Independent Market Operator

Final Report: Maximum Reserve Capacity Price Review for the 2012/13 Reserve Capacity Year

January 2010

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EXECUTIVE SUMMARY

Each year, the IMO is required to conduct a review of the Maximum Reserve Capacity Price. This Final Report details the outcome of the review conducted in 2009 to determine the Maximum Reserve Capacity Price for the 2010 Reserve Capacity Cycle.

The 2010 Maximum Reserve Capacity Price proposed by the IMO is $238,500 per MW per year. This value will be effective from 1 October 2012 through to 1 October 2013.

The review process included a technical costing of the following components:

- Developing and constructing a 160MW Open Cycle Gas Turbine power station;
- Land costs associated with developing the 160MW Open Cycle Gas Turbine power station;
- Technical connection to the 330kV transmission system;
- Operations and Maintenance costs associated with the Open Cycle Gas Turbine power station and the transmission components;
- Developing and constructing liquid fuel storage facilities; and
- Legal, approval and financing costs.

The Maximum Reserve Capacity Price determined for the 2010 Reserve Capacity Cycle is approximately 45% higher than the Maximum Reserve Capacity Price of $164,100 per MW per year determined for the 2009 Reserve Capacity Cycle. The main components of the $78,400 cost increase has resulted from:

- Substantial increases in the transmission connection costs (approx $36,700 per MW per year);
- Changes to the Minor components of the WACC (approx $14,000 per MW per year);
- Increases in the transmission Operation and Maintenance costs, resulting from the inclusion of Western Power Use of System charges (approx $8,300 per MW per year);
- Inclusion of the easement costs in the determination of the transmission cost component (approx $6,200 per MW per year); and
- Optimisation across different connection points to enable the Maximum Reserve Capacity Price to better reflect the actual costs of bringing the 160 MW Open Cycle Gas Turbine onto the South West interconnected system (approx $6,100 per MW per year).

The optimisation referred to above has involved determining the cost of connecting the 160 MW Open Cycle Gas Turbine for each of the locations at which land prices is determined. The Maximum Reserve Capacity Price is then calculated for each location, taking land prices and connection costs into account. The least cost location is then chosen. For the 2010 review, the

location determined to be least optimised cost was Kemerton.

While a number of components of the Maximum Reserve Capacity Price for the 2010 Reserve Capacity Cycle have increased in comparison to last year's values some have decreased. The main decreases have resulted from:

- The reduced value for the margin allowed to cover legal, approval and financing costs (approx $4,600 per MW per year); and
- Decreases to the costs associated with developing and constructing the liquid fuel storage facilities (approx $800 per MW per year).

The remaining $8,800 per MW per year difference between the 2010 MRCP and the 2009 MRCP is due to a number of smaller changes to the remaining components and changes to the escalation figures applied to all components. The magnitudes of these changes are detailed within this report.

This year the IMO requested that The Allen Consulting Group review the major components of the Weighted Average Cost of Capital used in the calculation of the Maximum Reserve Capacity Price to apply for the 2010 Reserve Capacity Cycle. A number of changes to the major components were suggested[1]. These major components are prescribed in the Market Procedure for the Determination of the Maximum Reserve Capacity Price (the Market Procedure). In order to use updated values for the major components a procedure change was necessary

On 20 November 2009 the IMO proposed a change to the procedure used to calculate the MRCP. The proposal provided for the major components of the WACC to be updated. At the same time, the IMO published the 2010 Draft Maximum Reserve Capacity Price report using the updated parameters. One Market Participant questioned this action and the IMO held stakeholder consultation to discuss the impacts of this action. Subsequent advice indicated it was inappropriate to release the two documents in parallel.

A further draft report was issued on 10 December 2009 using the major components of the WACC from the original Market Procedure. Consultation on the draft report was also extended. This final report is produced on the same basis as the draft report.

Since the publication of the draft report the IMO has altered five components of the Maximum Reserve Capacity Price. These alterations are the result of both the submission period and the

[1] A copy of The Allen Consulting Group report is available on the IMO website http://www.imowa.com.au/mrcp

IMO's commitment to update the minor Weighted Average Cost of Capital components. These changes include:

- Inclusion of a cost estimate for the acquisition of easements, as presented by Sinclair Knight Merz, in the calculation of the transmission costs associated with the Maximum Reserve Capacity Price. The inclusion of this parameter has put upward pressure on the Maximum Reserve Capacity Price;

- Removal of the Financing Charges (IDC) component from the Margin M parameter, this has had downward pressure on the Maximum Reserve Capacity Price;

- Updates to the minor components of the Weighted Average Cost of Capital as committed to by the IMO in the draft report. These changes have had put upward pressure on the Weighted Average Cost of Capital and therefore on the Maximum Reserve Capacity Price

- Inclusion of debt and equity raising costs in the Margin M parameter; and

- Updated Transmission O&M costs and Transmission cost capital contributions based on the approved Western Power tariff increases.

The overall effect of these changes is a Maximum Reserve Capacity Price which is 3% higher in comparison to that proposed in the draft report, and 45% higher than the price that was determined for the 2009 Reserve Capacity Cycle.

1. INTRODUCTION

The Maximum Reserve Capacity Price (MRCP) sets the maximum offer 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, by the Wholesale Electricity Market Rules (Market Rules), to conduct a review of a number of the components that are used to determine the MRCP. The results of this review, and a proposed revised MRCP value, are published in a draft report for public consultation.

Following the public consultation process, the IMO must then propose a final revised MRCP value and submit that value, along with a final report[2] (produced in accordance with clause 4.16.7 of the Market Rules) to the Economic Regulation Authority (ERA) for approval.

The MRCP value used for the 2010 Reserve Capacity Cycle will be effective from 1 October 2012 to through to 1 October 2013.

In accordance with the Market Procedure for the Determination of the Maximum Reserve Capacity Price (Market Procedure), the IMO is required to assess the appropriateness of the following values:

- The optimum size of an Open Cycle Gas Turbine (OCGT) for the South West interconnected system (SWIS);
- The capital cost of an OCGT power station;
- Land costs associated with developing and constructing an OCGT power station;
- The level of electricity transmission connection costs;
- The cost of acquiring and installing fuel tanks for sufficient liquid fuel storage to accommodate 24 hours of operation;
- The estimate of the fixed Operating and Maintenance (O&M) costs for the power station and the transmission facilities listed above; and
- A margin for legal, approval, financing costs and contingencies.

This final report reviews the appropriateness of each of these values for the 2010 Reserve Capacity Cycle. To do this the IMO uses publicly available information, together with advice from independent engineering and economics consultants, to review the various input parameters that are used in calculating the MRCP.

[2] Published on the IMO website: www.imowa.com.au/mrcp

On 20 November 2009 the IMO proposed a change to the Market Procedure used to calculate the MRCP. The proposal provided for the major components of the WACC to be updated. At the same time, the IMO published the 2010 Draft Maximum Reserve Capacity Price report using the updated parameters. One Market Participant questioned this action and the IMO held stakeholder consultation to discuss the impacts of this action. Subsequent advice indicated it was inappropriate to release the two documents in parallel.

