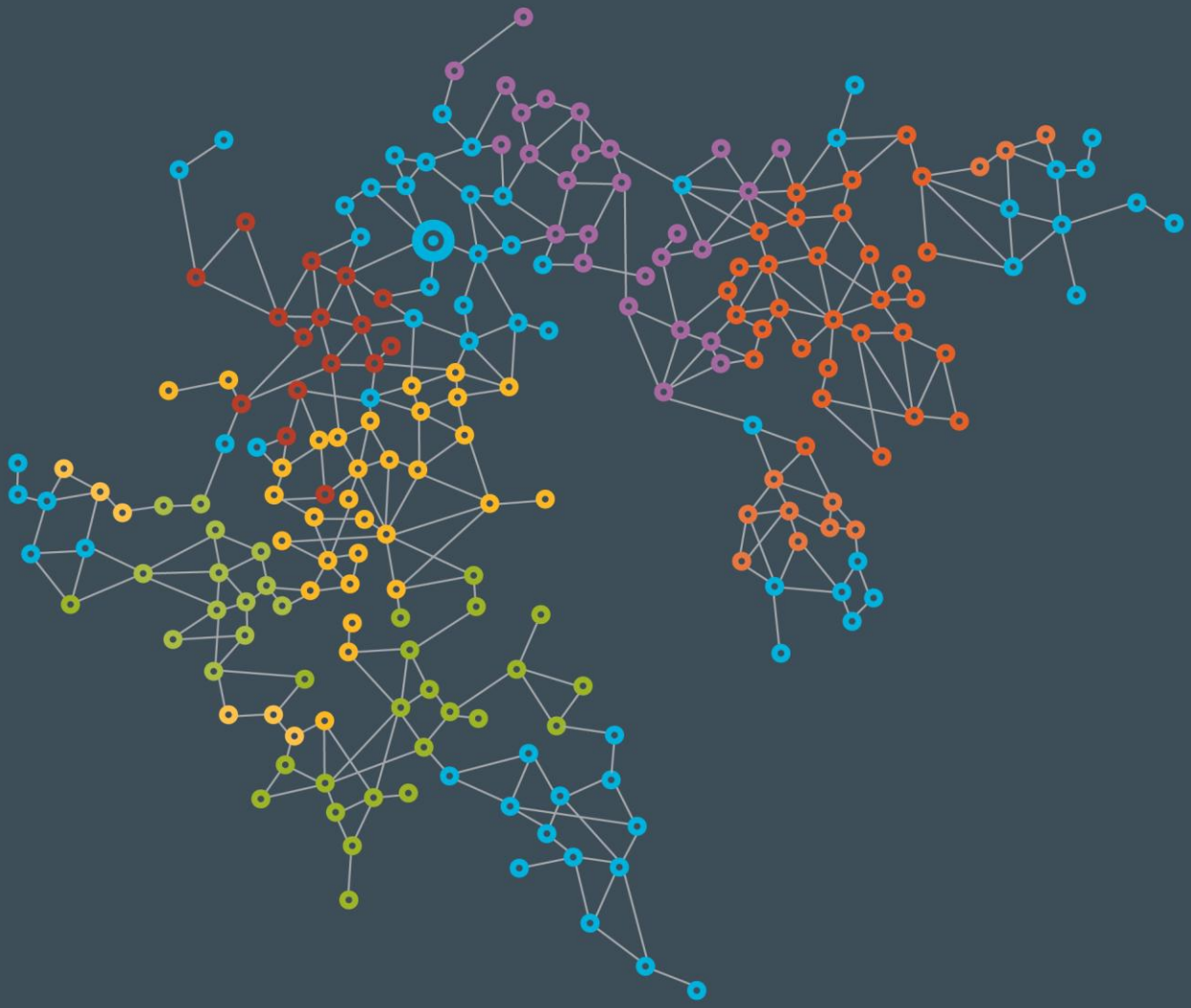
INDEPENDENT MARKET OPERATOR

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

October 2013



DISCLAIMER

The Independent Market Operator (IMO) has prepared this report under clause 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.

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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*[1] (Market Procedure).

