imo
Independent Market Operator

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Draft Report: Maximum Reserve Capacity Price for the 2014/15 Capacity Year

December 2011

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.

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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 that can be made in a Reserve Capacity Auction and is used to determine an administered Reserve Capacity Price if no auction is required. The MRCP aims to reflect the marginal cost of providing additional Reserve Capacity in each Capacity Year. It 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 determination of the MRCP for the 2012 Reserve Capacity Cycle. The value used for the 2012 Reserve Capacity Cycle will be effective from 1 October 2014 through to 1 October 2015.

The methodology for determining the MRCP 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).

While the underlying concept (valuing the cost of entry of a 160 MW OCGT power station) employed this year for determining the MRCP is broadly the same as last year, the IMO was required under clause 4.16.9 of the Market Rules, to conduct a review of the methodology and process for determining the MRCP. This MRCP Review, undertaken by the Maximum Reserve Capacity Price Working Group[2] (MRCPWG), was completed during 2011.

[1] The Market Procedure is available at http://www.imowa.com.au/market-procedures
[2] Proceedings of the MRCPWG are available at http://www.imowa.com.au/mrcpwg

The MRCP Review culminated in Procedure Change PC_2011_06[3] for the Market Procedure, which has now commenced. This is the first year in which the MRCP has been determined using the revised methodology.

A number of refinements to the methodology have been implemented following agreement by the MRCPWG and approval of the Procedure Change Proposal. These refinements could be classified into changes that had a significant impact on the MRCP and those that had less impact. The changes included in the MRCP methodology this year are listed below.

Changes expected to have a significant impact on MRCP:

- The methodology includes an allowance for the costs and output efficiency gains of installing inlet cooling.
- The transmission cost estimate is determined from real costs faced by project developers, represented in historical connection costs and actual access offers determined by Western Power.

Changes expected to have less impact on MRCP:

- The land cost estimate is based on the average cost of the selected land parcels (rather than the cheapest location), with the land size set at three hectares (or the minimum land size for the location where this is greater than three hectares).
- The allowance to initially fill the fuel tank is sufficient for 14 hours of operation of the facility, increased from 12 hours.
- The effective compensation period is set to six months, shortened from two years, with capital costs escalated forward to April of Year 3 of the Reserve Capacity Cycle.
- An allowance for annual insurance costs is included within the Fixed O&M costs.
- An allowance for debt issuance costs is included within the Weighted Average Cost of Capital (WACC), with the corresponding debt financing costs removed from the margin M.
- The IMO has the discretion to nominate a method for determining the debt risk premium that, in its opinion, is consistent with current accepted Australian regulatory practice.

In addition to the changes that were incorporated into the methodology as a result of the MRCP Review, this year's MRCP has also been materially impacted by significant movements in the Weighted Average Cost of Capital (WACC). Turbulence in global financial markets during the second half of 2011, largely driven by concerns over sovereign debt levels in Europe and slow economic growth in the US, has strengthened demand for bonds and seen a fall in yields. This

[33] Details of Procedure Change PC_2011_06 are available at http://www.imowa.com.au/PC_2011_06

shift in bond yields has had a material impact on this year's proposed MRCP.

The 2012 Maximum Reserve Capacity Price proposed by the IMO in its Draft Report is $166,100 per MW per year.

This MRCP determined for the 2012 Reserve Capacity Cycle is approximately 31% lower than the MRCP of $240,600 determined for the 2011 Reserve Capacity Cycle.

This reduction is caused by a combination of year-on-year variation in input parameters and the methodology changes as a result of the MRCP Review.

The impact of year-on-year variation in the input parameters (excluding the impact of methodology changes) is shown in Table A below. This variation has led to a 9% reduction from the 2011 MRCP. This reduction is predominately caused by a significant shift lower in the WACC, for which key parameters are determined from observed bond yields.

The impact of the methodology changes as a result of the MRCP Review is shown in Table B below. These changes have contributed a 24% reduction, which is consistent with the indicative impact assessment provided in the Procedure Change Proposal PC_2011_06.

As noted above, this reduction is dominated by the adoption of inlet cooling within the power station design and the amended methodology for the transmission connection cost estimate.

Figure A combines the data from Tables A and B.

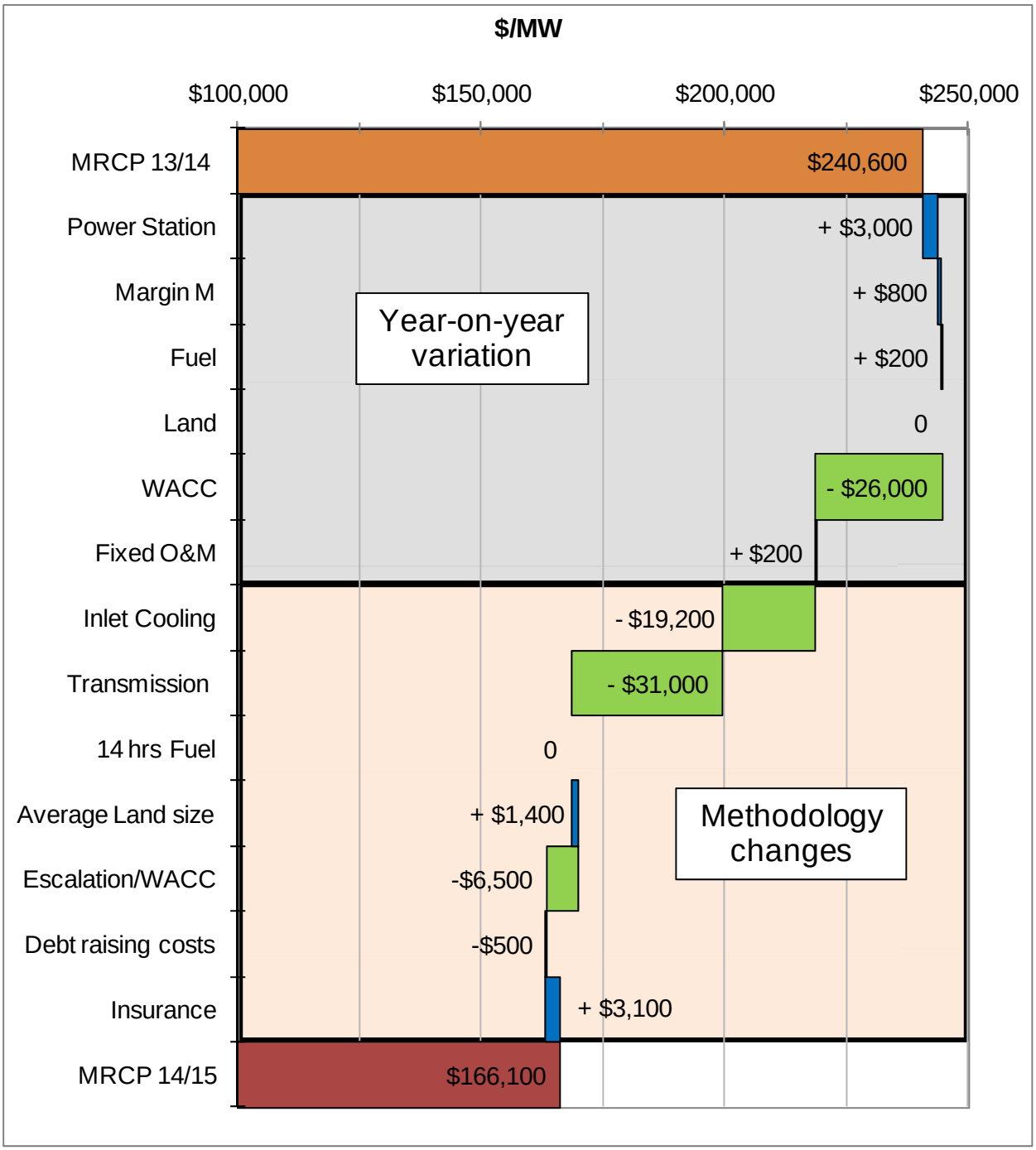
Table A: Impact of year-on-year changes in input parameters

	Impact ($)	Impact (%)	MRCP ($)
2013/14 MRCP			**240,600**
Power Station costs	+ 3,000	+ 1.2%	243,600
Margin M	+ 800	+ 0.3%	244,400
Fixed Fuel Cost	+ 200	+ 0.1%	244,600
Land Cost	-	-	244,600
WACC	- 26,000	- 10.8%	218,600
Fixed O&M	+ 200	+ 0.1%	218,800
Combined impact	**- 21,800**	**- 9.1%**	**218,800**

