over 250MW of generation capacity for a number of clients. The costs to Perth Energy of maintaining IT systems and manning the</p>	<p>The IMO does not consider it appropriate to include an allowance for costs associated with market interactions.</p> <p>The IMO notes that Market Participants may submit standing offers into both the STEM and the Balancing Market.</p> <p>Further, the Market Procedure does not make specific allowances for the cost of operational interaction with the Market as it is envisaged that these will be limited for a peaking plant that operates infrequently.</p> <p>The IMO notes that the MRCP is based on a theoretical power station and may not reflect the specific risks and circumstances of individual projects.</p>

No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			<p>trading desk 24/7 costs represent a significant cost, with all clients meeting a share of those costs. We accept that Perth Energy's fees incorporate a profit margin. However, in the absence of a superior and more cost effective solution, generators are compelled to meet that cost or face capacity credit refunds. Such refunds and penalties associated with non-compliance are so significant that generators cannot take any risk of breaching market rules. We dismiss any perception that this type of administrative work is simple. The reality is that the WEM operation is not a simple matter. Evidence of apparently excessive balancing costs to market participants since IMO's introduction of the new balancing regime, for instance, shows that low-cost perception is a can be a fallacy and is often matched with high-cost implementation in practice.</p> <p>We encourage the IMO to independently assess the most cost effective solution for complying with the balancing regime and including that cost in the Fixed O&M component of the MRCP. In particular, we encourage the IMO to obtain a quote from Perth Energy and any other market participants who offer that service to independent generators.</p>	
15	Merredin	Fixed O&M - Insurance	<p>Insurance costs have increased significantly over the past 12 months. We note the IMO has not been successful in obtaining updated estimates of insurance and therefore proposes to retain the insurance costs as a fixed percentage of the sum insured. This would appear a convenient argument to limit capacity price increases.</p> <p>The Australian Bureau of Statistics releases detailed time series on components of the CPI. This includes the quarterly index of insurance costs in Perth. The series ID: A3602858X</p>	<p>The IMO notes that the CPI relates to household costs and not business expenses. The IMO understands that the ABS index is an indicator of movements in insurance premiums.</p> <p>However the index does not apply as described by Merredin Energy. Paragraph 8.137 of the ABS Information Paper²³ entitled <i>Consumer Price Index: Concepts, Sources and Methods, 2011</i> states that</p>

²³ Available at [http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/970952416B75A402CA257968000C70E5/\\$File/64610_2011.pdf](http://www.ausstats.abs.gov.au/ausstats/subscriber.nsf/0/970952416B75A402CA257968000C70E5/$File/64610_2011.pdf).



No.	Submitter	Component/ Issue	Comment/Change Requested	IMO's response
			<p>is a sub-series of the CPI data and shows that insurance costs in Perth increased 6.3% in nominal terms over the 12 months to end September 2013. This should be added to the IMO's 7.1% allowance for the increased in sum insured to give an aggregate 13.4% increase in insurance costs.</p> <p>Asset replacement and business interruption insurance was estimated by the IMO to cost A\$708,276 per year as at 1 April 2016, calculated as 0.29% of the limit of liability at that date. Applying the CPI insurance increase of 6.3% over the past 12 months, would see the insurance parameter increase to around \$753,000 or 0.31%.</p>	<p><i>"the gross insurance premium is used to measure the price movement"</i>. Thus the index of insurance costs includes the effect of an increase in the value of the insured assets.</p> <p>This is described further in Paragraph 8.138, which describes the quality adjustment that the ABS makes to account for changes to the value of the insured assets.</p> <p>The IMO notes that the insurance cost in the MRCP has increased by 7.7% since the 2013 MRCP. This is consistent with the increases in the CPI insurance index quoted by Merredin Energy, which grew by 7.7% from June 2012 to June 2013, and by 6.3% from September 2012 to September 2013.</p>

6. CONCLUSION

The IMO has conducted a review of the main factors used to determine the MRCP, in accordance with the Market Procedure.

