imo
Independent Market Operator

Independent Market Operator

Final Report: Maximum Reserve Capacity Price Review for the 2013/14 Reserve Capacity Year

January 2011

DISCLAIMER

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

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

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EXECUTIVE SUMMARY

Each year, the Independent Market Operator (IMO) is required to conduct a review of the Maximum Reserve Capacity Price. This final report details the outcome of the review conducted in 2010 to determine the Maximum Reserve Capacity Price for the 2011 Reserve Capacity Cycle. The value used for the 2011 Reserve Capacity Cycle will be effective from 1 October 2013 through to 1 October 2014.

The 2011 Maximum Reserve Capacity Price proposed by the IMO in its final report is $240,600 per MW per year.

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

- Developing and constructing an Open Cycle Gas Turbine (OCGT) power station with a nominal nameplate capacity of 160 MW;
- Land costs associated with developing the OCGT power station;
- Technical connection to the 330 kV transmission system;
- Operations and maintenance costs associated with the OCGT power station and the transmission components;
- Developing and constructing liquid fuel storage facilities; and
- Legal, approval and financing costs.

The review process considers a range of locations throughout the South West interconnected system (SWIS) where generation projects are reasonably likely to be connected. The land and transmission connection costs are estimated for each of the nominated locations. The Maximum Reserve Capacity Price is then calculated for each location and the least cost location is chosen. For the 2011 review, Kemerton has been determined to be the location with the least cost.

The Maximum Reserve Capacity Price determined for the 2011 Reserve Capacity Cycle is approximately 0.9% higher than the Maximum Reserve Capacity Price of $238,500 determined for the 2010 Reserve Capacity Cycle. The main changes have resulted from:

- a higher Weighted Average Cost of Capital;
- incremental increases in land costs and the costs of constructing the power station and fuel storage and handling facilities; and
- a decrease in the transmission connection cost, resulting from reduced shared connection asset costs and an adjustment to the determination of easement acquisition costs.

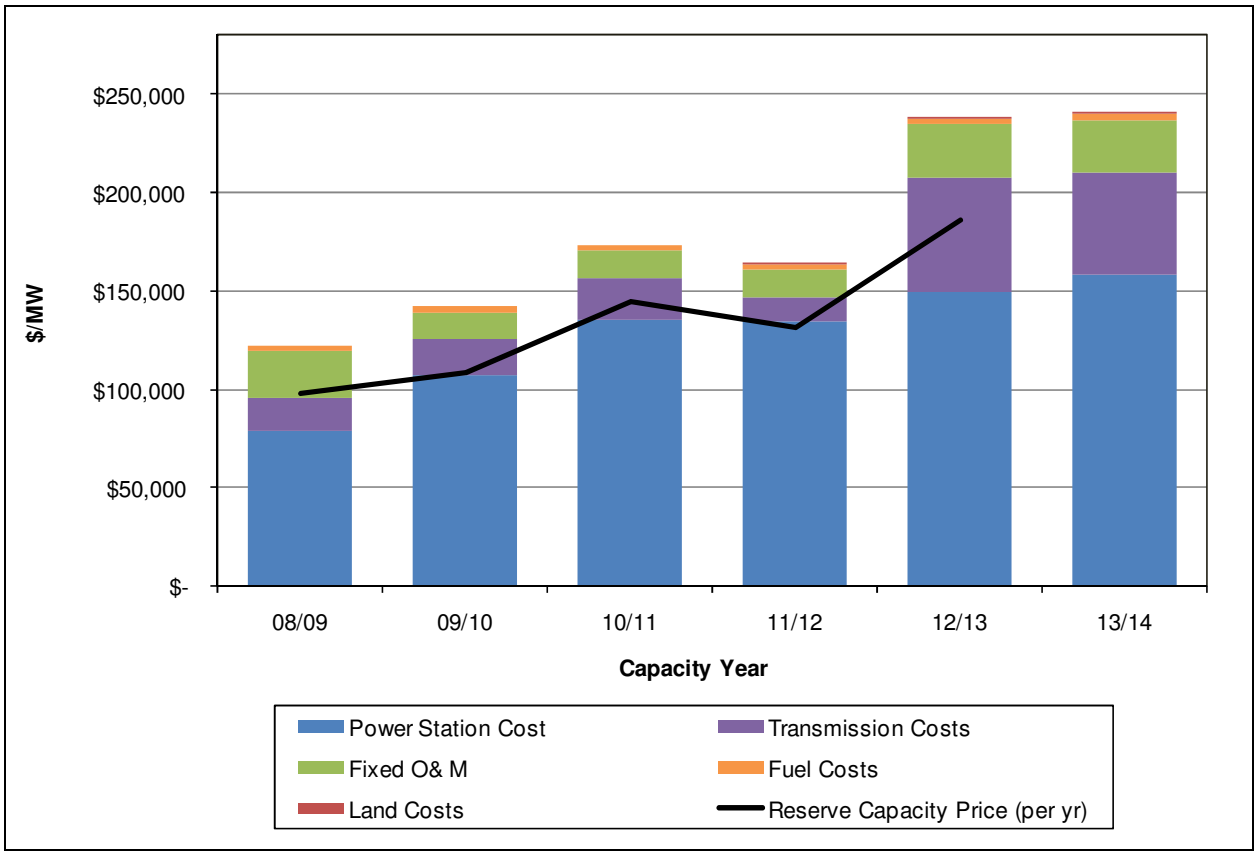
The magnitude of these changes is detailed within this report.