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 Draft Report details the outcome of the draft 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 Maximum Reserve Capacity Price proposed by the IMO in its Draft Report is $175,100 per MW per year, approximately 11.5% 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 ($)	Impact (%)	MRCP ($)
2013 MRCP			**157,000**
Escalation factors	+ 4,800	+ 3.1%	161,800
Power Station Cost	+ 2,900	+ 1.8%	164,700
Margin M	+ 400	+ 0.3%	165,100
Fixed Fuel Cost	+ 100	+ 0.1%	165,200
Land Cost	-	-	165,200
Transmission Cost	+ 2,900	+ 1.8%	168,100
WACC	+ 9,200	+ 5.9%	177,300
Fixed O&M	- 2,200	- 1.4%	175,100
Combined impact	**+ 18,100**	**+ 11.5%**	**175,100**

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

- The WACC has increased from 5.95% to 6.92%, 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 falls in prices 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].

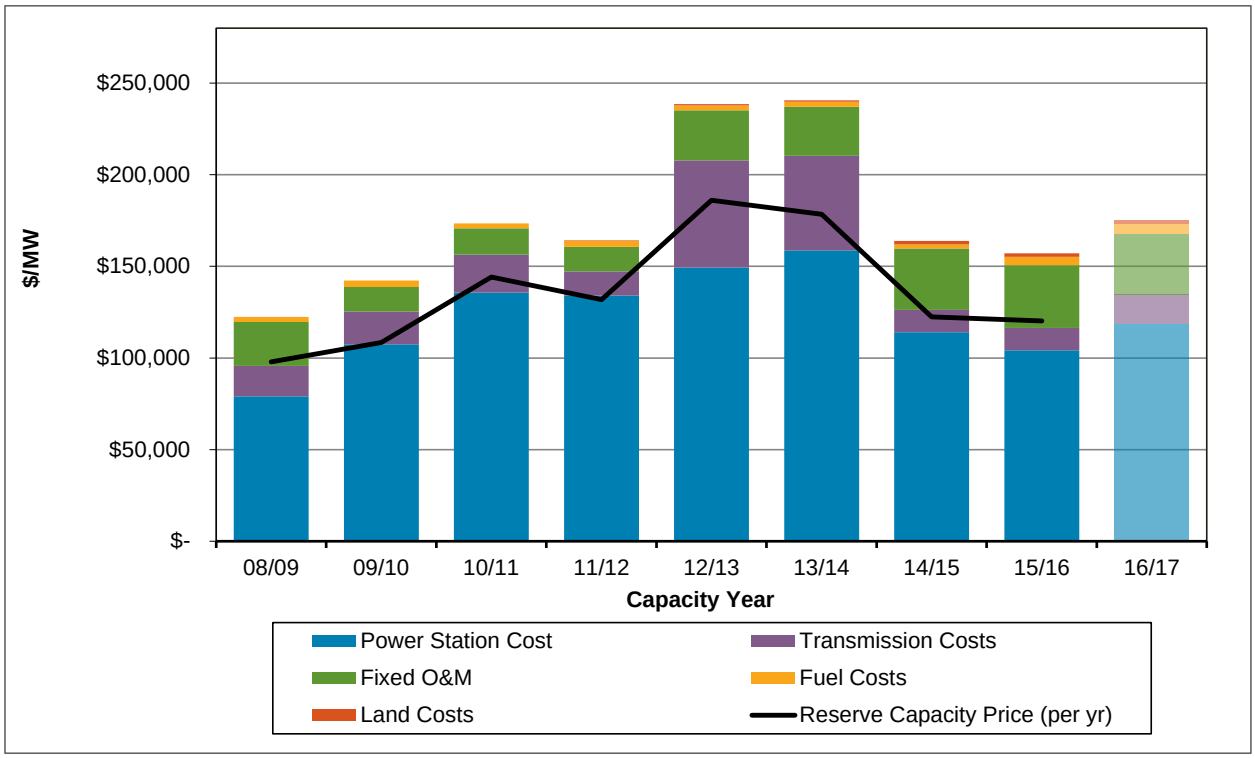
Historical variation of MRCP

Figure A indicates that the MRCP has been relatively stable aside from the 2010 and 2011

[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.

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 review[3], based on a weighted average of actual contribution costs charged by

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

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.

Invitation for submissions

The IMO seeks submissions on this Draft Report. Information on the public submission process is included within this report and can also be found on the IMO website at http://www.imowa.com.au/mrcp.

[4] This analysis excludes the effect of the WACC.

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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*[5] (Market Procedure). The proposed revised 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.

This Draft Report is produced in accordance with clause 4.16.6 of the Wholesale Electricity Market Rules (Market Rules).

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 Market Rules) to the Economic Regulation Authority (ERA) for approval.

This Draft 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.