For the 2014 Reserve Capacity Cycle, the IMO proposes that the MRCP be set at \$176,800 per MW per year. This is an increase of 12.6% from the 2013 MRCP of \$157,000 per MW per year.

The main drivers of the higher MRCP have been the increase in RBA bond yields, higher cost escalation factors for copper and steel, the weakening of the Australian dollar relative to the Euro and an increase in the estimated transmission connection cost.

The 2014 MRCP computation has been included in Appendix B and a comparison between the 2013 and 2014 MRCPs can be found in Appendix C.

APPENDIX A: WEIGHTED AVERAGE COST OF CAPITAL (WACC)

The pre-tax real Officer WACC is used for the determination of the Maximum Reserve Capacity Price. The formulae are shown below:

$$WACC_{real} = \left(\frac{(1 + WACC_{nominal})}{(1 + i)} \right) - 1$$

and

$$WACC_{nominal} = \frac{1}{(1 - t(1 - \gamma))} R_e \frac{E}{V} + R_d \frac{D}{V}$$

where the nominal Return on Equity is calculated as:

$$R_e = R_f + \beta_e \times MRP$$

and the nominal Return on Debt is calculated as:

$$R_d = R_f + (DRP + d)$$

Pricewaterhouse Coopers (PwC) calculated the debt risk premium and the IMO reviewed the remaining Annual parameters. A table of the parameters and values are shown in Table A1 below. The volatile Minor parameters, highlighted in yellow, were recalculated prior to the publication of the final report so that the most recent numbers are used.

Table A1: WACC parameters for 2013 and 2014

Parameter	Notation	2014 Value	2013 Value
Nominal Risk Free Rate of Return (%)	R_f	4.23	3.14
Expected Inflation (%)	i	2.5	2.57
Real risk free rate of return (%)	R_{fr}	1.69	0.55
Market Risk Premium (%)	MRP	6	6
Asset beta	β_a	0.5	0.5
Equity beta	β_e	0.83	0.83
Debt Margin / Debt Risk Premium (%)	DRP	2.03	2.71
Debt issuance costs (%)	d	0.125	0.125
Corporate tax rate (%)	t	30	30
Franking credit value	γ	0.25	0.25
Debt to total assets ratio (%)	D/V	40	40
Equity to total assets ratio (%)	E/V	60	60

For the purposes of the 2014 MRCP:

WACC = 7.01%

APPENDIX B: CALCULATION OF THE MAXIMUM RESERVE CAPACITY PRICE

The Maximum Reserve Capacity Price is calculated as described by the *Market Procedure: Maximum Reserve Capacity Price*. This is shown below:

$$\text{MRCP} = \text{ANNUALISED_FIXED_O\&M} + (\text{ANNUALISED_CAP_COST} / \text{CC})$$

where:

MRCP is the Maximum Reserve Capacity Price to apply in a Reserve Capacity Auction.

ANNUALISED_FIXED_O&M is the annualised fixed operating and maintenance costs for the power station and any associated electricity transmission facilities, expressed in Australian dollars, per MW per year.

ANNUALISED_CAP_COST is the CAPCOST, expressed in Australian dollars, annualised over a 15 year period using the Weighted Average Cost of Capital (WACC).

CC is the expected Capacity Credit allocation determined in conjunction with the power station capital cost, expressed in MW.

Table B1: 2014 MRCP and associated parameters

Parameter	Value	Unit
2013 MRCP	\$176,800.00	A\$/MW/Year
Where		
ANNUALISED_FIXED_O&M	\$33,238.01	A\$/MW/Year
ANNUALISED_CAPCOST	\$21,607,991.70	A\$/Year
CC	150.5	MW

Table B2: ANNUALISED_CAPCOST and associated parameters

Parameter	Value	Unit
CAPCOST	\$196,690,722.71	A\$
Where		
PC	\$878,792.83	A\$/MW
M	20.10%	%
TC	\$141,910.00	A\$
CC	150.5	MW
FFC	\$7,206,385.63	A\$
LC	\$2,733,933.12	A\$
WACC	7.01%	%
Annualisation		
ANNUALISED_CAPCOST	\$21,607,991.70	A\$/Year
Where		
CAPCOST	\$196,690,722.71	A\$
WACC	7.01%	%
Term of Finance (Years)	15	Years