Since the publication of the draft report, the IMO has altered two components of the Maximum Reserve Capacity Price. These changes are:

- updates to the volatile minor components of the Weighted Average Cost of Capital as committed to by the IMO in the draft report; and
- corrections to values used in the determination of the transmission connection cost, which were erroneously copied from the Western Power report.

The overall effect of these changes is a Maximum Reserve Capacity Price which is 3.5% higher in comparison to that proposed in the draft report.

The IMO notes that the Maximum Reserve Capacity Price has varied considerably since the first determination for the 2008/09 Capacity Year. The graph below (also in Appendix E) provides further information on the variation of the Maximum Reserve Capacity Price and the component costs.



Maximum Reserve Capacity Price cost components for last three determinations

Capacity Year	2011/12	2012/13	2013/14
Power Station Cost	$ 134,091	$ 149,306	$ 158,710
Transmission Costs	$ 13,151	$ 58,493	$ 51,621
Fixed O& M	$ 13,431	$ 27,335	$ 26,649
Fuel Costs	$ 3,151	$ 2,615	$ 2,825
Land Costs	$ 293	$ 769	$ 818
MRCP (nearest $100)	$ 164,100	$ 238,500	$ 240,600
Excess Capacity	5.83%	8.99%	NA
Reserve Capacity Price (per yr)	$ 131,805	$ 186,001	NA

As can be seen in the graph, the main drivers of price growth since the first determination have been the Power Station Cost and Transmission Costs. Significant increases in commodity prices and labour costs have caused the Power Station Cost to increase by 101% since the 2008/09 Maximum Reserve Capacity Price was determined (in 2005). Notwithstanding the reduction in the Transmission Costs from 2012/13 to 2013/14, this component has risen sharply over the period since 2005 as spare capacity in the transmission network has been utilised, such that the connection of a 160 MW facility now requires significant augmentation to the network.

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1. INTRODUCTION

The Maximum Reserve Capacity Price (MRCP) sets the maximum bid that can be made in a Reserve Capacity Auction and is used as the basis to determine an administered Reserve Capacity Price if no auction is required. Each year the Independent Market Operator (IMO) is required to conduct a review, in accordance with the Market Procedure for: Determination of the Maximum Reserve Capacity Price (Market Procedure), of a number of the components that are used to determine the MRCP. The IMO uses publicly available information, together with advice from independent engineering and economics consultants and Western Power, to review the various input parameters that are used in calculating the MRCP.

The results of this review, and the proposed revised value for the MRCP, are published in the form of 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 (produced in accordance with clause 4.16.7 of the Market Rules), to the Economic Regulation Authority (ERA) for approval.