1.1 Reserve Capacity Cycle timing

This Draft 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 Draft 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 MRCP outcome for the 2014 Reserve Capacity Cycle

The IMO proposes a value of the MRCP of $175,100 per MW per year for the 2014 Reserve Capacity Cycle.

This is an increase of 11.5% from the 2013 MRCP of $157,000 per MW per year.

1.4 Supporting Documents

The following related documents are available on the IMO website (http://www.imowa.com.au/mrcp):

- 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, *Estimated debt risk premium using the ERA's bond yield methodology* (Draft Report version);
- WACC parameter calculation spreadsheet (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 2016/17*.

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	2.50%	2.50%	2.38%	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.
- Escalation factors for connection asset O&M costs have also been calculated by SKM.

[6] Published in the Statement on Monetary Policy, August 2013

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 recovery in prices for these commodities.

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

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 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.

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. SKM notes the following contributing factors to this increase:

- 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 ($/kW) of the Siemens SGT5-2000E compared with the Alstom GT13E2.

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

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.

For the purposes of the 2014 MRCP:

M = 19.35%

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

The margin M is added as a fixed percentage of the capital cost of developing the power station. However, 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 introduced by SKM has led to a lower power station capital cost[8], 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 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 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

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

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 report[10] published on the IMO website (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.

- 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.

[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*.

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 of 2.5%. Further escalation of this cost to 1 April 2016 occurs within the transmission connection cost estimate methodology where required.

The IMO has estimated that the easement cost as at 30 June 2014 is A$5.233M, up 1.7% from the 2013 value of A$5.147M, predominantly due to increases in the cost of land at Pinjar and Kwinana.

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 1.

For the purposes of the 2014 MRCP:

FFC = A$7.121M

This price represents an increase of 0.7% from the corresponding value for the 2013 MRCP.

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 1.

For the purposes of the 2014 MRCP:

LC = A$2.730 M

This price represents an increase of 1.3% from the corresponding value for the 2013 Maximum Reserve Capacity Price. 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.

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.

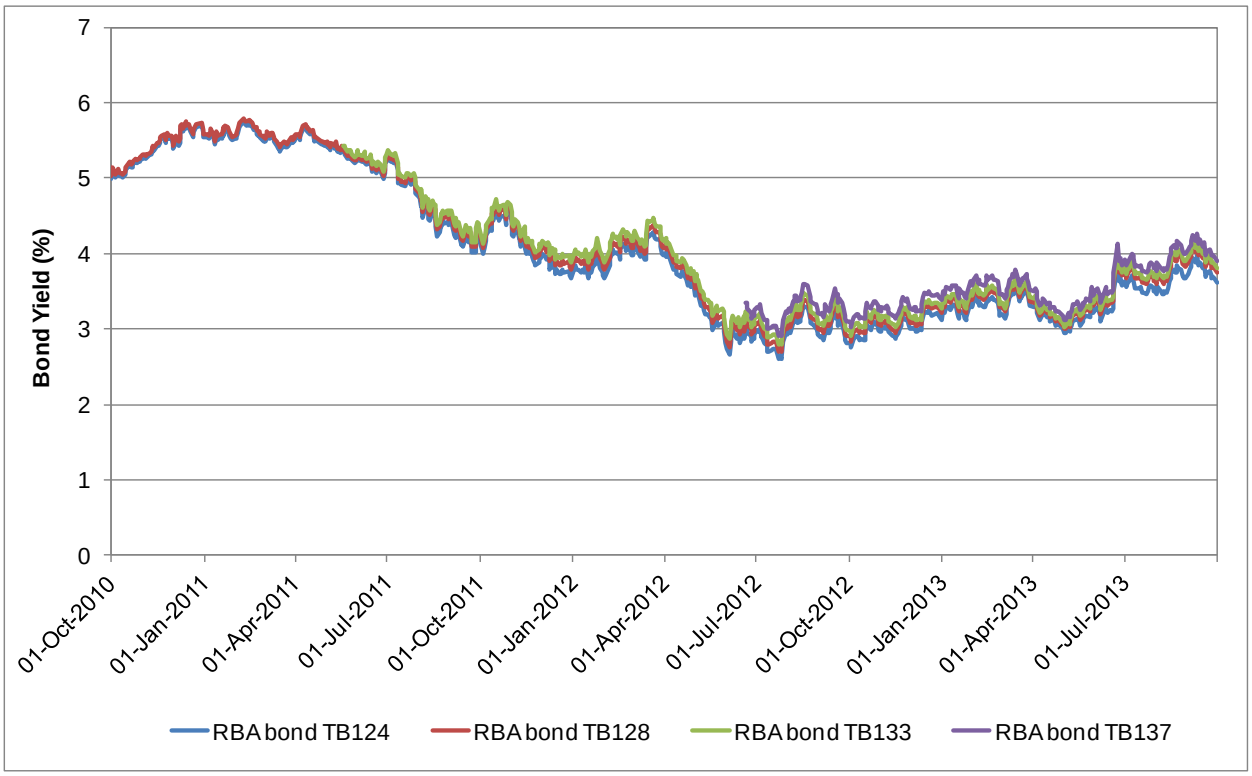
The WACC is determined according to the Capital Asset Pricing Model (CAPM), with bond yields considered in both the costs of equity and debt. The nominal risk free rate is determined from observed yields of Commonwealth Government bonds, while the DRP is derived from observed yields of corporate bonds.