Table B: Impact of methodology changes in input parameters

	Impact ($)	Impact (%)	MRCP ($)
MRCP after year-on-year changes			**218,800**
Inclusion of inlet cooling	- 19,200	- 8.8%	199,600
Revised Transmission Cost methodology	- 31,000	- 14.2%	168,600
Increased fuel allowance (increase from 12 to 14 hours)	-	-	168,600
Use of average land cost	+ 1,400	+ 0.6%	170,000
Revised cost escalation/WACC methodology	- 6,500	- 3.0%	163,500
Debt issuance cost included in WACC, corresponding costs removed from Margin M	- 500	- 0.2%	163,000
Annual insurance costs included in Fixed O&M	+ 3,100	+ 1.4%	166,100
Net change	**- 52,700**	**- 24.1%**	**166,100**

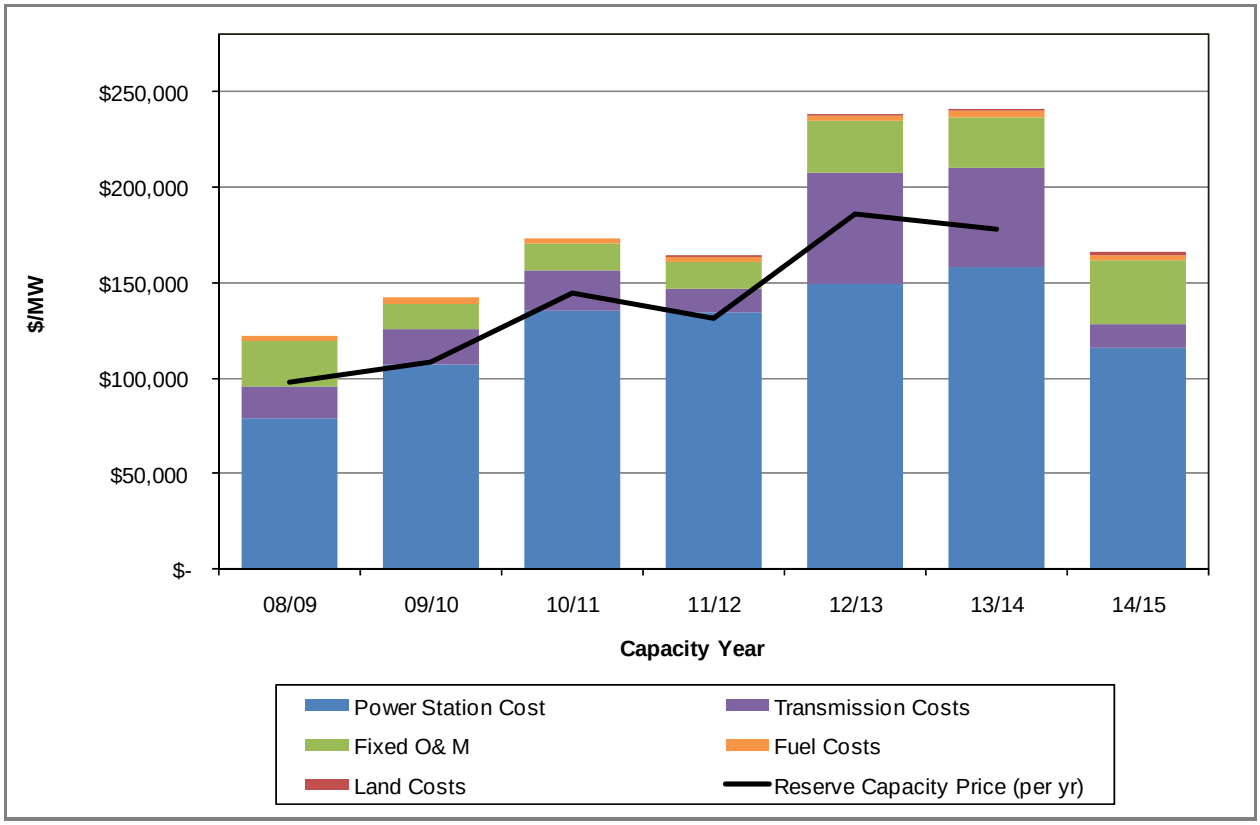
Figure A: Comparison of 2011 and 2012 MRCPs



The IMO notes that the MRCP has varied considerably since the first determination for the 2008/09 Capacity Year, particularly for the two previous MRCP determinations (2012/13 & 2013/14). This volatility has been largely driven by the escalation in Power Station Costs and Transmission costs. The graph below (also in Appendix D) provides further information on the variation of the MRCP and the component costs. Please note the individual cost components

include the impact of the WACC.

Figure B: MRCPs for 2008/09 to 2014/15 Capacity Years



As can be seen in the graph, the most variable components have been the Power Station Cost and the Transmission Cost estimate.

- Significant increases in commodity prices and labour costs caused the Power Station Cost to increase by 101% from the 2008/09 MRCP to the 2013/14 MRCP. The Power Station Cost shown above for the proposed 2014/15 MRCP is 27% lower than for the previous year as it includes the impacts of:
    - the output efficiency gains of installing inlet cooling;
    - the lower margin M; and
    - the lower WACC.
- The Transmission Cost estimate rose sharply for the 2012/13 and 2013/14 MRCPs, largely due to the methodology change adopted by Western Power. The IMO notes that the method used by Western Power changed for the 2012/13 MRCP following discussions between the IMO and Western Power. The IMO considered that estimates provided by Western Power for previous MRCP determinations lacked detail and transparency.

It should be noted that the 2012/13 estimate provided by Western Power for the shared connection cost was more than 350% higher than the estimate provided for the 2011/12 MRCP[4]. In its analysis for the MRCPWG, Sinclair Knight Merz (SKM) highlighted that the method adopted by Western Power required a range of assumptions that could lead to significant inaccuracies.

The amended methodology employed for the 2014/15 MRCP is calculated based on a weighted average of actual contribution costs charged by Western Power to generation project developers. This value for the first time is subject to audit to verify that the number is calculated in accordance with the Market Procedure.

These actual contribution costs, combined with the lower WACC (as in Figure B), yield a value that is 76% lower than for the 2013/14 MRCP.

This suggests that the higher cost estimates provided by Western Power for 2012/13 and 2013/14 are not reflective of the capital contributions actually being charged to project developers that have either secured connection or been provided with an Access Offer to connect to the SWIS.

The graph also suggests that the 2012/13 and 2013/14 MRCPs are outliers and that the proposed 2014/15 MRCP is more consistent with previous determinations of the MRCP from 2008/09 to 2011/12.

The IMO seeks submissions on this Draft Report. Information on the public submission process is included within the report and can also be found in the Reserve Capacity section of the IMO website (www.imowa.com.au/mrcp).

[4] From Final Reports for the 2011/12 MRCP (shared connection cost of $10.158m) and 2012/13 MRCP (shared connection cost of $46.801m), available from http://www.imowa.com.au/mrcp_archive

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1. INTRODUCTION

The Maximum Reserve Capacity Price (MRCP) sets the maximum 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.

This Draft Report presents the updated component costs as determined for the 2012 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 Draft Report is published on the IMO website (www.imowa.com.au/mrcp) and a public consultation process will be held so that comments from stakeholders and other interested parties can be taken into consideration prior to publication of the Final Report. The final MRCP is then submitted to the Economic Regulation Authority (ERA) for approval.

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

1.1 Reserve Capacity Cycle Timing

This Draft Report has been prepared for the 2012 Reserve Capacity Cycle and the MRCP will be effective from 1 October 2014 through to 1 October 2015.

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 to accommodate 24 hours of operation;
- the fixed Operational and Maintenance (O&M) costs associated with the power station

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

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).

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.

Table 1: Consultants and agencies

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

The IMO notes that all but one of the organisations listed in Table 1 are the same as were consulted last year. The Annual WACC parameters were calculated last year by the Allen Consulting Group.

1.3 MRCP Review

The IMO is required, under Clause 4.16.9 of the Market Rules, to conduct a review of the methodology and process for determining the MRCP at least once in every five year period. The Market Advisory Committee (MAC) constituted the Maximum Reserve Capacity Price Working Group[6] (MRCPWG) in 2010 to consider, assess and develop any recommendations for changes to the Market Procedure.

The MRCPWG met ten times between May 2010 and June 2011. The review culminated in the development of a Procedure Change PC_2011_06[7] for the Market Procedure, which has now commenced.

This is the first year the amended Market Procedure (and modified methodology) has been used to determine the MRCP.

[6] Proceedings of the MRCPWG are available at http://www.imowa.com.au/mrcpwg
[7] Details of Procedure Change PC_2011_06 are available at http://www.imowa.com.au/PC_2011_06

As was agreed by the MRCPWG, the methodology employed this year for determining the MRCP is based on the same underlying concept of costing the entry of a 160 MW OCGT power station into the Wholesale Electricity Market (WEM) in the relevant Capacity Year (in this case 2014/15).