The IMO has this year received submissions from:

- Energy Response;
- Infratil Energy Australia;
- Tesla Corporation; and
- Perth Energy.

A summary of the submissions received and the IMO's response to each of the issues raised is included in section 5 of this 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 having considered the submissions received the IMO proposes a final revised value of the MRCP of $240,600 per MW per year. Since the publication of the draft report the IMO has altered several components of the Maximum Reserve Capacity Price. These changes are:

- updates to the minor components of the Weighted Average Cost of Capital as committed to by the IMO in the draft report; and
- corrections to values used in the determination of the transmission connection cost, which had been erroneously copied from the Western Power report.

The overall effect of these changes is a Maximum Reserve Capacity Price which is 3.5% higher in comparison to that proposed in the draft report, and 0.9% higher than the price that was determined for the 2010 Reserve Capacity Cycle.

This final report presents the updated component costs as determined for the 2011 Reserve Capacity Cycle and is produced on the same basis as the draft report. This final report is published on the IMO website (http://www.imowa.com.au/mrcp) with the supporting documents listed in Section 1.4 of this report.

1.1 Reserve Capacity Cycle Timing

This final report has been prepared for the 2011 Reserve Capacity Cycle and the MRCP will be effective from 1 October 2013 through to 1 October 2014.

1.2 General Costing Methodology and Structure of this Final Report

The yearly review of the MRCP requires the IMO to develop estimates of the following constituent costs, based on the notion of the marginal facility that is awarded Capacity Credits in the Reserve Capacity Auction and could be constructed in the two-year period between the Reserve Capacity Auction and the commencement of obligations for that facility:

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

In line with previous years, Sinclair Knight Merz (SKM) has estimated the capital cost for the power station, the margin for indirect costs and contingencies and 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.

The IMO commissioned Landgate to develop cost estimates of land parcels in areas that would be suitable for the development and construction of an OCGT power station. The locations are listed in the Market Procedure and have been selected as regions in which generation projects are reasonably likely to be proposed.

Under the Market Procedure, Western Power is required to provide the connection costs associated with connecting an OCGT power station to the transmission system. For the 2011 MRCP, Western Power has again been requested to provide this information for the same list of

locations for which the land costs are developed. This gives a clearer indication of the connection costs faced by project developers at likely sites for power station development.

The land and transmission connection costs are then combined and the least cost location is selected. This cost optimisation ensures that the MRCP is based upon the most economically efficient development outcome.

