imo
Independent Market Operator

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Draft Report: Maximum Reserve Capacity Price Review for the 2011/12 Reserve Capacity Year

November 2009

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EXECUTIVE SUMMARY

Each year, the IMO is required to conduct a review of the Maximum Reserve Capacity Price. This Draft Report details the outcome of the review conducted in 2009 to determine the Maximum Reserve Capacity Price for the 2010 Reserve Capacity Cycle. The value used for the 2010 Reserve Capacity Cycle will be effective from 1 October 2012 through to 1 October 2013.

The 2010 Maximum Reserve Capacity Price proposed by the IMO in its Draft Report is $231,300 per MW per year. The review process included a technical costing of the following components:

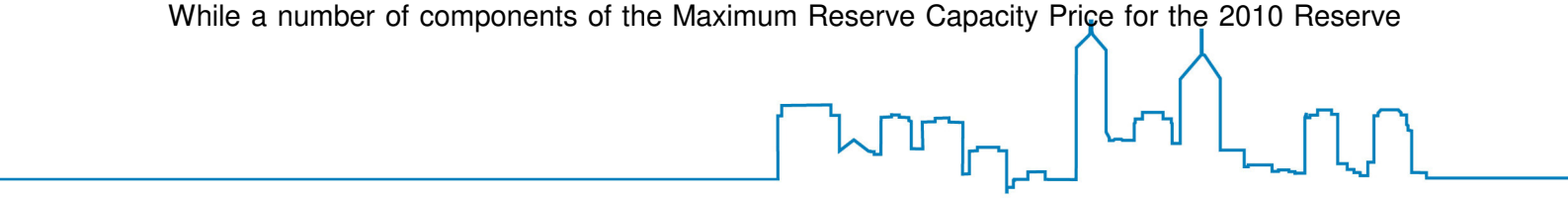
- Developing and constructing a 160MW Open Cycle Gas Turbine power station;
- Land costs associated with developing the 160MW Open Cycle Gas Turbine power station;
- Technical connection to the 330kV transmission system;
- Operations and maintenance costs associated with the Open Cycle Gas Turbine power 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 41% higher than the Maximum Reserve Capacity Price of $164,100 determined for the 2009 Reserve Capacity Cycle. The main cost increases have resulted from:

- Increases to the costs associated with developing and constructing the 160 MW Open Cycle Gas Turbine power station;
- Substantial increases in the transmission connection costs;
- Increases in the transmission Operation and Maintenance costs, resulting from the inclusion of Western Power Use of System charges; and
- Optimisation across different connection points to enable the Maximum Reserve Capacity Price to better reflect the actual costs of brining the 160 MW Open Cycle Gas Turbine onto the South West interconnected system.

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 are determined. The Maximum Reserve Capacity Price is then calculated for each location, taking varying land prices and connection costs into account, and the least cost location 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 years values, there have been instances of decreases to the value of inputs used in determining the Maximum Reserve Capacity Price. The main decreases have resulted from:

- The reduced value for the margin allowed to cover legal, approval and financing costs; and
- Decreases to the costs associated with developing and constructing the liquid fuel storage facilities.

The magnitude of these changes are detailed within this report.

This year the IMO requested The Allen Consulting Group to review the Major components of the Weighted Average Cost of Capital used in 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. A copy of The Allen Consulting Group report is available on the IMO webpage[1]. Since the release of the IMO's draft Maximum Reserve Capacity Price report on 20 November 2009 the IMO has reviewed the requirements of the Market Procedure and decided to reissue the draft report using the Major components as prescribed in the Market Procedure. This revised report is provided as an amendment to the Draft report and replaces the one issued on 20 November 2009.

By using the prescribed values for the Major components there has been an increase in the calculated WACC from 6.89% to 7.78%. This results in an increase in the value of the MRCP that was published previously by the IMO from $216,800 to $231,300.

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).