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 Reserve Bank of Australia (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.

11 https://rol.osr.wa.gov.au/Calculators/faces/Calculators?_afrLoop=482854060468439&_afrWindowMode=0&_adf.ctrl-state=1bjwmmsfw6_4

Figure 1: Reserve Bank of Australia bond yields, Nov 2010 to Sep 2013[12]



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

For the purposes of the 2014 MRCP:

WACC = 6.92%

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 4.08%. 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 2.49%, 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 2.22%. 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 IMO notes that the risk free rate and the DRP for this Draft Report were calculated from market observations in September 2013. These parameters will be recalculated for the Final Report.

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

3.6.1 Debt Risk Premium

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 is currently developing its first rate of return guidelines, as required under recent changes to the National Gas Rules, which are to be published by 29 November 2013. In the *Draft Rate of Return Guidelines* published on 6 August 2013[16], the ERA proposed to continue the use of the bond-yield approach.

The IMO notes that the Australian Energy Regulator (AER) is also updating its rate of return guideline and proposes to change its methodology for determining the DRP, as indicated in its *Better Regulation, Explanatory Statement, Draft rate of return guideline*[17] in August 2013. In recent decisions, the AER has continued to determine the DRP using the 7-year Bloomberg BBB fair value curve, extrapolated to a 10-year term. However, the AER proposes in the *Draft rate of return guideline* to determine the DRP utilising a "*trailing average model that would align the allowed cost of debt with the cost of a hypothetical portfolio of seven year bonds, with one-seventh of the portfolio refinanced each year*". The AER proposes to continue utilising a third

[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] See http://www.erawa.com.au/access/gas-access/guidelines-for-the-rate-of-return-for-gas-transmission-and-distribution-networks/ for further information.
[17] See http://www.aer.gov.au/node/18859 for further information.

party data service provider (such as Bloomberg) as the source of benchmark cost of debt estimates.

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:

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

For the purposes of the 2014 MRCP:

CAPCOST = A$195.492 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 report[18] 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 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.

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

3.8.2 Switchyard and transmission

For the 2014 determination, SKM provided the fixed O&M costs of the switchyard and 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 report[19] 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 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$11,369.66 per MW per year

This cost represents a decrease of 16.9% from the corresponding value for the 2013 MRCP due

[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

to the reduction of approximately 18% in Western Power's use of system charges since last year.

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 second 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 has yet to 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$708,276 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 value are calculated as

  PC x (1 + M) x CAP + FFC

  where

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

  M is margin M (see Section 3.2 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$5,770.12 per MW per year

This value is 7.1% 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.

3.8.5 Total Fixed Operation & Maintenance Costs

For the purposes of the 2014 MRCP:

ANNUALISED_FIXED_O&M = A$33,190 per MW per year

Total fixed operation and maintenance costs have decreased by 3.1% compared to last year.

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$195.492 M, as determined in Section 3.7;
- the WACC of 6.92%, 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$21.358 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$33,190 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 Maximum Reserve Capacity Price is calculated using the following equation as required by the Market Procedure:

MRCP = (ANNUALISED_FIXED_O&M + ANNUALISED_CAP_COST / 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$175,104.51, which is rounded to:

MRCP = A$175,100 per MW per year

A MRCP of A$175,100 per MW per year is proposed by the IMO. This represents an 11.5% 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	+ 400	+ 0.3%	165,100
Fixed Fuel Cost	+ 100	+ 0.1%	165,200
Land Cost	-	-	165,200
Transmission Cost	+ 2,900	+ 1.8%	168,100
WACC	+ 9,200	+ 5.9%	177,300
Fixed O&M	- 2,200	- 1.4%	175,100
Combined impact	**+ 18,100**	**+ 11.5%**	**175,100**

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

The IMO invites submissions from all sectors of the Western Australian energy industry, including end users, on the proposed new MRCP to apply for the 2016/17 Capacity Year. Following receipt of public submissions, the IMO will propose a final revised value of the MRCP to the ERA for approval.