A further draft report was issued on 10 December 2009 using the major components of the WACC from the original Market Procedure. Consultation on the draft report was also extended. This final report is produced on the same basis as the draft report.

Following the public consultation process the IMO received submissions from:

- Alinta;
- Griffin Energy;
- Infratil Energy Australia;
- Landfill Gas and Power;
- Perth Energy;
- Synergy; and
- Tesla Corporation.

A summary of the submissions received and the IMO's response to each of the issues raised is included in section 5 of this paper. The full details of the submissions are available on the IMO website.

In accordance with clause 4.16.7 of the Market Rules and as a result of the submissions received the IMO proposes a final revised value of the MRCP of $238,500 per MW per year. This value has been revised up from the draft report in response to the inclusion of easement costs in the calculation of the Transmission Cost (TC[2010]) component of the MRCP, the removal of the Financing Charges (IDC) component from the Margin M parameter, updates to the minor components of the Weighted Average Cost of Capital (WACC), inclusion of the cost of debt and equity raising in Margin M and updated Transmission costs and O&M costs in line with the recently approved Western Power Tariff increases.

1.1 Reserve Capacity Cycle Timing

This final report has been prepared for the 2010 Reserve Capacity Cycle and the resultant MRCP will be effective from 1 October 2012 through to 1 October 2013.

1.2 General Costing Methodology and Structure of this Final Report

There are a number of main components to the review. These include:

- The capital cost of an OCGT power station;
- The land costs associated with building the OCGT power station;
- The costs associated with connection of the OCGT power station to the transmission system;
- An estimation of O&M costs associated with the transmission connection and the OCGT plant; and
- A review of the costs associated with building liquid fuel storage and handling facilities for the OCGT peaking power station.

Under the Market Procedure Western Power is required to provide connection costs associated with connecting an OCGT power station to the transmission system. Previously these have been estimated by Sinclair Knight Merz (SKM). For the 2010 MRCP review, Western Power was required to provide this information to give a clearer indication of the costs associated with connecting to the SWIS.

In line with previous years' reviews, SKM has provided the O&M costs associated with the OCGT and the transmission connection assets. The same methodology for calculating these costs has been applied for the 2010 MRCP review.

As was done in the 2009 MRCP review, land costs are also included in the determination of the MRCP. The IMO commissioned Landgate to develop an appropriate costing of land parcels in areas that would be suitable for the development and construction of an OCGT power station.

For the 2010 Reserve Capacity Cycle, the IMO commissioned GHD to update the values determined in its 2008 review of the costs associated with building liquid fuel storage and handling facilities for a power station.

1.3 MRCP Outcome for the 2010 Reserve Capacity Cycle

Following the 2010 MRCP review the IMO proposes a value of the MRCP of $238,500 per MW per year.

Other than the increase in OCGT power station costs, the main upward cost drivers have been cost increases associated with connecting to the transmission system and the inclusion of Use of System charges in the calculation of Transmission Fixed O&M costs.

2. ESCALATION OF COSTS

2.1 Consumer Price Index (CPI)

The following CPI values are quoted by the Australian Bureau of Statistics (ABS) for the period June 2008 and June 2009.

CPI June 2008	164.6
CPI June 2009	167.0

The CPI provided by the ABS is the weighted average of eight capital cities within Australia[3]. These values indicate an inflation rate of 1.5% over the period June 2008 to June 2009. The CPI is used to escalate prices that are not determined by SKM as part of the industry escalation of the power station or transmission connection capital costs.

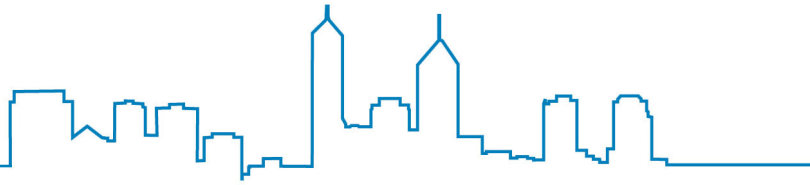
2.2 Industry Escalation

The IMO requested SKM to develop industry escalation figures for the 2010 MRCP review. These are used to reflect the changes in costs from the time that the price reviews were conducted in 2009 to the time the MRCP for 2010 will come into effect. The approach of calculating escalation figures is continued from previous years. Escalation parameters have been calculated for both the transmission and power station components of the capital costs.

In order to gauge the escalation figures, SKM has investigated a number of publically available indices and has assessed the impact of these indices on construction and actual component costs. SKM has determined that for the switchyard assets the appropriate escalation factor would be 4.8%. For the transmission line costs, SKM has determined an escalation factor of 2.2%. SKM notes that the major component of the connection assets (switchyard and transmission line) fixed O&M cost is labour cost. Therefore, the composite cost escalation index determined for the fixed O&M costs is equivalent to the Western Australian labour cost escalation index of 5.1% for the 2008 to 2009 period. SKM has also determined an escalation factor applicable to the power station capital cost of construction in order to adjust 2009 prices relative to 2010. This escalation takes into account decreases in labour rates and lower CPI growth over the 2008/09 year.

The IMO has used cost escalations of 4.8% and 2.2% for the transmission and switchyard materials related components respectively, 5.1% for transmission and switchyard O&M

[3] CPI Values and cities available at: http://www.abs.gov.au/AUSSTATS/abs@.nsf/mf/6401.0?opendocument#from-banner=LN



components and 4.59% for generation related components when translating June 2009 costs into to June 2010 costs.

3. INPUT PARAMETERS TO THE MAXIMUM RESERVE CAPACITY PRICE CALCULATION

3.1 Power Station Capital Costs (PC[t])

The IMO commissioned SKM to provide generation capital costs for a 160MW OCGT power station located within the SWIS. The process for calculating the power station capital costs is the same as the process applied for the 2009 MRCP.

SKM compared the capital costs for a generic 160MW OCGT power station (including procurement, installation and commissioning) with projects of similar size in order to develop the cost estimate for the parameter PC[t]. SKM's methodology involves calculating escalation factors that apply to specific stages in the development of the power station project and removing non-generic cost applicable to specific projects. These are used to develop normalised costs for a 160MW OCGT power station. This methodology builds the final cost estimate for the power station components of the MRCP. The final cost estimate is divided by 160MW to obtain the price per megawatt value used in the MRCP calculation.

For the purposes of the 2010 MRCP:

PC[2010] = A $ 779,195.50 per MW

3.2 Factor for legal, financing, approvals and contingencies (M)

The parameter M is defined as a margin to cover legal, approval, and financing costs and contingencies. SKM was commissioned to provide an estimate of these costs for 2010. This was conducted by measuring the costs associated with the development of plant of similar size, excluding any abnormal costs that may be particular to individual projects. By examining the costs accrued by similar projects, the methodology gives a better reflection of costs required for these "owners costs". The percentage attributed to these costs as a percentage of the power station development capital costs was calculated.