The constituent costs listed in section 1.2 above are the same as for previous years. However, a number of refinements to the methodology have been implemented following agreement by the MRCPWG and approval of the Procedure Change Proposal. These refinements could be classified into changes that had a significant impact on the MRCP and those that had less impact. The changes included in the MRCP methodology this year are listed below.

Changes expected to have a significant impact on MRCP:

- The methodology now includes an allowance for the costs and output efficiency gains of installing inlet cooling.
- The transmission cost calculation has been amended and is now determined from real costs faced by project developers, represented in historical connection costs and actual access offers determined by Western Power.

Changes expected to have less impact on MRCP:

- The land cost estimate is based on the average cost of the selected land parcels (rather than the cheapest location), with the land size set at three hectares (or the minimum land size for the location where this is greater than three hectares).
- The allowance to initially fill the fuel tank is sufficient for 14 hours of operation of the facility, increased from 12 hours.
- The effective compensation period is set to six months, shortened from two years, with capital costs escalated forward to April of Year 3 of the Reserve Capacity Cycle.
- An allowance for annual insurance costs is included within the Fixed O&M costs.
- An allowance for debt issuance costs is included within the Weighted Average Cost of Capital (WACC), with the corresponding debt financing costs removed from the margin M.
- The IMO has the discretion to nominate a method for determining the debt risk premium that, in its opinion, is consistent with current accepted Australian regulatory practice.

1.4 MRCP Outcome for the 2012 Reserve Capacity Cycle

The IMO proposes a value of the MRCP of $166,100 per MW per year for the 2012 Reserve Capacity Cycle.

This is a reduction of 31% from the 2011 MRCP of $240,600 per MW per year. This reduction is caused by a combination of year-on-year variation in input parameters (reduction of $21,800,

9.1%) and the methodology changes as a result of the MRCP Review (further reduction of $52,700, 24.1%). A detailed analysis of the changes since the 2011 MRCP is included in Section 4.4 of this report.

1.5 Supporting Documents

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

- MRCP Calculation Spreadsheet;
- Letter from Landgate, dated 29 September 2011, *Land Values for Reserve Capacity Price*;
- PwC letter, dated 4 October 2011, *WACC Components of the MRCP*;
- SKM report, dated 24 November 2011, *Review of the Maximum Reserve Capacity Price 2012*;
- GHD report, dated 24 November 2011, *Review of Fixed Fuel Cost for Maximum Reserve Capacity Price in the Wholesale Electricity Market, Diesel Fuel Storage and Handling Facility*; and
- Western Power report, dated 28 November 2011, *Total Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2014/15*.

2. ESCALATION OF COSTS

2.1 Escalation Factors

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 2012 MRCP is based on a theoretical power station that would commence operation on 1 October 2014. In line with the Market Procedure, capital costs are escalated to 1 April 2014 and O&M costs have been escalated to 1 October 2014. 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				
	2011/12	2012/13	2013/14	2014/15	2015/16
CPI	2.0%	3.25%	2.50%		
Power Station Capital Cost	4.29%	2.20%	2.29%	1.22%	1.16%
Connection Asset O&M Cost	4.38%				
Power Station O&M Cost	3.33%	3.82%	3.52%		
Transmission Connection Cost	4.90%				

In previous years, the escalation factors have been determined on the basis of historical price movements.

During the MRCP Review, the MRCPWG recommended that cost escalation be based on forecast price movements where feasible.

In addition, the application of these escalation factors has changed from previous MRCP determinations. For example, many of the capital costs for the 2011 MRCP were estimated in mid-2010 prices and escalated forward by one year using the applicable escalation factor. These were then escalated a further two years using the WACC.

The MRCPWG recommended that a revised approach be adopted for the 2012 MRCP whereby the WACC is applied to capital costs for an effective compensation period of six months. Consequently, capital cost estimates have been escalated forward to the corresponding date, six months prior to the commencement of the relevant Capacity Year (for the 2012 MRCP, 1 April 2014).

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

- The CPI (Consumer Price Index) escalation rates are determined from the forecasts of the Reserve Bank of Australia (RBA) 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 2013/14 financial year onwards. These values are also provided in the SKM report.
- 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. 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. Consequently, a single rate applies from the 2013/14 financial year onwards.
- 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.

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 2011 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 fifth year in which SKM has provided this estimate to the IMO. The scope provided to SKM was broadly the same as for last year, except for the inclusion of an allowance for the costs and output efficiency gains of installing inlet cooling.

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.

For the purposes of the 2012 MRCP:

PC = A$858,860.85 per MW

This price represents an increase of 8.6% from the corresponding value for the 2011 MRCP. Three key factors have contributed to this increase:

- The cost of main plant equipment has reduced by 12% since last year, providing an 8% reduction in PC. SKM has increased its reliance on current international market data as local project-related data has aged. SKM also notes in its report that "*increased competition globally for the supply of E Class OCGT's* [yields] *a materially lower plant and equipment estimate*".
- By contrast, increasing construction labour costs in Western Australia has increased the local costs by 33%, providing an increase of 12% in PC.
- The changed approach to cost escalation has contributed an increase of 4%. Costs have been escalated forward to 1 April 2014 and the WACC applied for six months (previously the costs were escalated one year and WACC applied for two years).

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 2012. This is the fifth 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 2012 MRCP:

M = 18.2%

This value is marginally lower than the corresponding value of 18.6% for the 2011 MRCP. The significant changes relate to:

- a reduction of 1% in the cost of raising capital, for which the cost of debt raising has been removed (debt issuance costs have been added to the WACC) as agreed by the MRCPWG;
- a reduction of 1.1% in the allowance for project insurance, acknowledging that "*The cost of project contract works insurance is included within the Capital Cost estimate*"[8]; and
- the inclusion (for the first time) of an allowance of 2% for start-up costs such as personnel-related expenses and costs associated with testing and commissioning.

The margin M is added as a fixed percentage of the capital cost of developing the power station.

3.3 Transmission Connection Costs (TC)

For the 2012 MRCP, Western Power has calculated the transmission connection cost estimate as part of its obligations under the Market Procedure.

The transmission connection cost estimate 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.

For the purposes of the 2012 MRCP:

TC = A$109,821 per MW

This value is approximately 64% lower than the corresponding value in 2011[9].

The IMO also notes that this is 14% lower than the indicative estimate provided in the Procedure Change Proposal PC_2011_06[10]. This indicative estimate was determined as if it

[8] See Section 6.3.4 of the SKM Report
[9] The transmission connection cost estimate this year is presented in dollars per MW, whereas it had previously been presented in dollars. For comparison purposes, this year's TC is multiplied by the expected Capacity Credit allocation (see Section 4.3).
[10] A reduction of 58% was estimated in the Procedure Change Proposal, which is available from http://www.imowa.com.au/PC_2011_06. This was taken from SKM's report to the MRCPWG, available from http://www.imowa.com.au/mrcpwg

was being prepared for last year's MRCP.

The revised methodology adopted as a result of the MRCP Review uses actual connection costs for projects within a 5-year window, and weights each connection cost according to the year that the facility commenced, or is expected to commence, operation. In determining TC for the 2012 MRCP, the calculation considers a different 5-year window than for the indicative estimate in Procedure Change Proposal PC_2011_06. This change in 5-year window results in changes to the set of projects considered in the calculation, as well as the application of different weightings on the projects' capital contributions.

For further information regarding the costing provided by Western Power, please refer to the Western Power report[11] 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 a similar basis to 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 easement. As such, the IMO has estimated the easement costs to be 50% of the purchase value of the land, consistent with the 2011 MRCP.
- The purchase price per hectare has been estimated by dividing the average cost of the land parcels (as valued by Landgate) by three hectares. Note that this cost estimate is as at 30 June 2011.

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 2012 using the CPI escalation factor for the 2011/12 financial year of 2.0%. Further escalation of this cost to 1 April 2014 occurs within the transmission connection cost estimate methodology where required.

The IMO has estimated that the easement cost as at 30 June 2012 is A$5.339M, and provided this value to Western Power for incorporation into its calculation.

In addition, the IMO recalculated the easement cost that would have applied for the 2011 MRCP

[11] See Western Power report *Total Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2014/15*.

to ensure that the costs were estimated on a consistent basis. This value is required under the Market Procedure in the determination of the transmission connection cost escalation factor. The IMO has performed the same calculation as described above, using the average cost of the land parcels that were valued by Landgate last year. This value has been escalated forward to 30 June 2011 using the 2010/11 CPI of 3.6% as reported in the RBA's *Statement of Monetary Policy, November 2011*. The resulting easement cost estimate for last year is A$5.195M.