[1] http://www.imowa.com.au/mrcp

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 IMO is required to conduct a review of a number of the components that are used to determine the MRCP. The results of this review, and the proposed revised value for the MRCP, are published in the form of a Draft Report.

Following a public consultation process, the IMO must then propose a final revised value for the MRCP and submit that value, along with this Final Report to the Economic Regulation Authority (ERA) for approval.

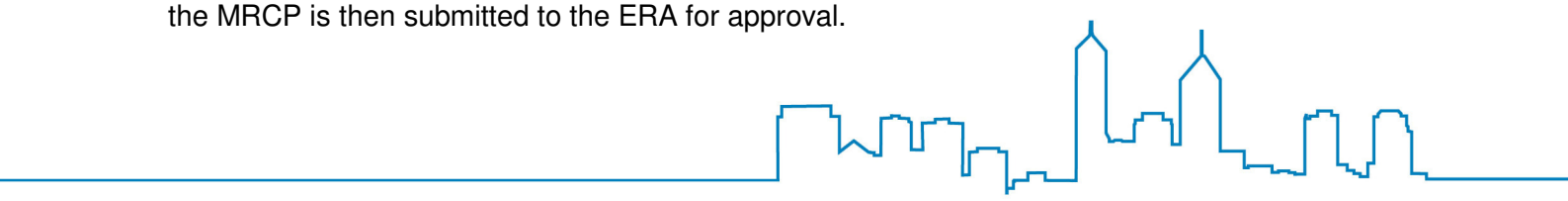
This Draft Report is produced in accordance with clause 4.16.6 of the Wholesale Electricity Market Rules (Market Rules).

In accordance with the Market Procedure for the Determination of the Maximum Reserve Capacity Price, 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 costs for the power station and the transmission facilities listed above; and
- A margin for legal, approval, financing costs and contingencies.

This Draft 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.

The Draft Report is published on the IMO website (www.imowa.com.au) and a public consultation process will be held so that comments from stakeholders and other interested parties can be taken into consideration prior to publishing the Final Report. The Final Report on the MRCP is then submitted to the ERA for approval.



1.1 Reserve Capacity Cycle Timing

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

1.2 General Costing Methodology and Structure of this Draft 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 Operational and Maintenance (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 Determination of the Maximum Reserve Capacity Price 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, Western Power has been required to provide this information to give a clearer indication of the connection costs associated with connecting to the SWIS.

In line with previous years, SKM have 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.

As was done last year, 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 their 2008 review of the costs associated with building liquid fuel storage and handling facilities for the power station. This price escalation reflects changes to the pricing of construction components for the fuel storage facility and the increased cost of distillate.

1.3 MRCP Outcome for the 2010 Reserve Capacity Cycle

Following the review of the MRCP for the 2010 Reserve Capacity Cycle the IMO proposes a value of the MRCP of $231,300 per MW per year.

Other than the increase in OCGT power station costs, the main upward cost drivers have been costs 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

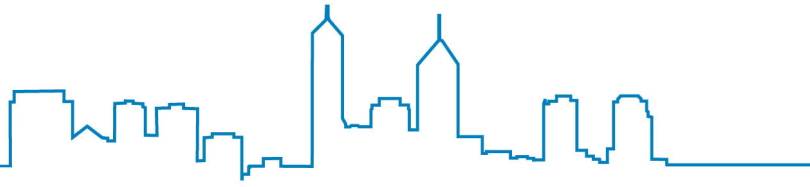
The CPI provided by the ABS is the weighted average of eight capital cities within Australia[2]. These values indicate an inflation rate of 1.5% over the period June 2008 to June 2009. The CPI is used to escalate prices that are not determined by SKM as part of the industry escalation of the power station or transmission connection capital costs.

2.2 Industry Escalation

The IMO requested SKM to develop industry escalation figures for the 2010 MRCP. These are used to reflect the changes in costs from the time that 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 year 2008-2009.