The value of 18.6% for the 2010 Margin M figure represents a 17.33% decrease compared to the 2009 figure of 22.5%. This decrease is in part due to the component entitled "Owners Engineering Costs to Oversee, Witness Tests etc" having been removed from the calculation of Margin M. this component was removed as the costs this value is implying are implicitly incorporated in the "Owners Engineers – Part B" component. The IMO considers that the 2010

figure is a more reasonable indication of the percentage of the capital expenditure that is used for the legal, financing and approval costs of developing a 160MW OCGT power station.

Alinta's submission on the calculation of the MRCP noted that the Margin M included an element for Financing Charges (IDC), which the SKM report defined as a margin for Investment During Financing. Alinta noted that this component is applied to the capital cost of the power station and then is escalated twice by multiplying it by the WACC. As these interest costs are already incorporated within the value of the WACC this resulted in a double counting of the capital cost charges.

The IMO has consulted with ACG and agrees with Alinta that this component should be removed from the calculation of Margin M.

In its submission Alinta also identified that there was no allowance made for debt issuance costs in the WACC. The Alinta submission suggested that this cost be included in the calculation of the WACC, however upon review of the procedure the IMO determined that this cost should be included in the Margin M parameter. The revised value of Margin M can be found in the SKM Power station elements report. The combined effect of these changes has caused a 1.6% decrease to the MRCP that was proposed in the draft report.

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

For the purposes of the 2010 MRCP:

M = 18.6%

3.3 Transmission Connection Costs (TC[t])

For the 2010 MRCP, Western Power determined the transmission connection costs as part of its obligations under the Market Procedure. These included the direct connection costs to the transmission system and deep connection costs used to reinforce the network under certain circumstances. These costs are described below. Since the draft report was published, and as a result of a number of submissions, the IMO requested Western Power to update the transmission cost estimates. This was to ensure that the estimates were inline with the tariff increases approved by the ERA which will be in effect for the 2010 Reserve Capacity Cycle. The increase in tariffs lead to a substantial decrease in the estimated capital contribution required from the connecting power station. The combined effect of the tariff increases and decreased transmission cost lead to a decrease of 0.13% to the MRCP that was proposed in the draft report.

In addition to the transmission costs presented in the draft report the IMO has included an estimate of easement costs as required by the Market Procedure.

As a result of submissions made in the public consultation process the IMO has included a detailed breakdown of the total transmission connection costs (TC[2010]) value in Appendix D.

3.3.1 Dedicated Connection Asset Costs

Dedicated connection asset costs relate to the assets that are dedicated to connecting the power station directly to the physical network. For the purposes of the 2010 MRCP review, these costs include the transmission line assets connecting the power station to the wider network and the dedicated switchyard assets that facilitate the connection between the power station and the transmission system. In determining the dedicated connection asset costs, Western Power compared recent projects of similar size and removed abnormal costs in order to determine a normalised value for the direct connection costs. These estimates are then adjusted in line with SKM's determination of the transmission assets escalation.

For the purposes of the 2010 MRCP:

Total Dedicated Connection Asset Costs = A$ 4.507 M

3.3.2 Shared Connection Asset Costs

Western Power has also developed estimates of the shared connection assets as part of the transmission connection capital costs. These include an estimate of deep network augmentation costs or network reinforcement costs, which are required under certain circumstances in order to maintain Power System Security and Power System Reliability. These costs can vary greatly depending on the nature of the generation being developed, and the peculiarities of the local transmission system that the power station is connecting to. A shared component of the substation costs is also included.

For the purposes of the 2010 MRCP:

Total Shared Connection Asset Costs = A$ 46.801 M

3.3.3 Easement Costs

The costs for the transmission line easement acquisition estimates, presented in Appendix D of

the SKM report,[4] are escalated by CPI and added to the total transmission costs. This is the first year that these costs have been used in the calculation of the MRCP. The inclusion of these costs is responsible for a 3% increase to the MRCP which was presented in the Draft Report

For the purposes of the 2010 MRCP:

Total Easement Costs = A$ 6.619 M

3.3.4 Total Transmission Connection Costs

Total transmission costs have been calculated by summing the costs determined for dedicated connection assets and shared connection assets.

For the purposes of the 2010 MRCP:

TC [2010] = A$ 57.927 M

Western Power determined the cost of connecting the 160 MW OCGT for each of the locations at which land prices were determined. The figures presented above are based on the optimal (least cost) location taking varying land prices and varying connection costs into account. For further information regarding the costing provided by Western Power please refer to the IMO website[5].

3.4 Fixed Fuel Costs (FFC[t])

Fixed fuel costs for the determination of the 2010 MRCP were calculated by GHD. The IMO commissioned GHD to update the costings provided in its 2008 report ("Review of Fixed Fuel Costs for Maximum Reserve Capacity Price in the Wholesale Electricity Market") with prices that reflect those in 2009.

Fixed fuel costs as determined by GHD were A$ 2.590 M when adjusted to 2010 prices by CPI. This represents a substantial decrease in price in comparison to the fixed fuel costing determined for the 2009 MRCP review, equating to a decrease of A$0.784M or 23.0%. This decrease is reflective of the price spike experienced in oil prices last year, with the return to 'normal' distillate prices the fixed fuel cost estimate has returned to a level similar to the 2007 estimate.

[4] Review of the Maximum Reserve Capacity Price 2009 – Non Power Station Elements
[5] www.imowa.com.au/mrcp

For the purposes of the 2010 MRCP:

FFC [2010] = A$2.590 M

3.5 Land Costs (LC[t])

The IMO commissioned Landgate to update the land cost estimates to be used in the 2010 MRCP determination. These estimated land valuations are based on guidelines outlined in the Market Procedure. Valuations were conducted in those areas 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; and
- Kalgoorlie Region

Land sizes and costs were determined in accordance with the Market Procedure. Areas that did not require a substantive buffer zone had costs determined based on a 3 hectare site. Areas where a substantive buffer zone was required had costs determined based on a 30 hectare site.

Land valuations were conducted under the provisions stated in the Market Procedure and assumptions and pricing of the individual parcels of land can be found on the IMO website (http://www.imowa.com.au/mrcp). For the purposes of the MRCP, the lowest cost option as outlined in section 3.3 of this report is selected for the development a 160MW OCGT power station.

For the purposes of the 2010 MRCP:

LC[2010] = A$ 761,250

3.6 Weighted Average Cost of Capital (WACC)

The methodology for calculating the WACC for the 2010 MRCP was reviewed by The Allen Consulting Group in 2007 and subsequently the parameters were updated to reflect changes in line with 2008 prices for the 2009 MRCP calculation. The IMO commissioned The Allen Consulting Group to update the minor parameters in the determination of the WACC to be used

in the calculation of the 2010 MRCP. As advised in the draft report, the minor components of the WACC were revised to give a more appropriate indication of the WACC applicable for the 2009 Reserve Capacity Cycle.