3.4 Fixed Fuel Costs (FFC)

Fixed fuel costs for the determination of the 2012 MRCP were calculated by GHD. The IMO commissioned GHD to update the costing provided in its October 2010 report, entitled *Review of Fixed Fuel Cost for Maximum Reserve Capacity Price in the Wholesale Electricity Market*, with prices that reflect those in 2011. This is the fifth year in which GHD has provided this estimate to the IMO.

GHD has provided its cost estimate as at 30 June 2011, which has been escalated to 1 April 2014, using the CPI escalation rates from Table 1.

For the purposes of the 2012 MRCP:

FFC = A$3.180 M

This price represents an increase of 19.1% from the corresponding value for the 2011 MRCP. Three factors have contributed to this change:

- GHD estimates that the cost of engineering, procurement and construction of the facility has increased by 7%, providing a 6% increase in FFC.
- The unit price for distillate fuel, taken from the *Final Report, 2011 Review of the Energy Price Limits for the Wholesale Electricity Market in the SWIS*[12], has increased by 21% from last year. In addition, the initial fuel supply has been increased by 17% as agreed by the MRCPWG. The initial supply, sufficient to allow operation for 14 hours at maximum capacity, aligns with the requirements for certification of Reserve Capacity. In combination, these changes have provided a 9% increase in FFC.
- The approach to cost escalation has changed since last year, providing an increase of 5% in FFC. Costs have been escalated forward to 1 April 2014 and the WACC applied for six months (previously the costs were escalated one year and WACC applied for two years).

[12] Available at http://www.imowa.com.au/2011_EPL_REVIEW

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 fourth 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 differs from that used in the 2011 MRCP, where land sizes were fixed at three hectares for locations where no buffer zone is required and 30 hectares for locations where a substantive buffer zone is required. In its letter, Landgate notes that the change in land size from 30 hectares to three hectares for some locations has enabled suitable sites to be considered in industrial estates that are more centrally located within relevant towns. This has resulted in higher land prices per hectare for some locations.

Landgate has provided its estimate of the cost of each land parcel as at 30 June 2011. 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 2014, using the CPI escalation rates from Table 1.

For the purposes of the 2012 MRCP:

LC = A$2.670 M

This price represents an increase of 245% from the corresponding value for the 2011 MRCP. This significant increase in a relatively small component of the MRCP is predominantly due to the shift from using the cheapest location in the 2011 MRCP to the use of the average land cost.

3.6 Weighted Average Cost of Capital (WACC)

The methodology for calculating the WACC was reviewed by PwC for the MRCPWG in 2011.

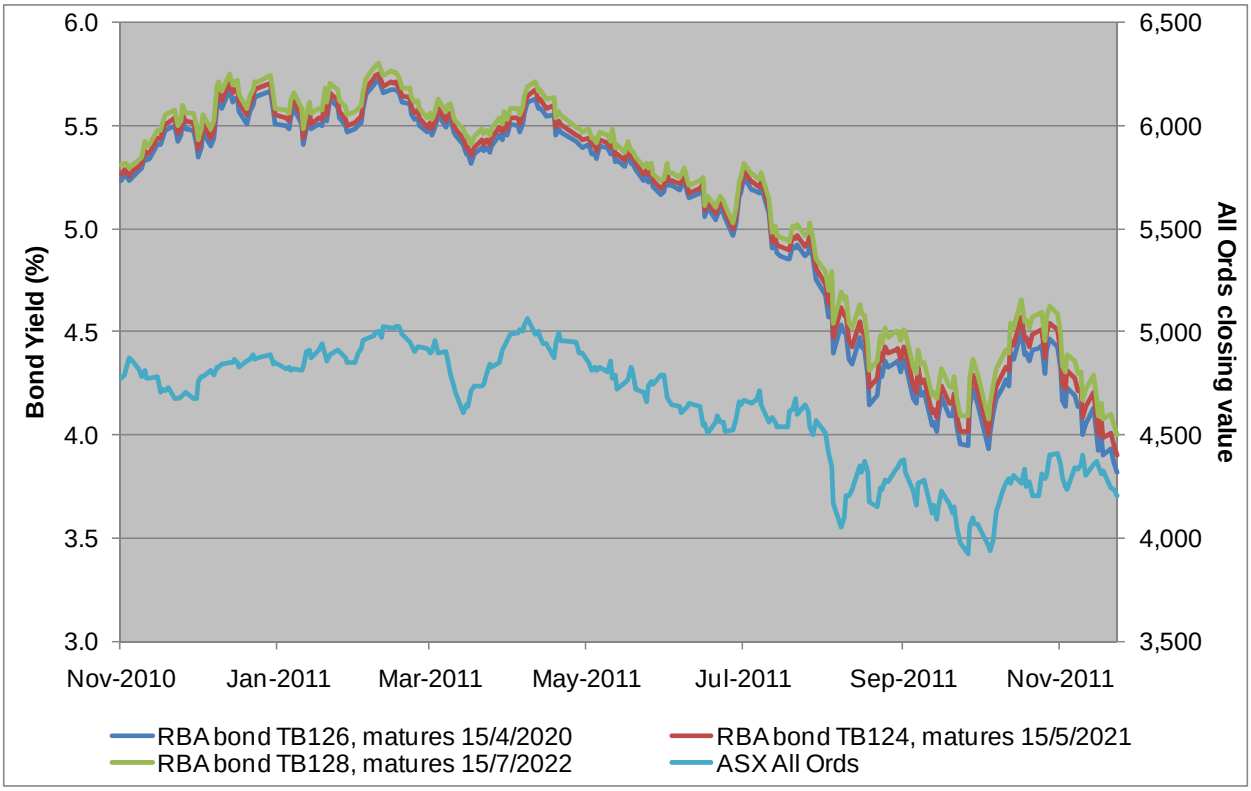
The IMO has subsequently commissioned PwC to update the Annual WACC parameters in line with 2011 prices for the 2012 MRCP.

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 risk free rate is determined from observed yields of Commonwealth Government bonds, while the debt risk premium (DRP) is determined from observed yields of corporate bonds.

The IMO notes that the WACC used for the determination of the 2012 MRCP has been significantly affected by turbulence in global financial markets during the second half of 2011. The turbulence in global markets has largely been driven by concerns over sovereign debt levels in Europe and slow economic growth in the US.

The market volatility has led many investors to prefer lower risk investments, such as government and high quality corporate bonds. Higher demand for bonds causes their prices to increase and yields to decrease. This is reflected in Figure 1, which shows the daily closing value of the All Ordinaries as well as indicative daily yields of Commonwealth Government securities with a maturity date approximately ten years from now.

Figure 1: Stock market results and bond yields, Nov 2010 to Nov 2011[13]



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

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

For the purposes of the 2012 MRCP:

WACC = 7.11%

This value is significantly lower than the WACC of 8.65% determined for the 2011 MRCP. This reduction is driven by lower values for two input parameters.

- The risk free rate has reduced from 5.59% to 4.25%. This parameter has been calculated from Commonwealth Government security yields using the same method as last year.
- The debt risk premium has reduced from 5.25% to 4.26%. As explained in Section 3.6.1, this parameter has been calculated from Bloomberg fair value data.

The parameters used to determine the WACC were calculated at 30 September 2011. The volatile Annual parameters will be recalculated prior to the publication of the final report so that the most recent numbers are used.

3.6.1 Debt Risk Premium

The methodology for calculation of the majority of the Annual WACC parameters is detailed in the Market Procedure. However, the MRCPWG agreed that it was appropriate that the IMO should have discretion to determine the methodology for calculating the debt risk premium (DRP). The MRCPWG acknowledged two key limitations with regard to previous methods used for the DRP:

- The availability of bond market data has declined significantly in recent years, specifically from Bloomberg and CBASpectrum, which have historically been the two providers of fair yield curves used by regulatory authorities in Australia. CBASpectrum has now ceased publishing fair value curves, "*citing a lack of data, problems with reliability and confusion about how the curves can be used*"[14]. Bloomberg ceased publishing its 10-year BBB fair value curves in 2008, its 8-year BBB curves in 2009 and 10-year AAA curves in 2010.
- This in turn has led to divergence between Australian regulatory authorities, as well as inconsistency in the approaches used by some authorities.

With the current instability, the MRCPWG considered that the allowance of discretion would enable the IMO to nominate the method it deemed most appropriate at the time that the MRCP is determined.