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



The IMO proposes to use 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 components and 4.59% for generation related components when translating 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 last year 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 costs 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 21.6% for the 2010 M figure represents a 4% decrease compared to the 2009

figure of 22.5%. This decrease is due to a decrease in the "Owners Engineers – Part B"[3] component of SKMs estimate of the value of M. 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.

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 = 21.6%

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 Determination of the Maximum Reserve Capacity Price 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.

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 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.

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

[3] Found in Table 4.1 of the SKM report – Review of the Maximum Reserve Capacity Price 2009 – Power Station Elements

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.

Total Shared Connection Asset Costs = A$ 51.585 M

3.3.3 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 2009 MRCP:

TC [2010] = A$ 56.092 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.

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 costing provided in their 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 Report. This equates to a decrease of A$0.784M or 23.0% from the 2009 Report. 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.

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 MRCP determination. These estimated land valuations are based on guidelines outlined in the Market Procedure for the Determination of the Maximum Reserve Capacity Price. 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 for the Determination of the Maximum Reserve Capacity Price. Areas that did not require a substantive buffer zone had costs determined based on a 3 ha site. Areas where a substantive buffer zone was required had costs determined based on a 30 ha site.

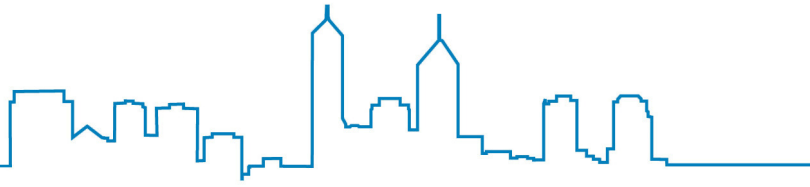
Land valuations were conducted under the provisions stated in the Market Procedure and assumptions and pricing of the individual parcels of land can be found on the IMO website (http://www.imowa.com.au). For the purposes of the MRCP, the lowest cost option as outlined in section 3.3 of this report is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



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

For the purposes of the 2010 MRCP:

WACC = 7.78%

The parameters used to determine the WACC were calculated at 8 October 2008. The Minor parameters will be recalculated prior to the publication of the final report so that the most recent numbers are used.

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$ 245.160 M

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

3.8.1 Generation

For the 2010 review, SKM have 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) over the first 15 years and 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 are added to this and then escalated to 2010 prices through CPI. This results in a combined transmission O&M cost as shown below.

Transmission Fixed O&M Costs = A$ 10,547.66 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$ 22,857 per year

Total fixed operation and maintenance costs have increased by 70% compared to last year, however this has a cumulative effect on the MRCP of A$ 9,425.57. The main increases in cost have been attributed to the inclusion of the Western Power Use of System Charges.

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: 7.78%

The annualised capital cost was determined using a capital cost of A$ 245.160 M, a WACC of 7.78% and a term of 15 years.

For the purposes of the 2010 MRCP:

ANNUALISED_CAPCOST [2010] = A$ 28.258 M per year

This represents an increase of 38% compared to the value from the 2009 MRCP. The main cost drivers have been in the margin for legal, financing, approvals and contingencies (margin M), the capital costs of development of the power station and fixed fuel costs.

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:

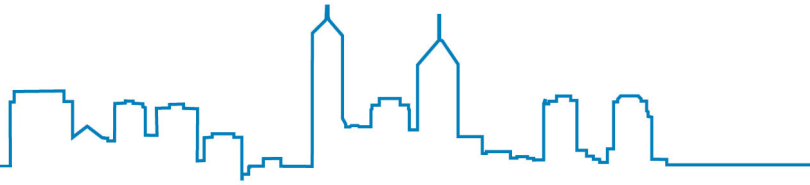
ANNUALISED_FIXED_O&M[2010] = A$ 22,857 per year

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 Determination of the Maximum Reserve Capacity Price.

For the purposes of the 2010 MRCP:

CAP = 160MW



4.4 Summer De-rating Factor (SDF)

The summer de-rating factor is outlined in the Market Rules.