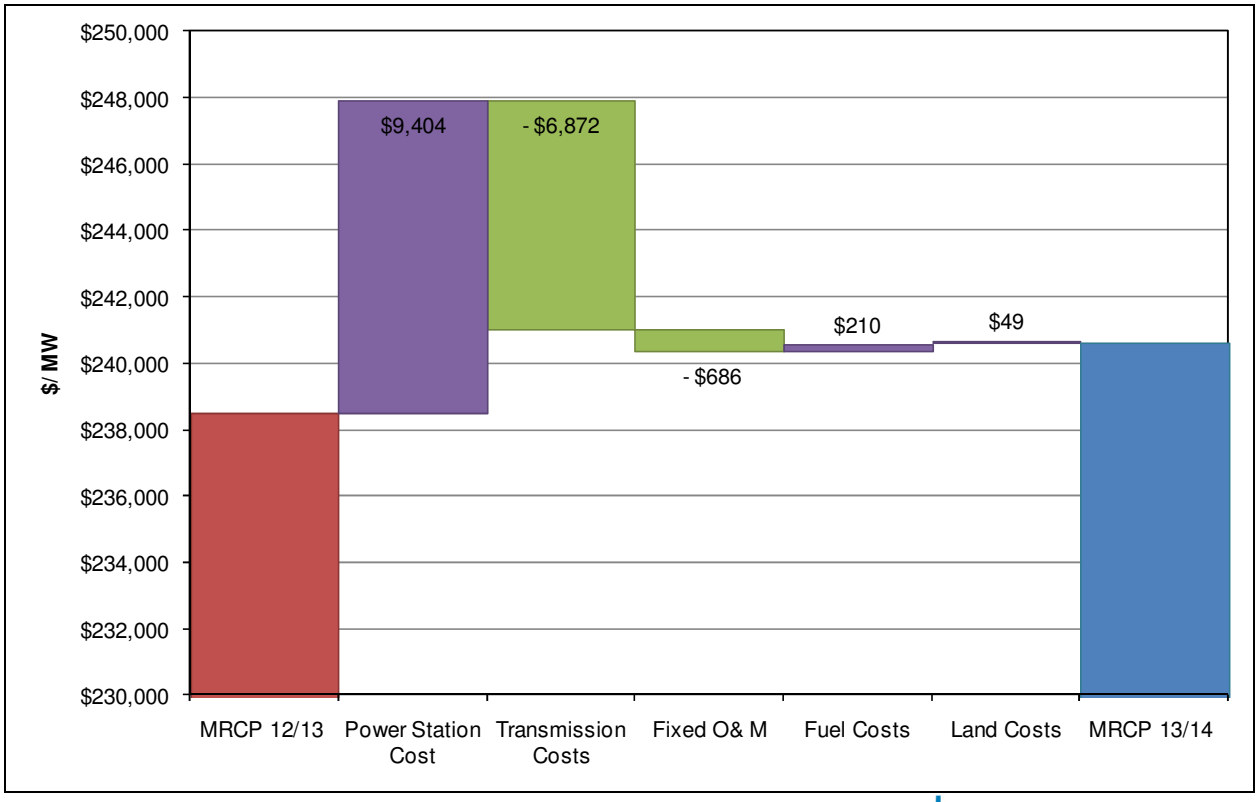
For the 2011 MRCP, the IMO commissioned GHD to update the values determined in their 2010 review of the costs associated with building liquid fuel storage and handling facilities for the power station.

The Weighted Average Cost of Capital has been determined in accordance with the Market Procedure, with the Minor parameters being updated for the IMO by the Allen Consulting Group (ACG). The Major parameter values are as laid out in the Market Procedure.

1.3 MRCP Outcome for the 2011 Reserve Capacity Cycle

Following the review of the MRCP for the 2011 Reserve Capacity Cycle the IMO proposes a value of the MRCP of $240,600 per MW per year.

This is an increase of 0.9% from the 2010 MRCP of $238,500 per MW per year. The chart below shows the contribution of the various components, after application of the WACC, to the increase from the 2010 MRCP to the 2011 MRCP.



While not shown on the graph, the most significant driver of the higher MRCP is the higher WACC, which has put upward pressure on each of the components. This is counteracted by reduced shared transmission connection asset costs, an adjustment to the determination of the easement acquisition cost and the exclusion of GST from Western Power tariff charges, which have led to reductions in the Transmission Costs and Fixed O&M Costs.

The IMO notes that the MRCP has varied considerably since the first determination for the 2008/09 Capacity Year. The graph in Appendix E provides further information on the variation of the MRCP and the variation in the component costs.

The main drivers of price growth have been the Power Station Cost and Transmission Costs. Significant increases in commodity prices and labour costs have caused the Power Station Cost to increase by 101% since the 2008/09 MRCP was determined (in 2005). The Transmission Costs have risen sharply over the period since the 2008/09 MRCP was determined as spare capacity in the transmission network has been utilised, such that the connection of a 160 MW facility now requires significant augmentation to the network.

1.4 Supporting Documents

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

- *Draft Report: Maximum Reserve Capacity Price Review for the 2013/14 Reserve Capacity Year*;
- MRCP Calculation Spreadsheet;
- Allen Consulting Group memorandum, dated 17 December 2010, *Update of the values of the volatile WACC parameters*;
- Letter from Landgate, dated 5 October 2010, *Land Values for Reserve Capacity Price*;
- Allen Consulting Group report, dated October 2010, *Update of WACC Minor Parameters for the Purpose of Determining the Maximum Reserve Capacity Price*;
- SKM report, dated 16 November 2010, *Review of the Maximum Reserve Capacity Price – Power Station Elements*;
- SKM report, dated 16 November 2010, *Review of the Maximum Reserve Capacity Price – Non Power Station Elements*;
- GHD report, dated November 2010, *Review of Fixed Fuel Cost for Maximum Reserve Capacity Price in the Wholesale Electricity Market (Diesel Fuel Storage and Handling Facility*;
- Western Power report, dated 15 November 2010, *Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2013/14*; and
- Submissions from:
    - Infratil Energy Australia;
    - Energy Response;
    - Tesla Corporation; and
    - Perth Energy.