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

For the purposes of the 2010 MRCP:

WACC = **8.06%**

The minor volatile parameters used to determine the WACC were updated and presented to the IMO by The Allen Consulting Group on 22 December 2009, a copy of the memorandum can be found on the IMO website (www.imowa.com.au/mrcp)

3.7 Capital Costs (CAPCOST[t])

The term CAPCOST[t] refers to the total capital cost expressed in millions of Australian dollars in year t, assumed for a 160MW OCGT power station. This is calculated by using the following formula:

$$CAPCOST[t] = (PC[t] \times (1+M) \times CAP + TC[t] + FFC[t] + LC[t]) \times (1+WACC)^2$$

For the purposes of the 2010 MRCP:

CAPCOST[2010] = A$ 243.974 M

3.8 Fixed Operation & Maintenance Costs (ANNUALISED_FIXED_O&M[t])

3.8.1 Generation

For the 2010 review, SKM has determined the fixed O&M costs for the generator assets.

An annuity is calculated taking the first 15 years of O&M provided by SKM. The SKM report details the total fixed O&M costs of the OCGT to year 15 as A$ 28.245 M in 2009 terms. This cost is annualised and then escalated at 4.59% to a 2010 value that equates to A$ 12,308.94 per MW per year.

Generation Fixed O&M Costs = A$ 12,308.94 per MW per year

3.8.2 Transmission

SKM provided the fixed O&M costs of the switchyard and transmission line assets. The methodology being used to estimate these costs is contained in SKM's report which is available on the IMO website (http://www.imowa.com.au). These costs form part of the term ANNUALISED_FIXED_O&M[t] in the MRCP calculation.

The direct O&M costs are determined by taking the average of the five-year cumulative transmission costs in SKM's report (Table 4-1 and Table 4-2) creating an annuity discounted at the real WACC (see Appendix A). The 2009 costs provided in the SKM report have been escalated to 2010 figures using an escalation of 5.1% for both the switchyard and transmission line assets. This results in a cost of A$ 348.14 per MW per year.

Western Power Use of System charges, control system service charges, and fixed metering charges are added to the SKM O&M estimates and then escalated to 2010 prices through CPI. This results in a combined transmission O&M cost as shown below.

Western Power has adjusted the charges that were used in the Draft report to reflect the recently approved tariff increases. Details of these changes can be found in the revised Western Power report available on the IMO website. The result of this change was an increase of 42% over the transmission O&M costs presented in the Draft report.

Transmission Fixed O&M Costs = A$ 15,025.97 per MW per year

3.8.3 Total Fixed Operation & Maintenance Costs

For the purposes of the 2010 MRCP:

ANNUALISED_FIXED_O&M [2010] = A$ 27,335 per year

Total fixed operation and maintenance costs have increased by 104% compared to 2009; this has a cumulative effect on the MRCP of A$13,903.87. The main increases in cost have been attributed to the inclusion of the Western Power Use of System Charges, control system service charges and the fixed metering charge.

4 MAXIMUM RESERVE CAPACITY PRICE CALCULATION

4.1 Annualised Capital Costs (ANNUALISED_CAPCOST[t])

The WACC is determined as outlined in Section 3.6 and was conducted by The Allen Consulting Group for the 2010 MRCP.

The resultant WACC for the 2010 MRCP is: 8.06%

The annualised capital cost was determined using a capital cost of A$ 244.210 M, a WACC of 8.06% and a term of 15 years.

For the purposes of the 2010 MRCP:

ANNUALISED_CAPCOST [2010] = A$ 28.635 M per year

This represents an increase of 40% compared to the value from the 2009 MRCP. The main cost drivers have been increases in the costs associated with transmission connection works and an increase to land prices due to the optimisation over transmission costs and land prices.

4.2 Annualised Fixed Operation & Maintenance Costs (ANNUALISED_FIXED_O&M[t])

The total annualised fixed O&M costs are outlined in Section 3.8.3. It is calculated by summing the fixed O&M costs of the power station assets, transmission line assets and the switchyard assets. All the values that form part of the parameter ANNUALISED_FIXED_O&M[t] are adjusted to 2010 prices by their respective escalation factors.

For the purposes of the 2010 MRCP:

ANNUALISED_FIXED_O&M[2010] = A$ 27,334.90 per year

4.3 Capacity Parameter (CAP)

For the 2010 MRCP calculation the capacity parameter CAP has remained at 160MW as required in the Market Procedure.

For the purposes of the 2010 MRCP:

CAP = 160MW

4.4 Summer De-rating Factor (SDF)

The SDF is outlined in the Market Procedure Step 1.14.1.

For the purposes of the 2010 MRCP:

SDF = 1.18

4.5 Calculation

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

PRICECAP[t] = (ANNUALISED_FIXED_O&M[t] + ANNUALISED_CAP_COST[t] / (CAP/SDF))

Using the values determined by the IMO and presented in previous sections, PRICECAP[2010] for the 2010 Reserve Capacity Cycle is determined to be A$ 238,522.45 which is rounded to:

PRICECAP[2010] = A$ 238,500 per MW per year

A MRCP of A$ 238,500 per MW per year is proposed by the IMO. This represents a 45% increase from the 2009 MRCP of $164,100. For a detailed comparison of the 2010 MRCP parameters to 2009 MRCP parameters, please refer to Appendix C. The main cost drivers have been the increase in the costs associated with shared transmission assets and increases in the fixed operation and maintenance costs and the power station capital costs. For a detailed breakdown of the calculation please refer to Appendix B.

5.0 STAKEHOLDER INPUT

The IMO published the draft report and supporting documents for the 2010 MRCP on its website and initiated a consultation process on 20 November 2009. The IMO directly advised Rule Participants and other industry stakeholders and published an announcement in the West Australian on 28 November 2009 and in the Financial Review on 27 November 2009. The submission deadline was 18 December 2009.

On 20 November 2009 the IMO proposed a change to the procedure used to calculate the MRCP. The proposal provided for the major components of the WACC to be updated. At the same time, the IMO published the 2010 Draft Maximum Reserve Capacity Price report using the updated parameters. One Market Participant questioned this action and the IMO held stakeholder consultation to discuss the impacts of this action. Subsequent advice indicated it

was inappropriate to release the two documents in parallel.

A further draft report was issued on 10 December 2009 using the major components of the WACC from the original Market Procedure. Consultation on the draft report was also extended. This final report is produced on the same basis as the draft report.

During the public consultation period the IMO received responses from LGP, Tesla Corporation, Alinta, Griffin Power, Synergy and separately from Perth Energy and Infratil. A copy of each submission can be found on the IMO website (www.imowa.com.au/mrcp). A summary of the submissions and IMO responses is given below.

Submitter	Comment/Change Requested	IMO's response
LGP	LGP supports the process conducted by the IMO in determining the MRCP. However LGP wished to emphasise its opinion that an urgent review of the assumptions underlying the calculation of the MRCP is required. LGP listed a number of these potential issues in its submission	A major review of the MRCP is required, and the IMO has undertaken to conduct this review early in 2010 with the aim of incorporating the results from that review into the 2011 MRCP process. The major review will address all the points raised by LGP.
Tesla Corp	Tesla Corp submits that the IMO should forward price the recent tariff increases approved by the ERA in the calculation of the MRCP. Tesla Corp considered that this will more accurately represent the costs that will be incurred by Market Generators in the 2012 Reserve Capacity Year.	The IMO received updated tariff costs for Kemerton (the least cost solution) from Western Power which incorporates the approved tariff increases, The IMO also received a revised Capital Contribution figure using the new tariffs. Details of the new transmission estimates provided by Western Power can be found on the IMO website[6]. The resultant effect of these changes to the MRCP is detailed in sections 3.3 and 3.8 of this report.