[14] See paragraph 21, Australian Competition Tribunal, Application by Jemena Gas Networks (NSW) Ltd (No 5) [2011] ACompT 10 (9 June 2011), available at http://www.austlii.edu.au/au/cases/cth/ACompT/2011/10.html

This is reflected in the Market Procedure, as amended following Procedure Change PC_2011_06. Step 2.9.7(h) of the Market Procedure states that:

> *The debt risk premium, DRP, for a Capacity Year is a margin above the risk free rate reflecting the risk in provision of debt finance. This will be estimated by the IMO as the margin between the observed annualised yields of Australian corporate bonds which have a BBB (or equivalent) credit rating from Standard and Poors and the nominal risk free rate.*
>
> *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.*[1]

The footnote on page 15 of the Procedure states:

> *Given observed issues with Bloomberg data, the ERA adopted an alternative 'Bond-Yield Approach' to establishing the DRP in its Final Decision on revisions proposed by WA Gas Networks (WAGN) to the access arrangement for the Mid West and South West gas distribution systems. It is understood that WAGN is appealing the use of this method to the Australian Competition Tribunal. Pending the outcomes of the appeal, and if the 'Bond-Yield Approach' were to become accepted Australian regulatory practice, the IMO intends to amend this Market Procedure.*

The IMO notes that the requirements for the methodology to be "*current*" and "*accepted*" would appear to be conflicting at this time. The IMO has placed emphasis on the acceptance of various methodologies, consistent with the footnote incorporated in the Market Procedure. The IMO considers that a methodology for determining the DRP is accepted if it has been challenged (for example, to the Australian Competition Tribunal) and the application of this methodology has been upheld.

In forming its opinion of the method that is consistent with current Australian accepted regulatory practice, the IMO has considered:

- the requirements of the Market Procedure;
- methodologies used by the ERA and the Australian Energy Regulator (AER); and
- decisions of the Australian Competition Tribunal (ACT).

The IMO notes that the Independent Pricing and Regulatory Tribunal of New South Wales (IPART) has recently utilised a methodology that has similarities to the *Bond-Yield Approach* employed by the ERA. However, the IMO notes that IPART's decisions in relation to the WACC are not reviewable by the ACT. The IMO has thus not considered IPART's methodology.

The ERA has developed the *Bond-Yield Approach* that was first employed in the *Final decision*

on WA Gas Networks Pty Ltd proposed revised access arrangement for the Mid-West and South-West Gas Distribution System[15] on 28 February 2011. The IMO notes the ERA's efforts to restore consistency through consistent application of the *Bond-Yield Approach* in subsequent decisions. The ERA had previously determined the DRP from CBASpectrum data.

However, the IMO notes that WA Gas Networks (WAGN) has appealed the ERA's Final Decision, including the determination of the cost of capital, to the ACT.

At the initial hearing on 28 October 2011, the ACT indicated that "*there is a serious question to be tried*"[16] in relation to the WACC proposed in the WAGN Final decision, within which the DRP is one element of the WACC that WAGN has specifically challenged. The ACT gave leave to WAGN to apply for a review of the Reviewable Decision.

The consistent use of the *Bond-Yield Approach* by the ERA since the WAGN Final Decision, as well as IPART's adoption of a methodology that is similar to ERA's approach, adds currency to the suggestion that the *Bond-Yield Approach* is the most current DRP adopted by Australian regulators. However, as noted above, the IMO does not consider this methodology to be consistent with accepted regulatory practice until the imposition of the methodology has been upheld by ACT.

By contrast, the AER has utilised various methods in recent decisions, some of which have been amended by order of the ACT.

- In its final decision on the access arrangement for ActewAGL (released on 30 March 2010), the AER used CBASpectrum data to determine the DRP. The AER considered that CBASpectrum best reflected bond market conditions based on comparison with a selection of corporate bonds.

  The ACT rejected the AER's decision on 17 September 2010[17] on the grounds that the comparative analysis undertaken by the AER was flawed. In its ruling, the ACT stated that:

  "*74. In a robust bond market, it would likely be possible for the AER to calculate the yield based on particular representative bonds issued in Australia in reasonably close proximity to the time of the AER's determination.*

  75. In the absence of a deep market for corporate bonds, the AER will likely have to rely on published fair value curves to estimate benchmark debt financing costs.

  76. If the fair value curves differ substantially, the AER will need to choose between them."

[15] Available at http://www.erawa.com.au/3/1086/48/dampier_to_bunbury_natural_gas_pipeline__revised_a.pm
[16] See paragraph 24, Australian Competition Tribunal, WA Gas Networks Pty Ltd (No 1) [2011] ACompT 14 (28 October 2011), available at http://www.austlii.edu.au/au/cases/cth/ACompT/2011/14.html
[17] Available at http://www.austlii.edu.au/au/cases/cth/ACompT/2010/4.html

Despite limitations in the availability of 10-year BBB data from Bloomberg, the ACT considered that this could be estimated by extrapolation of Bloomberg's 7-year BBB fair value curve:

"*21. … Both the parties agreed that it was possible to extrapolate Bloomberg's curve to 10 years by adding to it the spread between Bloomberg's AAA seven year and 10 year fair value curves.*"

- In its final decision on the access arrangement for Jemena Gas Networks (released on 11 June 2010), the AER used an average of Bloomberg and CBASpectrum data to determine the DRP. Following an analysis of the relative merits of the two data sources, the ACT rejected the AER's decision on 9 June 2011:

  "*86. We therefore find that the appropriate curve from which the debt risk premium for JGN should be calculated is the Bloomberg fair value curve. The Bloomberg fair value curve is a much better fit than the CBASpectrum curve. The latter is so poor a fit to the data that it would not even be appropriate to consider averaging it with the Bloomberg curve.*"

- In its *Final decision, Victorian electricity distribution network service providers, Distribution determination 2011-2015*[18], the AER determined the DRP from a weighted average of Bloomberg data (75%) and the observed yield for the Australian Pipeline Trust (APT) BBB-rated 10-year bond (25%). In subsequent decisions, the AER determined the DRP by applying equal weightings to the Bloomberg data and APT bond. In initial hearings on 12 October 2011, the ACT gave leave to Envestra to apply for a review of the Reviewable Decision in relation to the debt risk premium (and other parameters) used in the access arrangement decisions related to its Queensland and South Australia gas distribution networks[19].

- In its *Draft decision, Powerlink Transmission determination, 2012-13 to 2016-17*[20], issued on 29 November 2011, the AER determined the DRP from the average yield of a sample of 9 Australian corporate bonds with a remaining term to maturity between 7 and 13 years. Powerlink has indicated that it will be responding to the Draft decision by 16 January 2012[21]. The IMO considers that this methodology is similar in principle to the ERA's *Bond-Yield Approach*, which is subject to appeal to the ACT as noted above.

The IMO acknowledges that current Australian regulatory practice with regard to the determination of the DRP is in a state of transition and is awaiting a number of ACT decisions that will provide significant clarity to determinations of DRP. However, the IMO does not have

[18] Available at http://www.aer.gov.au/content/index.phtml/itemId/740791
[19] Available at http://www.austlii.edu.au/au/cases/cth/ACompT/recent.html
[20] Available at http://www.aer.gov.au/content/index.phtml/itemId/750738
[21] See http://www.powerlink.com.au/Network/Connection_and_pricing/Revenue_reset_proposal.aspx for more information.

the benefit of delaying its MRCP determination until methodologies have either been upheld or rejected in an ACT decision.

On the balance of the information presented, the IMO is of the opinion that it should determine the DRP from the 7-year Bloomberg BBB fair value curve, extrapolated to ten years using the difference between the AAA 7-year and 10-year fair value curves (taken from the most recent publication of those AAA curves). This opinion is based on:

- paragraphs 74 and 75 from the ACT's ActewAGL decision, which indicate that the DRP should be determined from published fair value curves in the absence of a deep bond market (a finding that remains relevant in current market conditions);
- the ACT's Jemena decision, which indicates that Bloomberg provides the more reliable fair value curve (compared to CBASpectrum);
- the extrapolation technique agreed by both parties in the ACT's ActewAGL decision;
- the outstanding applications to the ACT in relation to the use of the APT bond and the ERA's *Bond-Yield Approach*, leading the IMO to conclude that these methods are not yet "*accepted*"; and
- the drafting of the Market Procedure.

The IMO notes that this is consistent with the recommendation of PwC in its report for the MRCPWG[22].

Despite this, the IMO notes the significant shortcomings with the nominated method, particularly in relation to its currency. The method relies on extrapolation of Bloomberg fair value curves, which are determined through a confidential method. Further, the extrapolation technique is reliant on the 10-year AAA fair value curve that Bloomberg ceased publishing in June 2010. The IMO also notes that regulatory authorities have variously formed the view that extrapolated Bloomberg fair value curves over-estimate the true cost of debt and have moved away from methodologies based on Bloomberg data.

In acknowledgement of these shortcomings, the IMO has committed to amend the Market Procedure to adopt the *Bond-Yield Approach* for future MRCP determinations if it is upheld by the ACT.