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 from June 2009 to June 2010.

CPI June 2009	167.0
CPI June 2010	172.1

The CPI provided by the ABS is the weighted average of eight capital cities within Australia[1]. These values indicate an inflation rate of 3.1% over the period June 2009 to June 2010. 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 factors for the 2011 MRCP. These are used to reflect the changes in costs from the time that price reviews were conducted in 2010 to the time the MRCP for 2011 will come into effect. The approach of calculating escalation figures is continued from previous years. Escalation parameters have been calculated for the transmission, switchyard and power station components of the MRCP.

In order to estimate the escalation factors, SKM has investigated a number of publicly 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 0.82%. For the transmission line costs, SKM has determined an escalation factor of -2.72%, which has decreased due to the reduction in base metal prices from 2009 to 2010. 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 these fixed O&M costs is equivalent to the Australian electricity-water-gas industry sector labour cost escalation index of 4.4%. SKM has also determined an escalation factor applicable to the power station costs of 3.86% in order to adjust 2009 prices relative to 2010.

The IMO has thus used cost escalations of 0.82% and -2.72% for the switchyard and transmission materials related components respectively, 4.4% for transmission and switchyard O&M components and 3.86% for generation-related components when translating 2010 costs into June 2011 costs.

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

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 plant capital costs for a 160 MW 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 2010 MRCP.

SKM compared the capital costs for a generic 160 MW 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]. The costs for these projects are normalised for plant size, configuration and timing and non-generic costs applicable to specific projects are removed to best approximate the cost of a 160 MW OCGT power station in June 2010 money terms. The final cost estimate is divided by 160 MW and escalated by 3.86% to 2011 prices to obtain the price per megawatt value used in the MRCP calculation.

For the purposes of the 2011 MRCP:

PC[2011] = A$790,634.25 per MW

This price represents an increase of 1.5% from the corresponding value for the 2010 MRCP. SKM notes in its report that the gas turbine market in the Middle East, Asia and Australia region appears to be relatively steady. The upward pressure on power station capital costs from higher commodity prices and labour costs has been offset somewhat by the increased strength of the Australian dollar against other currencies.

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 2011. This is estimated by normalising the costs associated with recent comparable developments, excluding any abnormal costs that may be particular to individual projects. The margin M is added as a fixed percentage of the capital cost of developing the power station.

The value of margin M of 18.6% for the 2011 MRCP is the same as the 2010 value. SKM notes in its report[2] that the Global Financial Crisis has led to a scarcity of comparative projects in the last year. The margin M value is based on SKM's experience and discussions with industry contacts.

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

[2] See Section 4 of the SKM report *Review of the Maximum Reserve Capacity Price 2010 – Power Station Elements*.

For the purposes of the 2011 MRCP:

M = 18.6%

3.3 Transmission Connection Costs (TC[t])

For the 2011 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.

Western Power has provided estimates of the cost of connecting the 160 MW OCGT at each of the locations for which land prices are determined. The estimates presented below are based on the optimal (least cost) location, taking varying land prices and varying connection costs into account. For the 2011 MRCP, the optimal location is Kemerton.

For further information regarding the costing provided by Western Power please refer to the Western Power report[3] published on the IMO website (http://www.imowa.com.au/mrcp).

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 2011 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. These estimates are then adjusted in line with SKM's determination of the transmission assets escalation.

Total Dedicated Connection Asset Costs = A$9.182 M

This represents an increase of 103% when compared with the corresponding cost from last year's MRCP, resulting from a change in the method employed by Western Power in determining the cost of the transmission line assets. Whereas the previous estimates were based on simple unit costs of transmission line construction, Western Power has this year accounted for the fixed costs associated with constructing a short line length.