[6] www.imowa.com.au/wrcp

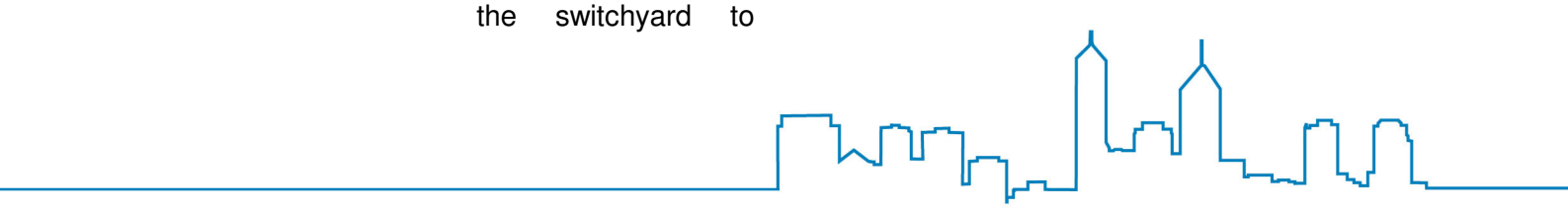
Submitter	Comment/Change Requested	IMO's response
Infratil Energy Australia	Infratil is supportive of the methodology and the choice of parameters used to compute the various components of the 2012-13 MRCP with the exception of the WACC.	The IMO notes Infratil's support.
Infratil Energy Australia	The power station capital and development costs both seem reasonable given Infratil's recent experiences at Kwinana.	The IMO notes Infratil's comment.
Infratil Energy Australia	While the operations and maintenance costs appear reasonable, Infratil notes that the cost of operational insurance does not seem to have been addressed	Step 1.12.1(c) of the Market Procedure specifies that the Insurance cost must be accounted for in the calculation of the WACC, however there is no aspect of the prescribed WACC formula in the Market Procedure where this is included. Additionally, operational insurance is seen as a variable O&M cost as it will depend upon how the plant is run and as such is considered to be a Short Run Marginal Cost. Therefore the insurance cost is not included in the calculation of the MRCP
Infratil Energy Australia	Infratil supports the principles behind the calculation of the dedicated and shared transmission connection asset costs and appreciates the wide range of potential costs that may arise. Infratil notes that it did not understand how the IMO arrived at the "TC[2010]" cost in the report based on the information provided by Western Power and suggested that some additional transparency on how these costs were computed would be helpful.	This aspect of the process has been questioned both formally by Infratil and Alinta, and informally by a number of other stakeholders. In response to these queries the IMO has included a breakdown of this calculation in Appendix D of this final report.
Infratil Energy Australia	Infratil congratulates the IMO on their approach to dealing with land costs and their linking to the cost of shared transmission connections.	The IMO notes Infratil's support.

Submitter	Comment/Change Requested	IMO's response
Infratil Energy Australia	Infratil notes that given that in the ACG report the forecast rate of inflation is solely used in the Fisher equation to strip out inflation expectations from the nominal WACC, it would be inappropriate to use anything other than 2.4%. Infratil noted that to do so would be inconsistent with the quoted real risk free rate of return of 3.15% in the ACG report (Table ES.1 and section 4.2).	The ACG report (p.21) also indicates that "the RBA's survey of inflationary expectations contained in the August Statement on Monetary policy indicated an underlying inflation of 3.75% over the year to the June quarter". ACG go on to say that "…given the dichotomy in available evidence, there is no persuasive evidence to adopt a value that differs from our previous recommendation of 3 percent…" Using the Fisher equation based on government securities is just one indicator of inflation and should not be interpreted as the final inflationary figure. It should also be noted that it is the nominal risk free rate of return which is used in the calculation of the WACC and therefore it is appropriate to use the current estimate of inflation from all factors and not just the forecast based on the fisher equation and government securities in the calculation of the WACC. The IMO agrees with ACG that there is not sufficient evidence to change the forecast rate of inflation, and maintains a rate of 3.00%
Infratil Energy Australia	ACG has used a number of analytical methods to compute debt margins for BBB+ entities resulting in values that range from 2.14% to 4.13%. Infratil's experience is that while there is downward pressure on margins compared with those being offered by the banks 12 months ago, BBB+ money is still only available at between 3.25% and 3.75%.	The updated Minor components' in the ACG memo, which is available on the IMO Website (www.imowa.com.au/mrcp), produces a final proposed value of 4.3% for the debt risk premium component. This is the value used in the final calculation of the MRCP as outlined in this report.
Infratil Energy Australia	Infratil considers that for a peaking plant business in the Western Australian Wholesale Electricity Market, an appropriate asset beta would be	The equity beta value is a prescribed value in the Market Procedure and as such the IMO must adopt this value (0.83) to be in compliance with the Market Procedure.

Submitter	Comment/Change Requested	IMO's response
	0.65 and hence at 40% gearing the equity beta would be 1.08.	The IMO however commits to pursuing the issue of the equity beta value raised by Infratil in the Major Review to be conducted early in 2010.
Infratil Energy Australia	Infratil is supportive of the IMOs decision to maintain Gamma at 0.50.	The IMO notes Infratil's support.
Perth Energy	Perth Energy's current experience in the construction of the Kwinana Swift power station supports the capital cost assumptions for a green fields site (sections 3.1 and 3.2 of the Draft Report).	The IMO notes Perth Energy's support.
Perth Energy	Perth Energy notes that no additional costs have been included in the construction costs for a plant to be operated on duel fuel. For energy security purposes Perth Energy suggested that the IMO consider providing a capital allowance for dual fuel power plants as part of a systematic risk mitigation for the loss of a single source of fuel.	These costs cannot be incorporated in this year's calculation of the MRCP under the current Market Procedure. However the IMO is currently investigating the role that dual fuelled facilities play in the reliable delivery of electricity in the WEM. The IMO will release a final report early in 2010 on possible Reserve Capacity implications for dual fuelled facilities.
Perth Energy	Perth Energy notes that no credits have been given to fast response plants like Kwinana Swift.	The current MRCP process does not provide additional revenue for plants which deviate from the definition of a power station in section 1.5 of the Market Procedure. Fast response capabilities an ancillary service. There is potential for this value to be recognised in the ancillary service market segment.
Perth Energy	Perth Energy notes that the Factor for legal financing, approvals and contingencies (margin M in the section 1.14 of the Market Procedure) has decreased from previous years,	The decrease is the result of the component "Owners Engineering Costs to Oversee, Witness Tests etc." being removed form the calculation of Margin M. SKM note in their report (subscript p.10) this is because this