5.1 Submission Guidelines

Submissions must be made in writing, should clearly address issues that interested parties consider relevant to this review and should provide supporting evidence or calculations (if appropriate).

In keeping with the principle of open and transparent processes, all submissions will be published on the IMO website. If confidential information is provided in a submission as supporting evidence, it must be clearly marked as confidential. Any confidential information will be excluded when the submission is made public.

5.2 Maximum Reserve Capacity Price Consultation Workshop

Following the close of submissions, the IMO may hold a workshop on the proposed new MRCP to apply for the 2016/17 Capacity Year. Attendance at the workshop may be offered to those who have made a submission. The IMO would then discuss any issues that have arisen and will take into consideration the submissions and the outcome of the workshop when producing the Final Report to be submitted to the ERA.

5.3 Details for Making a Submission

Submissions should be addressed to:

Greg Ruthven
Manager, System Capacity
Independent Market Operator

By post: PO Box 7096, Cloisters Square, Perth, WA, 6850

By email: imo@imowa.com.au

By facsimile: +61 8 9254 4399

The deadline for submissions is:

4.00PM Western Standard Time on Wednesday, 27 November 2013.

General enquiries may be directed to Neetika Kapani or Greg Ruthven on (08) 9254 4300.

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 $175,100 per MW per year.

The MRCP of $175,100 per MW per year represents an increase of 11.5% from the 2013 MRCP. 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 estimated transmission connection cost.

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:

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

and

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

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:

$$R_d = R_f + \left(DRP + d\right)$$

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, will be 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	4.08	3.14
Expected Inflation (%)	i	2.49	2.57
Real risk free rate of return (%)	R_{fr}	1.55	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	2.22	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 = 6.92%

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:

MRCP = ANNUALISED_FIXED_O&M + (ANNUALISED_CAP_COST / 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: 2013 MRCP and associated parameters

Parameter	Value	Unit
2012 MRCP	**$175,100.00**	**A$/MW/Year**
Where		
ANNUALISED_FIXED_O&M	$33,189.72	A$/MW/Year
ANNUALISED_CAPCOST	$21,358,175.47	A$/Year
CC	150.5	MW

Table B2: ANNUALISED_CAPCOST and associated parameters

Parameter	Value	Unit
CAPCOST	**$195,492,412.93**	**A$**
Where		
PC	$878,792.83	A$/MW
M	19.35%	%
TC	$141,910.00	A$
CC	150.5	MW
FFC	$7,121,155.71	A$
LC	$2,729,795.07	A$
WACC	6.92%	%
Annualisation		
ANNUALISED_CAPCOST	**$21,358,175.47**	**A$/Year**
Where		
CAPCOST	$195,492,412.93	A$
WACC	6.92%	%
Term of Finance (Years)	15	Years