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:

[22] Available at http://www.imowa.com.au/mrcpwg

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

For the purposes of the 2012 MRCP:

CAPCOST = A$191.877 M

3.8 Fixed Operation & Maintenance Costs (ANNUALISED_FIXED_O&M)

3.8.1 Generation

For the 2012 determination, SKM has determined the fixed O&M costs for the generator assets using the same methodology as last year. This is the sixth 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[23] details the total fixed O&M costs of the OCGT to year 15 as A$30.448 M in June 2011 terms. This cost is annualised and then escalated forward by 3-1/4 years, to 1 October 2014 (the point at which these costs are assumed to commence), using the power station O&M escalation factors.

For the purposes of the 2012 MRCP:

Generation Fixed O&M Costs = A$14,249.30 per MW per year

This cost represents an increase of 12.6% from the corresponding value for the 2011 MRCP. The un-escalated cost has increased by 3.8%, with the remainder of the increase caused by the amended cost escalation methodology. For the 2011 MRCP, costs were escalated forward by 12 months.

3.8.2 Transmission

For the 2012 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 sixth MRCP for which SKM has provided the estimate of these costs. The IMO has added an estimate of Western Power's fixed network and tariff charges.

An annuity is calculated taking the first 15 years of O&M costs provided by SKM. The SKM report[24] details the total fixed O&M costs for the switchyard and transmission line assets. This cost is annualised and then escalated forward by 3-1/4 years, to 1 October 2014 (the point at which these costs are assumed to commence), using the connection asset O&M escalation factor.

[23] See Table 3-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2012*.
[24] See Tables 4-1 and 4-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2012*.

For the purposes of the 2012 MRCP:

Transmission Fixed O&M Costs = A$418.54 per MW per year

This cost represents an increase of 14.4% from the corresponding value for the 2011 MRCP. The un-escalated cost has increased by 3.7%, with the remainder of the increase caused by the amended cost escalation methodology. For the 2011 MRCP, costs were escalated forward by 12 months.

3.8.3 Network access charges

Western Power's published 2011/12 Price List[25] provides the various charges for network access and related services that apply for generation facilities. Reference Tariff TRT2 is assumed to apply to the power station. 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 2011/12, Collie was the most expensive of the locations.

For the purpose of the MRCP, the costs are assumed as at 1 July 2011 and have been escalated forward to 1 October 2014. As the Western Power charges fund capital and operating expenditure related to the transmission and distribution network, the transmission connection cost escalation factor has been used.

For the purposes of the 2012 MRCP:

Fixed Network Access Costs = A$15,415.02 per MW per year

This cost represents an increase of 13.5% from the corresponding value for the 2011 MRCP. The un-escalated cost has decreased by 0.2% as the Western Power unit prices are lower than in the 2010/11 price list. However, the increase in this value is caused by the amended cost escalation methodology. For the 2011 MRCP, costs were escalated forward by 12 months.

3.8.4 Insurance costs

Following the recent amendments to the Market Procedure, the Fixed O&M component of the MRCP is required to include 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 first year for which these costs are included in the MRCP.

[25] Available at http://www.westernpower.com.au/documents/aboutus/accessarrangement/2011/2011_12_Price_List.pdf

The IMO has consulted with two well-known insurance brokers to estimate the relevant insurance premiums. The insurance brokers have requested that they not be named. Based on the indicative quotations provided to the IMO, the insurance premiums have been estimated as follows:

- Asset replacement and business interruption insurance is estimated as A$321,000 per year as at 1 April 2014, calculated as 0.23% of the asset capital costs at that date (being PC plus the non-fuel component of FFC). A terrorism levy of 2% has been added to this estimate, with the total then marked up by 10% to cover stamp duty.
- Public and products liability insurance is estimated as A$120,000 per year as at 30 June 2011, based on a limit of $50M for any one occurrence. As with the asset replacement and business interruption insurance, a terrorism levy of 2% has been added to this estimate, with the total then marked up by 10% to cover stamp duty.

The insurance costs have been escalated forward to 1 October 2014 (the point at which these costs are assumed to commence), using the CPI escalation factor.

For the purposes of the 2012 MRCP:

Insurance Costs = A$3,101.53 per MW per year

The IMO notes that insurance costs related to the development phase of the power station are included within margin M.

3.8.5 Total Fixed Operation & Maintenance Costs

For the purposes of the 2012 MRCP:

ANNUALISED_FIXED_O&M = A$33,184 per MW per year

Total fixed operation and maintenance costs have increased by 24.5% compared to last year, predominantly due to the inclusion of insurance charges and the amended cost escalation methodology.

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$191.877 M, as determined in Section 3.7;
- the WACC of 7.11%, as determined in Section 3.6; and
- a term of 15 years, as required by the Market Procedure.

For the purposes of the 2012 MRCP:

ANNUALISED_CAPCOST = A$21.213 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 3.8.4. For the purposes of the 2012 MRCP:

ANNUALISED_FIXED_O&M = A$33,184 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. For the purposes of the 2012 MRCP:

CAP = 159.6 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 2012 Reserve Capacity Cycle is determined to be A$166,097.44 which is rounded to:

MRCP = A$166,100 per MW per year

A MRCP of A$166,100 per MW per year is proposed by the IMO. This represents a 31% decrease from the 2011 MRCP of $240,600.

This reduction is caused by a combination of year-on-year variation in input parameters and the methodology changes as a result of the MRCP Review, as explained in Section 1.3 of this

report.

The impact of year-on-year variation in the input parameters (excluding the impact of methodology changes) is shown in Table 3 below. This variation has led to a 9% reduction from the 2011 MRCP. This reduction is predominately caused by a significant shift lower in the WACC, which is explained in Section 3.6.

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

	Impact ($)	Impact (%)	MRCP ($)
2013/14 MRCP			**240,600**
Power Station costs	+ 3,000	+ 1.2%	243,600
Margin M	+ 800	+ 0.3%	244,400
Fixed Fuel Cost	+ 200	+ 0.1%	244,600
Land Cost	-	-	244,600
WACC	- 26,000	- 10.8%	218,600
Fixed O&M	+ 200	+ 0.1%	218,800
Combined impact	**- 21,800**	**- 9.1%**	**218,800**

The impact of the methodology changes as a result of the MRCP Review is shown in Table 4 on the following page. These changes have contributed a 24% reduction, which is consistent with the indicative impact assessment provided in the Procedure Change Proposal PC_2011_06.

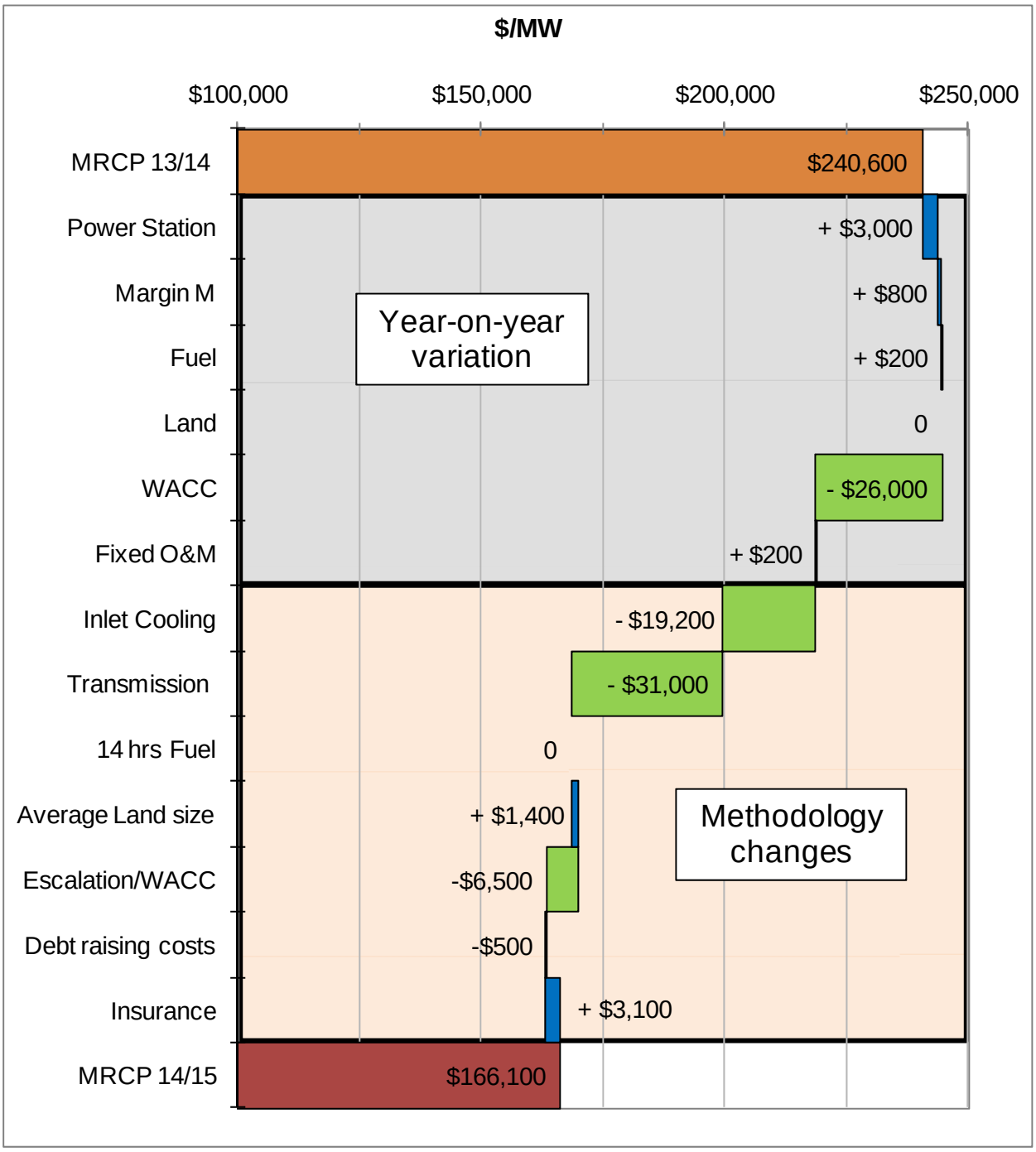
This reduction is dominated by the adoption of inlet cooling within the power station design and the amended methodology for the transmission connection cost estimate.