Submitter	Comment/Change Requested	IMO's response
	and is uncertain as to the cause of this decrease.	component is already included within the cost component "Owners Engineers - Part B (Including Construction Phase OE Costs, oversee project, witness tests & Commissioning".
Perth Energy	Perth Energy supports the presently proposed inclusion of very significant deep connection costs in the calculation of the MRCP. … However Perth Energy does not support, as a matter of principal, the blanket application of deep connection costs to all new generation projects and Perth Energy are calling for an urgent review of this approach by Western Power.	This is beyond the scope of the MRCP review and will be considered as part of the Major review.
Perth Energy	The length of line used in the cost estimate has been set to 2 km and the reference rate (in the SKM report) has been based on 100 km costing, which Perth Energy expect has the benefit of some economies of scale. While Perth Energy acknowledges that a 100% allowance for short length factor has been applied, Perth Energy view that, in aggregate, this provision is likely to be less than that required by generators connecting in most locations.	The MRCP is based on the cost estimate provided by Western Power in the construction of the 2 km line and this estimate does not use a 100 km line as a costing base. As such the IMO has not made any amendments to this value.
Perth Energy	The SKM report rationalises that only a single connection to the transmission system is required… However, the report notes that, consistent with the technical rules, this configuration may well need to be taken into account by	The MRCP is based on the cost estimate provided by Western Power and is consistent with the Technical Rules. However both the IMO and Western Power (p.3 of the Western Power report) consider that it is not possible to provide an estimate of site specific details. The IMO notes that a more prescribed

Submitter	Comment/Change Requested	IMO's response
	Western Power when considering specific locations. Taking such into account is likely to result in additional costs to the proponent.	connection arrangement will be considered as part of the Major Review.
Perth Energy	No allowance has been made for contractual negotiations, surveys and legal costs associated with establishing land easements.	The IMO has now considered easement costs in the determination of the MRCP. The IMO considers that the allowance Perth Energy refers to is not significant and has not been included in the calculation of the 2010 MRCP.
Perth Energy	Perth Energy notes that the switchyard costs to be incurred by proponents are also likely to be greater than those for which the MRCP calculation has been provided. Perth Energy questions several key assumptions which been made in the SKM report regarding the pre-existing network and switchyard configuration at the location. 1. The Switchyard will be located directly under the existing transmission line; 2. the switchyard will be conducted on flat land in a rural setting with minimal or no vegetation; 3. there will be no unforeseen environmental or civil costs; 4. the existing transmission line will not require modification to allow for this connection with the exception of one new tension tower located next to the switchyard to	The cost estimates submitted by Western Power are the costs used in the determination of the MRCP and not the cost estimates provided in the SKM report. Unlike SKM, Western Power do not mention the specific assumptions used in their estimation of the switchyard costs, however the IMO understands that Western Power uses costs estimated by recent connections to the SWIS with the site specific costs removed.



Submitter	Comment/Change Requested	IMO's response
	allow for connection into the new switchgear; and 5. No staging works costs have been included.	
Perth Energy	Perth Energy notes the continual volatility of fuel costs and states that no meaningful level of accuracy can be set for this component of the MRCP when considering a time horizon of more than three years. Rather than relying on a point estimate for this component, Perth Energy suggests that the IMO should consider using a rolling, historic, average to estimate these costs.	The IMO notes Perth Energy's recommendation, and acknowledges the potential volatility over such a long horizon. As with previous MRCP calculations, the value price for diesel fuel is based on Section 2.0 of the IMO's 2009 Final Report, "Review of the Energy Price Limits for the Wholesale Electricity Market in the SWIS" dated 25 September 2009. The value in this report is based on the report by MMA (available on the IMO website: http://www.imowa.com.au/f596,97693/MMA_Final_Report.pdf). The report assumes that the average cost of diesel will be $71/barrel for the next Capacity Year. In the determination of the MRCP the IMO then escalated this 2009 price by CPI to the 2010 value it assumes the fuel is purchased at. The specification of the CAPCOST[t] parameter effectively escalates the full 2010 fixed fuel costs into 2012 values by twice multiplying it by the WACC. The IMO therefore considers that no change is required to the value applied to the cost of diesel fuel in the calculation of the MRCP.
Perth Energy	Item 3.5 details a number of different regions where a power station could be set up…. [Perth Energy] query the Very Low value ascribed to land costs.	The Market Procedure directs the IMO to use Landgate to estimate the land values. This valuation can be found on the IMO website (www.imowa.com.au/mrcp) and as such no change has been made.
Perth Energy	Perth Energy disagrees with a number of the assumptions	The assumptions which the Perth Energy submission queries relate to are the Major

Submitter	Comment/Change Requested	IMO's response
	underlying the calculation of the WACC, and proposes that a more appropriate WACC value would be closer to 9%.	components of the WACC and as such cannot be reviewed as part of the 2010 MRCP process. However the IMO commits to reviewing this issue during the Major review of the MRCP to be conducted prior to the commencement of the 2011 Process.

Griffin Energy	Griffin submits that the estimates of deep connection costs submitted by Western Power may not meet the New Facilities Investment Test (NFIT) and are inherently too high. While Griffin acknowledges that in previous MRCP calculations the deep connection cost submitted by Western Power were "below those which in reality Western Power were quoting to prospective generators, Griffin propose that the IMO either engage a consultant to analyse the likelihood of the estimated augmentation costs meeting the NFIT or revert to the values used in the previous MRCP.	Western Power is required by the Market Procedure to provide estimates of deep connection costs associated with connecting a notional Power Station to the 330kV transmission system. Step 1.8.2 of the Market Procedure sets out how the Transmission Connection Cost Estimate is to be developed. Sub step (i) notes that an "estimate of deep connection costs shall be included". The Western Power estimates include indicative augmentation costs to extend the 330kV network to each of the sample locations.
		
		The IMO is required to include the costing of technical connection to the 330kV transmission system.
		
		The Market Procedure doesn't require these costs to be able to meet NFIT. However, the IMO will include this as a consideration for the major review.
		