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

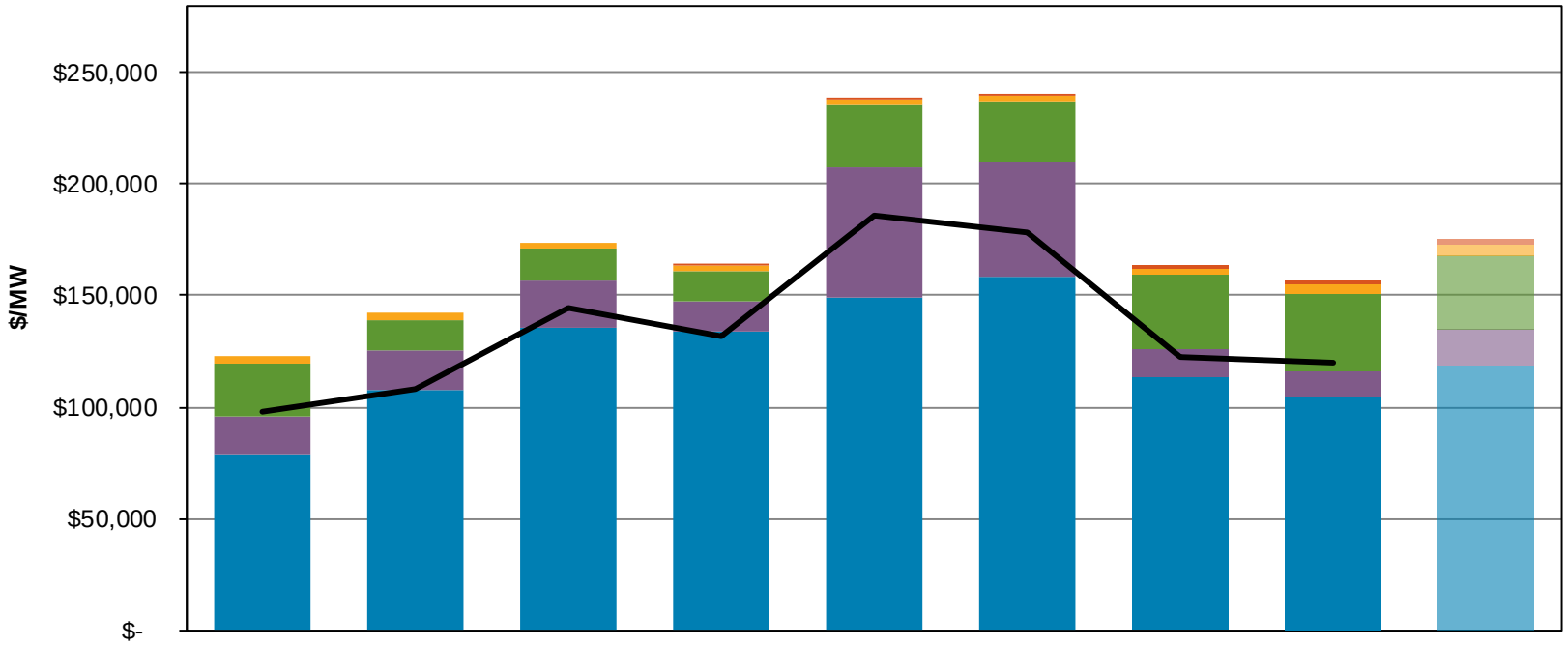
Table C1: Comparison between 2013 and 2014 MRCPs

Parameter	Reserve Capacity Year 2014	2013	Units
PC	$878,792.83	$829,446.75	A$/MW
M	19.35%	18.87%	%
TC ($/MW)	$141,910.00	$115,124.00	A$/MW
FFC	$7,121,155.71	$7,069,232.08	A$
LC	$2,729,795.07	$2,693,872.28	A$
CAPCOST	$195,492,412.93	$190,938,543.97	A$
Term of Finance	15	15	Years
WACC	6.92%	5.95%	%
ANNUALISED_CAPCOST	**$21,358,175.47**	**$19,599,805.92**	**A$/Year**
CC	150.5	159.6	MW
ANNUALISED_CAPCOST	$21,358,175.47	$19,599,805.92	A$/Year
ANNUALISED_FIXED_O&M	$33,189.72	$34,238.67	A$/MW/Year
MRCP	**$175,100.00**	**$157,000.00**	**A$/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	+ 400	+ 0.3%	165,100
Fixed Fuel Cost	+ 100	+ 0.1%	165,200
Land Cost	-	-	165,200
Transmission Cost	+ 2,900	+ 1.8%	168,100
WACC	+ 9,200	+ 5.9%	177,300
Fixed O&M	- 2,200	- 1.4%	175,100
Combined impact	**+ 18,100**	**+ 11.5%**	**175,100**

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	$ 118,410
Transmission Costs	$ 16,558	$ 18,017	$ 20,672	$ 13,151	$ 58,493	$ 51,621	$ 12,329	$ 12,164	$ 16,086
Fixed O&M	$ 23,900	$ 13,363	$ 14,392	$ 13,431	$ 27,335	$ 26,649	$ 33,384	$ 34,239	$ 33,190
Fuel Costs	$ 2,907	$ 3,456	$ 2,631	$ 3,151	$ 2,615	$ 2,825	$ 2,239	$ 4,680	$ 5,363
Land Costs	$ -	$ -	$ -	$ 293	$ 769	$ 818	$ 1,973	$ 1,783	$ 2,056
MRCP (nearest $100)	$ 122,500	$ 142,200	$ 173,400	$ 164,100	$ 238,500	$ 240,600	$ 163,900	$ 157,000	$ 175,100
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

IMO – Independent Market Operator

MRCP – Maximum Reserve Capacity Price

MRCPWG – Maximum Reserve Capacity Price Working Group

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