Table 4: Impact of methodology changes in input parameters

	Impact ($)	Impact (%)	MRCP ($)
MRCP after year-on-year changes			**218,800**
Inclusion of inlet cooling	- 19,200	- 8.8%	199,600
Revised Transmission Cost methodology	- 31,000	- 14.2%	168,600
Increased fuel allowance (increase from 12 to 14 hours)	-	-	168,600
Use of average land cost	+ 1,400	+ 0.6%	170,000
Revised cost escalation/WACC methodology	- 6,500	- 3.0%	163,500
Debt issuance cost included in WACC, corresponding costs removed from Margin M	- 500	- 0.2%	163,000
Annual insurance costs included in Fixed O&M	+ 3,100	+ 1.4%	166,100
Net change	**- 52,700**	**- 24.1%**	**166,100**

Figure 2 combines the data from Tables A and B.

Figure 2: Comparison of 2011 and 2012 MRCPs



Appendix B provides a detailed breakdown of the calculation and Appendix C provides a detailed comparison of the 2012 MRCP parameters and the 2011 MRCP parameters.

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 2014/15 Capacity Year. Following receipt of public submissions, the IMO will propose a final revised value of the Maximum Reserve Capacity Price to the ERA for approval.

5.1 Submission Guidelines

Submissions must be made in writing and be no longer than five pages in length (12 point font). Claims regarding the appropriateness of the values used by the IMO to determine the MRCP for the 2012 Reserve Capacity Cycle must be accompanied by supporting evidence.

In keeping with the principle of open and transparent processes, all submissions will be published on the IMO website.

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 2014/15 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.

The IMO will directly contact parties who make a submission with details of the workshop. When making a submission, please include details of one contact that will be nominated to attend the workshop.

5.3 Details for Making a Submission

Submissions should be addressed to:

Greg Ruthven
Acting 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 Friday, 13 January 2012.

General enquiries may be directed to Johan Van Niekerk 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. The 2012 MRCP is the first to be determined since the commencement of amendments to the Market Procedure as recommended by the MRCPWG.

For the 2012 Reserve Capacity Cycle, the IMO proposes that the MRCP be set at $166,100 per MW per year.

The MRCP of $166,100 per MW per year represents a decrease of 31% from the 2011 price. The main drivers of the lower MRCP have been the inclusion of inlet cooling in the power station design; the implementation of the methodology for estimating transmission connection costs as recommended by the MRCPWG; and a lower WACC.

The 2012 MRCP computation has been included in Appendix B and a comparison between the 2011 and 2012 MRCPs can be found in Appendix C.

As part of the review, the IMO calls for submissions from the Western Australian energy industry, including end users, on the proposed MRCP for the 2012 Reserve Capacity Cycle. The closing date for submissions is Friday, 13 January 2012.

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 reviewed the Annual parameters and updated the relevant parameters in line with current prices and values. 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 2011 and 2012

Parameter	Notation	2012 Value	2011 Value
Nominal Risk Free Rate of Return (%)	R_f	4.25	5.59
Expected Inflation (%)	i	2.67	2.9
Real risk free rate of return (%)	R_{fr}	1.53	2.65
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	4.26	5.25
Debt issuance costs (%)	d	0.125	0.125
Corporate tax rate (%)	t	30	30
Franking credit value	γ	0.5	0.5
Debt to total assets ratio (%)	D/V	40	40
Equity to total assets ratio (%)	E/V	60	60

For the purposes of the 2012 MRCP:

WACC = 7.11%

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: 2012 MRCP and associated parameters

Parameter	Value	Unit
2012 MRCP	**$166,100.00**	**A$/MW/Year**
Where		
ANNUALISED_FIXED_O&M	$33,184.39	A$/MW/Year
ANNUALISED_CAPCOST	$21,212,922.35	A$/Year
CC	159.6	MW

Table B2: ANNUALISED_CAPCOST and associated parameters

Parameter	Value	Unit
CAPCOST	**$191,876,640.83**	**A$**
Where		
PC	$858,860.85	A$/MW
M	18.20%	%
TC	$109,821.00	A$
CC	159.6	MW
FFC	$3,180,153.30	A$
LC	$2,670,053.52	A$
WACC	7.11%	%
Annualisation		
ANNUALISED_CAPCOST	**$21,212,922.35**	**A$/Year**
Where		
CAPCOST	$191,876,640.83	A$
WACC	7.11%	%
Term of Finance (Years)	15	Years

APPENDIX C: COMPARISON BETWEEN THE 2011 AND 2012 MAXIMUM RESERVE CAPACITY PRICES

Table C1: Comparison between 2011 and 2012 MRCPs

Parameter	Reserve Capacity Year 2012	2011	Units
PC	$858,860.85	$790,634.25	A$/MW
M	18.2%	18.6%	%
TC ($/MW)	$109,821.00	*$304,985.68*	A$/MW
TC ($)	*$17,527,431.60*	$48,797,708.54	A$
FFC	$3,180,153.30	$2,670,126.35	A$
LC	$2,670,053.52	$772,904.19	A$
CAPCOST	$191,876,640.83	$238,777,908.78	A$
Term of Finance	15	15	Years
WACC	7.11%	8.65%	%
ANNUALISED_CAPCOST	**$21,212,922.35**	**$29,013,199.36**	**A$/Year**
CC	159.6		MW
CAP		160.0	MW
SDF		1.18	N/A
ANNUALISED_CAPCOST	$21,212,922.35	$29,013,199.36	A$/Year
ANNUALISED_FIXED_O&M	$33,184.39	$26,648.64	A$/MW/Year
MRCP	**$166,100.00**	**$240,600.00**	**A$/MW/Year**