		Section 6.52 of the Access Code sets out the process for undertaking NFIT. In order to satisfy NFIT the following requirements must be met:
		
		• New investment does not exceed the amount that would be invested by a service provider efficiently minimising costs; and
		• Either one or more of the following is satisfied:
		  ○ Anticipated incremental revenue is expected to at least recover the investment or a modified test has been approved; or
		  ○ The new facility provides a net

Submitter	Comment/Change Requested	IMO's response
		benefit over a reasonable period of time that justifies the approval of higher reference tariffs; or ○ The new facility is necessary to maintain safety or reliability. The transmission cost estimates provided by Western Power are not specific to any project and as such represent a hypothetical situation. The IMO therefore considers that it would not be feasible to provide estimates that are guaranteed to meet the NFIT criteria, given that each new investment would have its own unique characteristics and the transmission cost estimates used in calculating the MRCP represent a generic scenario, as opposed to any specific project.
Griffin Energy	Griffin Energy notes that there has been an inclusion of a cost component for the annual network access tariffs which has not been included in past calculations of the MRCP. While Griffin Energy acknowledges that the inclusion of these costs appears sensible Griffin proposes, that in the interests of regulatory certainty, the IMO include these costs on a glide path over 5 years.	The Market Procedure states that the network access and/or ongoing charges must be included in the calculation of the MRCP (Step 1.10.3) and does not provide scope for the IMO to incorporate a glide path to introduce new costs when they are discovered. As such the IMO has not removed these costs from the MRCP calculation. The IMO will review the potential inclusion of a price shock mitigation component into the Major review to be conducted prior to the commencement of the 2011 MRCP Process.
Griffin Energy	Griffin Energy proposes that the IMO should return to a debt to equity ratio of 60:40 (from 40:60). Griffin Energy considers that the current capital structure identified for proposed generation investment in the WEM is not appropriate.	The values to which Griffin Energy's submission relate are prescribed Major components of the WACC and are not able to be reviewed as part of the 2010 MRCP process. However the IMO will incorporate the issues raised by Griffin Energy into the major review of the MRCP to be conducted next year.
Alinta	Alinta proposes that the Interest During Construction (IDC) component of the Margin M	The IMO agrees with Alinta's point and has removed the IDC component from the Margin M. For a detailed discussion of the effect of the

Submitter	Comment/Change Requested	IMO's response
	should not be included in the calculation of the margin M as it is in effect trying to replicate the WACC.	removal of this value please refer to section 3.2 of this report.
Alinta	Alinta question the calculation of the total direct substation costs in the Western Power report. The Western Power report states that 10% of the cost of the substation is allocated to connection assets with the remainder allocated to shared network costs. However Alinta note that for the remainder of the report this 10% is calculated in addition to the substation costs and state that the basis for this 10% assumption is unclear.	The IMO has discussed this issue with Western Power and has been informed this is a typographical error and should read that the cost is equivalent to 10%. As Alinta has noted in its submission Western Power has used the assumption that this cost is an additional 10% in all calculations, therefore the IMO has not changed any associated values in the calculation of the MRCP.
Alinta	Alinta submit that the estimates of deep connection cost submitted by Western Power may not meet the NFIT and are inherently too high.	Western Power is required by the Market Procedure to provide estimates of deep connection costs associated with connecting a notional Power Station to the 330kV transmission system. Step 1.8.2 of the Market Procedure sets out how the Transmission Connection Cost Estimate is to be developed. Sub step (i) notes that an "estimate of deep connection costs shall be included". The Western Power estimates include indicative augmentation costs to extend the 330kV network to each of the sample locations. The IMO is required to include the costing of technical connection to the 330kV transmission system. The Market Procedure doesn't require these costs to be able to meet NFIT. However, the IMO will include this as a consideration for the major review. Section 6.52 of the Access Code sets out the process for undertaking NFIT. In order to satisfy NFIT the following requirements must

Submitter	Comment/Change Requested	IMO's response

		be met:
		
		• New investment does not exceed the amount that would be invested by a service provider efficiently minimising costs; and
		• Either one or more of the following is satisfied:
		  ○ Anticipated incremental revenue is expected to at least recover the investment or a modified test has been approved; or
		  ○ The new facility provides a net benefit over a reasonable period of time that justifies the approval of higher reference tariffs; or
		  ○ The new facility is necessary to maintain safety or reliability.
		
		The transmission cost estimates provided by Western Power are not specific to any project and as such represent a hypothetical situation. The IMO therefore considers that it would not be feasible to provide estimates that are guaranteed to meet the NFIT criteria, given that each new investment would have its own unique characteristics and the transmission cost estimates used in calculating the MRCP represent a generic scenario, as opposed to any specific project.

Alinta	Clause 1.13.9 of the Market Procedure includes a debt issuance cost parameter; however this value is not included in the calculation of the WACC. This is potentially underestimating the true value of the WACC.	Step 1.12.1 (b) of the Market Procedure (and to a lesser extent step 1.14.1 in the calculation of the CAPCOST[t] parameter) implies this cost should be included in the Margin M parameter. The IMO commissioned SKM to reissue the power station elements report with the cost of capital and debt raising included in the Margin M. the details of this addition can be found in section 3.2 of this final report. The revised

Submitter	Comment/Change Requested	IMO's response
		version of the SKM report can be found on the IMO website[7].
Alinta	Alinta propose that the current methodology of escalating the parameter CAPCOST[t] by WACC twice is incorrect. This is because this approach assumes that all of the cost components are incurred at the start of the construction period in 2010. Alinta suggest in practice this is unlikely to be the case and recommend that an escalation factor based on WACC but sculpted to the likely draw down profile of capital expenditure and the allowances for legal, financing, approvals and contingencies over the two year construction phase be applied. Alinta also suggest that the CAPCOST[t] calculation should recognise that the fixed fuel costs are unlikely to be incurred until the end of the construction period and should therefore not be exculpated by WACC in each year of the construction period.	The IMO notes Alinta's comment and the inclusion of this methodology will be considered as part of the major review. However the calculation of CAPCOST[t] and the application of the WACC to arrive at the final CAPCOST[t] value has been calculated in accordance with the Market Procedure and as such has not been changed.
Alinta	Alinta question the accuracy of the application of the escalation factor to the fixed operational and maintenance costs (ANNUALISED_FIXED_O&M[t]). Alinta assume from the wording of the SKM report that the value associated with O&M costs is constant at 1.883 M (June 2009 dollars). Alinta propose that the correct escalation factor to apply to the	SKM has confirmed that it is appropriate to use the escalator defined in section 3.2 "Operation & Maintenance Cost Escalation" of the SKM report to escalate the O&M costs presented in table 3.2 of that report. This is because the O&M figures are required to be escalated by a combination of CPI and Labour cost and not just by CPI.

[7] www.imowa.com.au/mrcp

Submitter	Comment/Change Requested	IMO's response
	ANNUALISED_FIXED_O&M[t] value is the forecasted CPI value.	
Synergy	Synergy suggest that to reduce the cost of the transmission cost (TC[t]) component of the MRCP calculation the deep connection costs should be not be based on the N-1 criteria.	The Western Power report (p.2) states "These augmentations DO NOT provide N-1 capacity under all scenarios". Western Power details these violations of the N-1 criteria on pages 7 and 8 of the report.
Synergy	Synergy recommends that the IMO reconsider the need for a transmission substation in favour of a simpler connection arrangement.	The Market Procedure sets the specific type of substation to be used in the connection of the power station to the transmission network, and as such no change has been made. However the IMO will review this issue during the Major review of the MRCP to be conducted prior to the commencement of the 2011 MRCP Process.

6.0 CONCLUSION

The IMO has conducted a review of the main factors used to determine the MRCP. The 2010 MRCP computation has been included in Appendix B and a comparison between the 2009 and 2010 MRCP values can be found in Appendix C.

In consideration of the results of the review provided in the draft report and through the public consultation processes, the IMO proposes a final revised value of $238,500 per MW per year for the 2010 Reserve Capacity Cycle.