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

[3] See Western Power report *Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2013/14*.

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 to which the power station will be connected. A shared component of the substation costs is also included.

Total Shared Connection Asset Costs = A$36.009 M

This represents a decrease of 23% from the corresponding cost from last year's MRCP, which was also based on Kemerton representing the least cost location. While only 330kV augmentation was considered last year, Western Power has this year considered augmentation to both the 330kV and 132kV networks to allow connection of the power station to the transmission network.

This cost has decreased by 0.8% since the draft report due to the identification and correction of two errors where numbers had been incorrectly copied from the Western Power report.

3.3.3 Easement Costs

The costs for the transmission line easement acquisition, estimated by SKM[4], are escalated by CPI and added to the total transmission costs.

This is the second year that these costs have been used in the calculation of the MRCP. For the 2010 MRCP, SKM estimated the cost of buying the land along the 2km long transmission line. In this year's report, SKM has acknowledged that a project developer may not be required to purchase the full portion of land and could instead secure easement rights for some or all of the easement. In adopting this philosophy, SKM has estimated that easement costs would be approximately 50% of the purchase value of the land. The resulting estimate of A$3.607M is 46% lower than the easement cost used in the 2010 MRCP.

For the purposes of the 2011 MRCP:

Total Easement Costs = A$3.607 M

3.3.4 Total Transmission Connection Costs

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

For the purposes of the 2011 MRCP:

TC[2011] = A$48.798 M

[4] See Section 3.3 of the SKM report *Review of the Maximum Reserve Capacity Price 2010 – Non Power Station Elements*.

3.4 Fixed Fuel Costs (FFC[t])

Fixed fuel costs for the determination of the 2011 MRCP were calculated by GHD. The IMO commissioned GHD to update the costing provided in their October 2009 report ("*Review of Fixed Fuel Cost for Maximum Reserve Capacity Price in the Wholesale Electricity Market*") with prices that reflect those in 2010.

Fixed fuel costs as determined by GHD were A$2.670 M when adjusted to 2011 prices by CPI. This represents a 3.1% increase (A$80,000) from the fixed fuel cost determined for the 2010 MRCP. This rise is reflective of marginal cost increases for several of the fuel storage and handling components and the cost of diesel fuel.

For the purposes of the 2011 MRCP:

FFC[2011] = A$2.670 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. 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 (both Geraldton and Eneabba); 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 ha site. Areas where a substantive buffer zone is 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/mrcp). For the purposes of the MRCP, the lowest cost location is selected for the development of the 160 MW OCGT power station, as outlined in section 3.3.4 of this report. As indicated above, the lowest cost location for the 2011 MRCP is Kemerton.

For the purposes of the 2011 MRCP:

LC[2011] = A$ 772,904

3.6 Weighted Average Cost of Capital (WACC)

The methodology used by the IMO for calculating the WACC was reviewed by the Allen Consulting Group (ACG) in 2007. The IMO has subsequently commissioned the ACG to update the Minor WACC parameters in line with 2010 prices for the 2011 MRCP.

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

For the purposes of the 2011 MRCP:

WACC = 8.65%

The parameters used to determine the WACC were calculated at 29 October 2010, with the minor volatile parameters updated and presented to the IMO by ACG on 17 December 2010. A copy of the memorandum detailing the December update can be found on the IMO website (http://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 160 MW 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 2011 MRCP:

CAPCOST[2011] = A$ 238.778 M

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

3.8.1 Generation

For the 2011 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[5] details the total fixed O&M costs of the OCGT to year 15 as A$29.340 M in 2010 terms. This cost is annualised and then escalated at 3.86% to a 2011 value that equates to A$12,696.89 per MW per year.

Generation Fixed O&M Costs = A$12,696.89 per MW per year

[5] See Table 3-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2010 – Power Station Elements.*

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/mrcp). 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[6] over the first 15 years and creating an annuity discounted at the real WACC (see Appendix A). The 2010 costs provided in the SKM report have been escalated to 2011 figures using an escalation of 4.4% for both the switchyard and transmission line assets. This results in a cost of A$365.73 per MW per year.