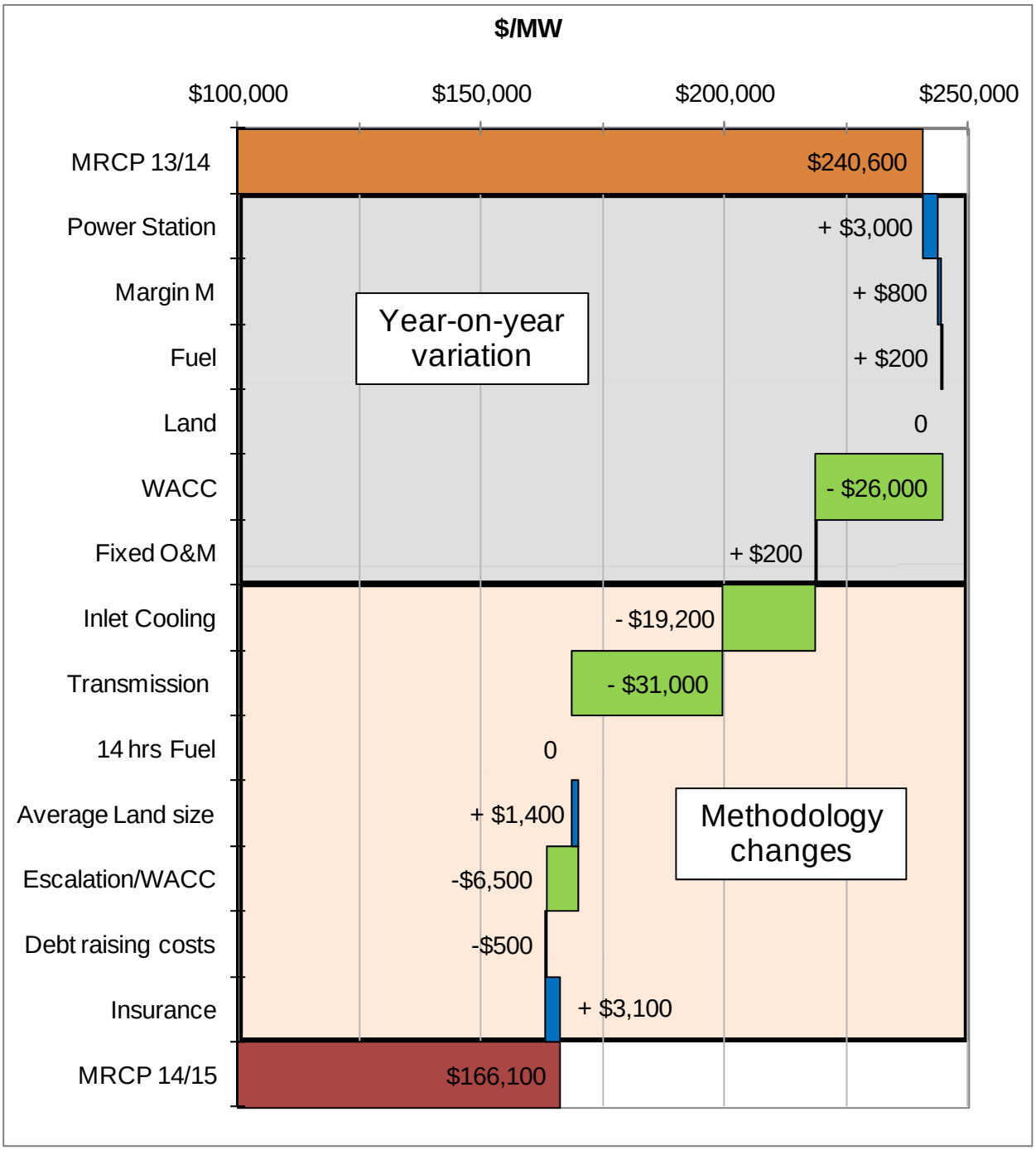
Table C2: Impact of year-on-year changes in input parameters

	Impact ($)	Impact (%)	MRCP ($)
2013/14 MRCP			**240,600**
Power Station costs	+ 3,000	+ 1.2%	243,600
Margin M	+ 800	+ 0.3%	244,400
Fixed Fuel Cost	+ 200	+ 0.1%	244,600
Land Cost	-	-	244,600
WACC	- 26,000	- 10.8%	218,600
Fixed O&M	+ 200	+ 0.1%	218,800
Combined impact	**- 21,800**	**- 9.1%**	**218,800**

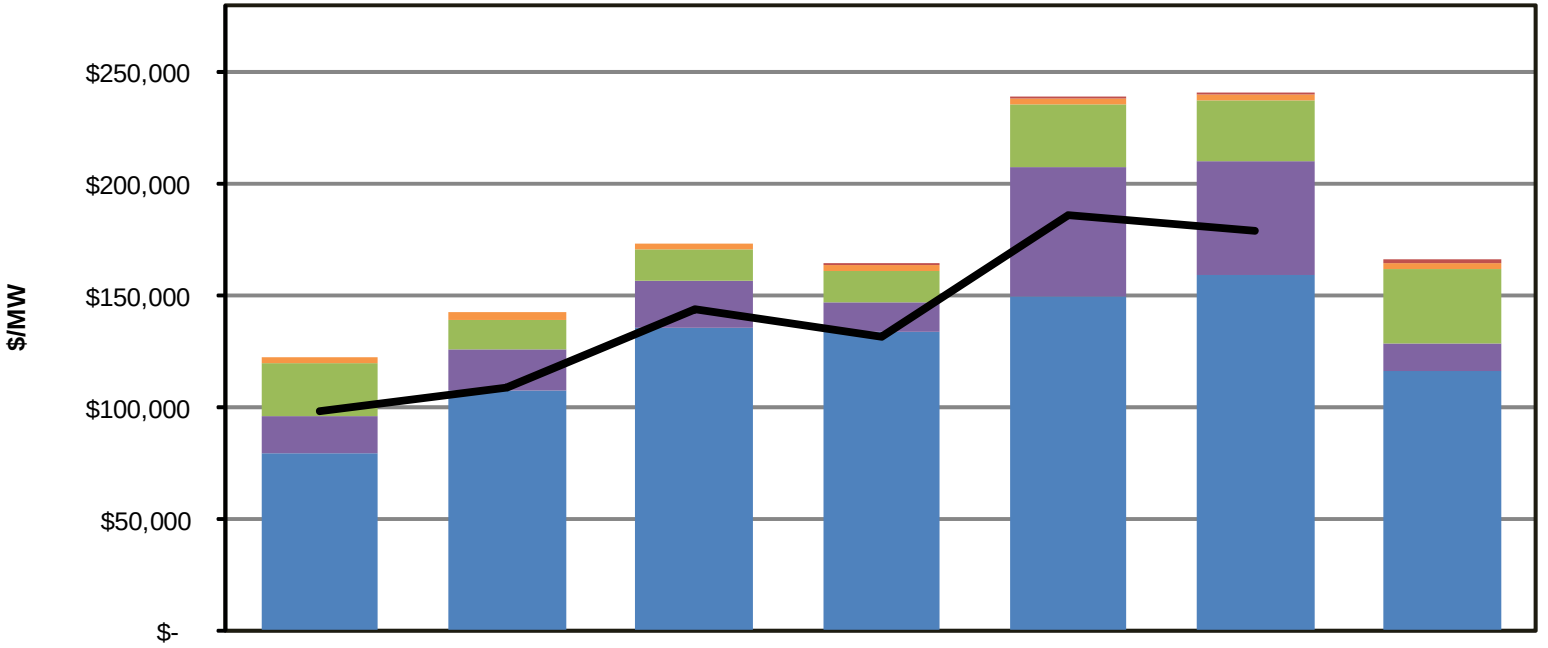
Table C3: Impact of methodology changes in input parameters

	Impact ($)	Impact (%)	MRCP ($)
MRCP after year-on-year changes			**218,800**
Inclusion of inlet cooling	- 19,200	- 8.8%	199,600
Revised Transmission Cost methodology	- 31,000	- 14.2%	168,600
Increased fuel allowance (increase from 12 to 14 hours)	-	-	168,600
Use of average land cost	+ 1,400	+ 0.6%	170,000
Revised cost escalation/WACC methodology	- 6,500	- 3.0%	163,500
Debt issuance cost included in WACC, corresponding costs removed from Margin M	- 500	- 0.2%	163,000
Annual insurance costs included in Fixed O&M	+ 3,100	+ 1.4%	166,100
Net change	**- 52,700**	**- 24.1%**	**166,100**

Figure C1: Comparison of 2011 and 2012 MRCPs



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
Power Station Cost	$ 79,110	$ 107,404	$ 135,701	$ 134,091	$ 149,306	$ 158,710	$ 116,154
Transmission Costs	$ 16,558	$ 18,017	$ 20,672	$ 13,151	$ 58,493	$ 51,621	$ 12,565
Fixed O& M	$ 23,900	$ 13,363	$ 14,392	$ 13,431	$ 27,335	$ 26,649	$ 33,184
Fuel Costs	$ 2,907	$ 3,456	$ 2,631	$ 3,151	$ 2,615	$ 2,825	$ 2,280
Land Costs	$ -	$ -	$ -	$ 293	$ 769	$ 818	$ 1,914
MRCP (nearest $100)	$ 122,500	$ 142,200	$ 173,400	$ 164,100	$ 238,500	$ 240,600	$ 166,100
Excess Capacity	6.43%	11.44%	2.19%	5.83%	8.99%	14.59%	NA
Reserve Capacity Price (per yr)	$ 97,837	$ 108,459	$ 144,235	$ 131,805	$ 186,001	$ 178,477	NA

APPENDIX E: ABBREVIATIONS

ABS – Australian Bureau of Statistics

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

GST – Goods and Services Tax

IMO – Independent Market Operator

IPART – Independent Pricing and Regulatory Tribunal of New South Wales

MAC – Market Advisory Committee

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

WAGN – WA Gas Networks

WEM – Wholesale Electricity Market