This represents an increase of 45% above the 2009 MRCP. The main cost increases have been in the area of the deep connection augmentation costs and the transmission costs. The optimisation of location, transmission and O&M costs also contributed to the increase in the 2010 MRCP.

The MRCP has been set three times using the current methodology. The IMO expects to conduct the review described under clause 4.16.9 of the Market Rules before the publication of the 2011 MRCP.

APPENDIX A- WEIGHTED AVERAGE COST OF CAPITAL

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

$$WACC_{real} = \left(\frac{\left(1 + WACC_{no\min al}\right)}{\left(1 + i\right)} \right) - 1$$

And

$$WACC_{no\min al} = \frac{1}{\left(1 - t\left(1 - \gamma\right)\right)} R_e \frac{E}{V} + R_d \frac{D}{V}$$

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:

$$R_d = R_f + DRP$$

The Allen Consulting Group reviewed the minor parameters and updated the relevant parameters in line with current prices and values. A table of the parameters and values are shown below:

Table A1: WACC and associated parameters

Parameter	2010 Value	2009 Value
Nominal Risk Free Rate of Return (%)	5.49	4.98
Expected Inflation (%)	3	3
Real risk free rate of return (%)	2.8	3.12
Market Risk Premium (%)	6	6
Asset beta	0.5	0.5
Equity beta	0.83	0.83
Debt Margin (%) , DRP (%)	4.3	3.2
Debt issuance costs (%)	NA	0.125
Corporate tax rate (%)	30	30
Franking credit value	0.5	0.5
Debt to total assets ratio (%)	40	40
Equity to total assets ratio (%)	60	60

For the purposes of the 2010 MRCP:

WACC = 8.06%

APPENDIX B - CALCULATION OF THE MAXIMUM RESERVE CAPACITY PRICE

The Maximum Reserve Capacity Price is calculated as describe by the latest version of the procedure “Determination of the Reserve Capacity Price”. This is shown below:

PRICECAP[t] = ANNUALISED_FIXED_O&M[t] + (ANNUALISED_CAP_COST[t]) / (CAP/SDF))

Where:

PRICECAP[t] is the Maximum Reserve Capacity Price to apply in a reserve Capacity Auction held in a calendar year t.

ANNUALISED_FIXED_O&M[t] is the annualised fixed operating and maintenance costs for a typical open cycle gas turbine power station and any associated electricity transmission facilities, expressed in Australian dollars in year, per MW per year.

ANNUALISED_CAP_COST[t] is the CAPCOST[t], expressed in Australia dollars in year t, annualised over a 15 year period, using a Weighted Average Cost of Capital (WACC) as determined as part of the Maximum Reserve Capacity Price Market Procedure and updated as required.

CAP is the Capacity of an open cycle gas turbine, expressed in MW and Equals 160MW.

SDF is the summer de-rating factor of a new open cycle gas turbine, and equals 1.18.

Table B1: PRICECAP[2010] and associated parameters

Parameter	Value	Unit
PRICECAP[2010]	**$238,500.00**	**$AUD/MW/Year**
Where		
ANNUALISED_FIXED_O&M[2010]	$27,334.90	$AUD/MW/Year
ANNUALISED_CAP_COST[2010]	$28,635,599.54	$AUD/Year
CAP	160	MW
SDF	1.18	N/A

Table B2: ANNUALISED_CAP_COST[2010] and associated parameters

Parameter	Value	Unit
CAP_COST[2009]	**$244,210,386.60**	**$AUD**
Where		
PC[2010]	$779,195.50	$AUD/MW
M	18.60%	%
CAP	160	MW
TC[2010]	$57,926,935.90	$AUD
FFC[2010]	$2,590,280.00	$AUD
LC[2010]	$761,250.00	$AUD
WACC	8.06%	%
Annualisation		
ANNUALISED_CAP_COST[t]	**$28,635,599.54**	**$AUD/Year**
Where		
CAP_COST[2010]	$244,210,386.60	$AUD
WACC	8.06%	%
Term of Finance (Years)	15	Years

APPENDIX C - COMPARISON BETWEEN THE 2008 AND THE 2010 MAXIMUM RESERVE CAPACITY PRICE

Table C1: PRICECAP[2010] and associated parameters

Parameter	Reserve Capacity Year 2009	2010	Units
FFC[t]	$3,374,305.00	$2,590,280.00	A$
LC[t]	$313,500.00	$761,250.00	A$
TC[t]	$14,081,877.08	$57,926,935.90	A$
M	22.5%	18.6%	%
PC[t]	$732,554.42	$779,195.50	A$
CAPCOST[t]	$185,040,905.07	$244,210,386.60	A$
Term of Finance	15	15	Years
WACC	7.09%	8.06%	%
ANNUALISED_CAP_COST[t]	**$20,432,138.81**	**$28,635,599.54**	**A$/Year**
CAP	160.00	160.00	MW
SDF	1.18	1.18	N/A
ANNUALISED_CAP_COST[t]	$20,432,138.81	$28,635,599.54	A$/Year
ANNUALISED_FIXED_O&M[t]	$13,431.03	$27,334.90	$AUD/MW/Year
PRICECAP[t]	**$164,100.00**	**$238,500.00**	**$AUD/MW/Year**

APPENDIX D – EXPLICIT EQUATION FOR THE TC[2010] COMPONENT OF THE 2010 MRCP

TC[2010] = Connection Assets + Shared Assets + Easement Costs

Where:

Connection assets =
(2KM + DEA) * (N-ME) * (1 + TE)

Where

2KM =	the estimate in western Power report for the cost of a 2km 330kV single-circuit line;
DEA =	Dedicated Connection Assets as reported in Western Power report
N-ME =	Non-Metro Escalation as defined in the Western Power Report
TE =	Transmission Escalation as defined in the SKM report

Shared Assets =
(PSC) * (1+SE) + (PDAC) * (1+TE)

PSC =	Proportionate 330 kV Substation Costs as defined below
SE =	Switchyard Escalation as defined in the SKM report
PDAC=	Proportionate Deep Augmentation costs as defined below

Proportionate 330 kV substation costs =
(SC / CCOSA) * (CCFSA)

Where:

SC =	Substation Cost - as defined in Western power report (value on page 3 multiplied by N-ME)
CCOSA =	Capital Cost Of Shared Asset – page 11, line 18 Western Power report
CCFSA =	Capital Contribution For Shared Assets – page 11, line 45 Western Power Report.

Proportionate Deep Augmentation Costs =
(DAC / CCOSA) * (CCFSA)

Where:

DAC =	Deep Augmentation costs - as defined in Western power report

CCOSA = Capital Cost Of Shared Assets – page 11, line 18 Western Power report

CCFSA = Capital Contribution For Shared Assets – page 11, line 45 Western Power Report.

Easement Costs =
(EA) * (1+CPI)

Where:

EA = Transmission Line Easement Acquisition Estimate as defined in the SKM non power station elements report.

CPI = CPI escalation as defined in section 2.1 of this report