APPENDIX C: COMPARISON BETWEEN THE 2013 and 2014 MAXIMUM RESERVE CAPACITY PRICES

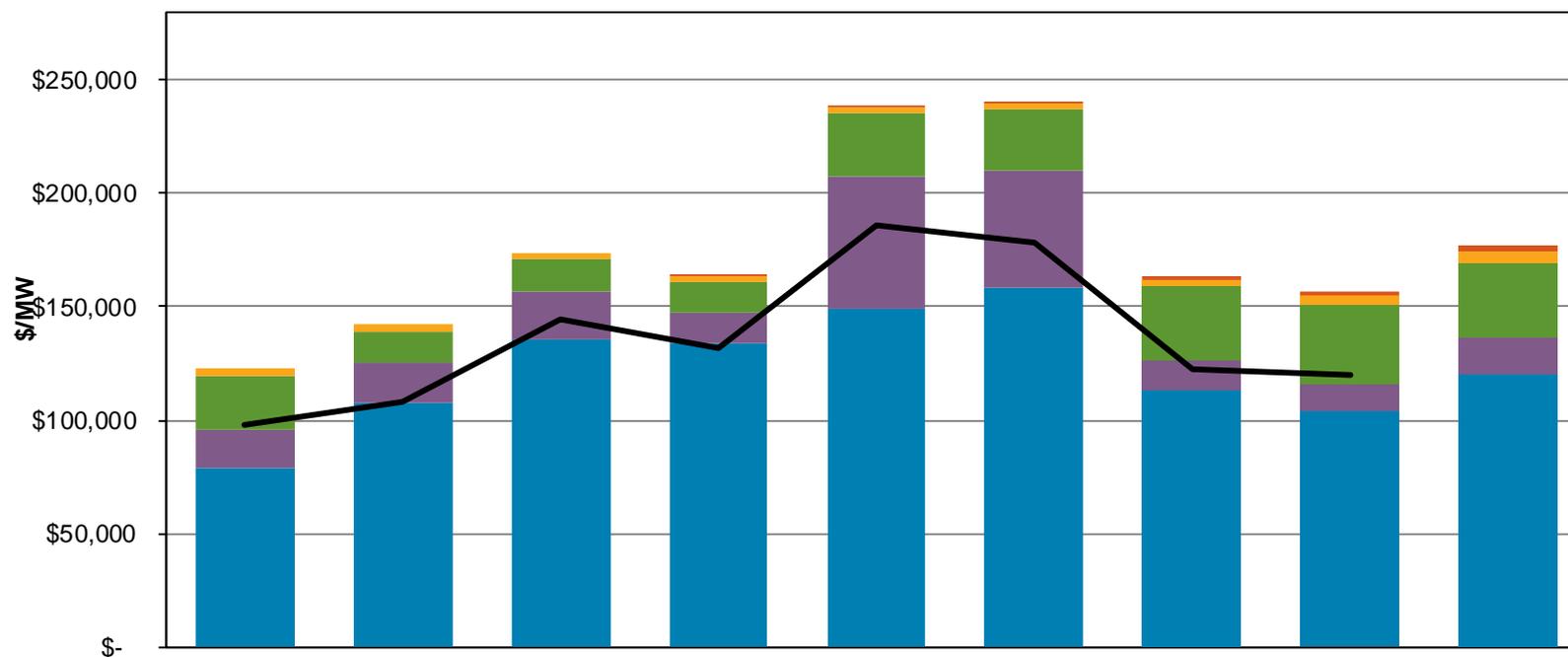
Table C1: Comparison between 2013 and 2014 MRCPs