For the purposes of the 2010 MRCP:

SDF = 1.18

4.5 Calculation

The Maximum Reserve Capacity Price is calculated using the following equation as required by the Market Procedure or the Determination of the Maximum Reserve Capacity Price 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$ 231.261.67 which is rounded to:

PRICECAP[2010] = A$ 231,300 per MW per year

A MRCP of A$ 231,300 per MW per year is proposed by the IMO. This represents a 41% 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 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 invites submissions from all sectors of the Western Australian energy industry, including end users, on the proposed new MRCP to apply for the 2012/13 Reserve 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 Submissions Guidelines

Submissions must be made in writing and be no longer that five pages in length (12 point font). Claims regarding the appropriateness of the values used by the IMO to determine the MRCP for the 2010 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 2012/13 Reserve 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:

Troy Forward
Manager, Market Development & 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, 18 December 2009.

General enquiries maybe directed to Ben Williams on (08) 9254 4305 or William Street on (08) 9254 4301.

6.0 CONCLUSION

The IMO has conducted a review of the main factors used to determine the MRCP. For the 2010 Reserve Capacity Cycle, the IMO proposes that the MRCP be set at $ 231,300 per MW per year.

The MRCP of $231,300 per MW per year represents an increase of 41% above the 2009 price. 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 an increase in the 2010 MRCP.

The 2009 MRCP computation has been included in Appendix B and a comparison between the 2009 and 2010 MRCP's 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 2010 Reserve Capacity Cycle. The closing date for submissions is Friday, 18 December 2009.

The Maximum Reserve Capacity Price has been set three times using the current methodology. The IMO will conduct the review described under clause 4.16.9 of the Market Rules before the publication of the 2011 Maximum Reserve Capacity Price.

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 is 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: PRICECAP[2010] and associated parameters

Parameter	2010 Value	2009 Value
Nominal Risk Free Rate of Return (%)	5.62	4.98
Expected Inflation (%)	3	3
Real risk free rate of return (%)	3.15	3.12
Market Risk Premium (%)	6	6
Asset beta	0.5	0.5
Equity beta	0.83	0.83
Debt Margin (%) , DRP (%)	3.22	3.2
Debt issuance costs (%)	0.125	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 = 7.78%

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[2009]	**$231,300.00**	**$AUD/MW/Year**
Where		
ANNUALISED_FIXED_O&M[2009]	$22,856.60	$AUD/MW/Year
ANNUALISED_CAP_COST[2009]	$28,258,314.64	$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]	**$245,159,806.27**	**$AUD**
Where		
PC[2009]	$779,195.50	$AUD/MW
M	21.60%	%
CAP	160	MW
TC[2009]	$56,092,145.58	$AUD
FFC[2009]	$2,590,280.00	$AUD
LC[2009]	$761,250.00	$AUD
WACC	7.78%	%
Annualisation		
ANNUALISED_CAP_COST[t]	**$28,258,314.64**	**$AUD/Year**
Where		
CAP_COST[2009]	$245,159,806.27	$AUD
WACC	7.78%	%
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	$56,092,145.58	A$
M	22.5%	21.6%	%
PC[t]	$732,554.42	$779,195.50	A$
CAPCOST[t]	$185,040,905.07	$245,159,806.27	A$
Term of Finance	15	15	Years
WACC	7.09%	7.78%	%
ANNUALISED_CAP_COST[t]	**$20,432,138.81**	**$28,258,314.64**	**A$/Year**
CAP	160.00	160.00	MW
SDF	1.18	1.18	N/A
ANNUALISED_CAP_COST[t]	$20,432,138.81	$28,258,314.64	A$/Year
ANNUALISED_FIXED_O&M[t]	$13,431.03	$22,856.60	$AUD/MW/Year
PRICECAP[t]	**$164,100.00**	**$231,300.00**	**$AUD/MW/Year**