Parameter	Reserve Capacity Year		Units
	2014	2013	
PC	\$878,792.83	\$829,446.75	A\$/MW
M	20.10%	18.87%	%
TC (\$/MW)	\$141,910.00	\$115,124.00	A\$/MW
FFC	\$7,206,385.63	\$7,069,232.08	A\$
LC	\$2,733,933.12	\$2,693,872.28	A\$
CAPCOST	\$196,690,722.71	\$190,938,543.97	A\$
Term of Finance	15	15	Years
WACC	7.01%	5.95%	%
ANNUALISED_CAPCOST	\$21,607,991.70	\$19,599,805.92	A\$/Year
CC	150.5	159.6	MW
ANNUALISED_CAPCOST	\$21,607,991.70	\$19,599,805.92	A\$/Year
ANNUALISED_FIXED_O&M	\$33,238.01	\$34,238.67	A\$/MW/Year
MRCP	\$176,800.00	\$157,000.00	A\$/MW/Year

Table C2: Impact of year-on-year changes in input parameters

	Impact (\$)	Impact (%)	MRCP (\$)
2013 MRCP			157,000
Escalation factors	+ 4,800	+ 3.1%	161,800
Power Station costs	+ 2,900	+ 1.8%	164,700
Margin M	+ 1,100	+ 0.8%	165,900
Fixed Fuel Cost	+ 200	+ 0.1%	166,000
Land Cost	-	-	166,000
Transmission Cost	+ 2,900	+ 1.8%	168,900
WACC	+ 10,100	+ 6.4%	179,000
Fixed O&M	- 2,200	- 1.4%	176,800
Combined impact	+ 19,800	+ 12.6%	176,800

APPENDIX D: VARIATION IN THE MAXIMUM RESERVE CAPACITY PRICE AND CONSTITUENT COSTS



Capacity Year	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17
Power Station Cost	\$ 79,110	\$ 107,404	\$ 135,701	\$ 134,091	\$ 149,306	\$ 158,710	\$ 113,971	\$ 104,178	\$ 119,942
Transmission Costs	\$ 16,558	\$ 18,017	\$ 20,672	\$ 13,151	\$ 58,493	\$ 51,621	\$ 12,329	\$ 12,164	\$ 16,127
Fixed O&M	\$ 23,900	\$ 13,363	\$ 14,392	\$ 13,431	\$ 27,335	\$ 26,649	\$ 33,384	\$ 34,239	\$ 33,238
Fuel Costs	\$ 2,907	\$ 3,456	\$ 2,631	\$ 3,151	\$ 2,615	\$ 2,825	\$ 2,239	\$ 4,680	\$ 5,442
Land Costs	\$ -	\$ -	\$ -	\$ 293	\$ 769	\$ 818	\$ 1,973	\$ 1,783	\$ 2,064
MRCP (nearest \$100)	\$ 122,500	\$ 142,200	\$ 173,400	\$ 164,100	\$ 238,500	\$ 240,600	\$ 163,900	\$ 157,000	\$ 176,800
Excess Capacity	6.43%	11.44%	2.19%	5.83%	8.99%	14.59%	13.79%	11.02%	n/a
Reserve Capacity Price (per yr) —	\$ 97,837	\$ 108,459	\$ 144,235	\$ 131,805	\$ 186,001	\$ 178,477	\$ 122,427	\$ 120,199	n/a

APPENDIX E: ABBREVIATIONS

ACT – Australian Competition Tribunal

AER – Australian Energy Regulator

CAPM – Capital Asset Pricing Model

CPI – Consumer Price Index

DRP – Debt Risk Premium

ERA – Economic Regulation Authority

GDP – Gross Domestic Product

GST – Goods and Services Tax

IMO – Independent Market Operator

MRCP – Maximum Reserve Capacity Price

MRCPWG – Maximum Reserve Capacity Price Working Group

MRP – Market Risk Premium

MW – Megawatt

OCGT – Open Cycle Gas Turbine

O&M – Operation and Maintenance

PwC – Pricewaterhouse Coopers

RBA – Reserve Bank of Australia

SKM – Sinclair Knight Merz

SWIS – South West interconnected system

WACC – Weighted Average Cost of Capital

WEM – Wholesale Electricity Market