Western Power tariff charges, provided in the Western Power report[7], are added to this and then escalated to 2011 prices through CPI. This results in a combined transmission O&M cost as shown below.

Transmission Fixed O&M Costs = A$13,951.76 per MW per year

This value is 7.1% lower than the corresponding value last year. While the Western Power tariff rates have increased by 1% from those used last year, the reduction is due to the exclusion of GST from the Western Power tariff charges.

3.8.3 Total Fixed Operation & Maintenance Costs

For the purposes of the 2011 MRCP:

ANNUALISED_FIXED_O&M[2011] = A$26,649 per MW per year

Total fixed operation and maintenance costs have reduced by 2.5% compared to last year, predominantly due to the exclusion of GST from the Western Power tariff charges.

[6] See Table 4-1 and Table 4-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2010 – Non Power Station Elements*.
[7] See Western Power report *Transmission Cost Estimate for the Maximum Reserve Capacity Price for 2013/14*.

4. MAXIMUM RESERVE CAPACITY PRICE CALCULATION

4.1 Annualised Capital Costs (ANNUALISED_CAPCOST[t])

The annualised capital cost is determined using:

- the capital cost of A$238.778 M, as determined in Section 3.7;
- the WACC of 8.65%, as determined in Section 3.6; and
- a term of 15 years, as required by the Market Procedure.

For the purposes of the 2011 MRCP:

ANNUALISED_CAPCOST[2011] = A$29.013 M per year

This represents an increase of 1.3% compared to the value from the 2010 MRCP. The main driver of this increase is the higher WACC, though this is offset by the reduction of the transmission connection cost for the power station.

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. These are 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 2011 prices by their respective escalation factors.

For the purposes of the 2011 MRCP:

ANNUALISED_FIXED_O&M[2011] = A$26,649 per MW per year

4.3 Capacity Parameter (CAP)

For the 2011 MRCP calculation the capacity parameter CAP is set at 160 MW as required in the Market Procedure.

For the purposes of the 2011 MRCP:

CAP = 160 MW

4.4 Summer De-rating Factor (SDF)

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

For the purposes of the 2011 MRCP:

SDF = 1.18

4.5 Calculation

The Maximum Reserve Capacity Price is calculated using the following equation as required by the Market Procedure:

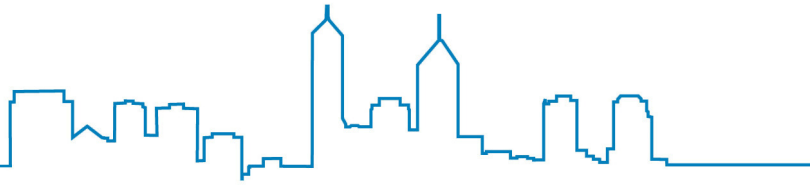
PRICECAP[t] = (ANNUALISED_FIXED_O&M[t] + ANNUALISED_CAP_COST[t]) / (CAP/SDF))

Using the values determined by the IMO and presented in previous sections, PRICECAP[2011] for the 2011 Reserve Capacity Cycle is determined to be A$240,620.99 which is rounded to:

PRICECAP[2011] = A$240,600 per MW per year

A MRCP of A$240,600 per MW per year is proposed by the IMO. This represents a 0.9% increase from the 2010 MRCP of $238,500. The main driver of the higher MRCP has been the higher WACC. This has been partially offset by decreases in the transmission connection cost and fixed O&M costs, caused by the reduction in the shared transmission connection asset costs, the adjustment to the determination of the easement acquisition cost and the exclusion of GST in the Western Power tariff charges. The remaining components of the MRCP, specifically the Power Station Capital Cost, Fixed Fuel Cost and Land Cost, have exhibited only marginal changes from last year.

Appendix C provides a detailed breakdown of the calculation and Appendix D provides a detailed comparison of the 2011 MRCP parameters and the 2010 MRCP parameters.



5. STAKEHOLDER INPUT

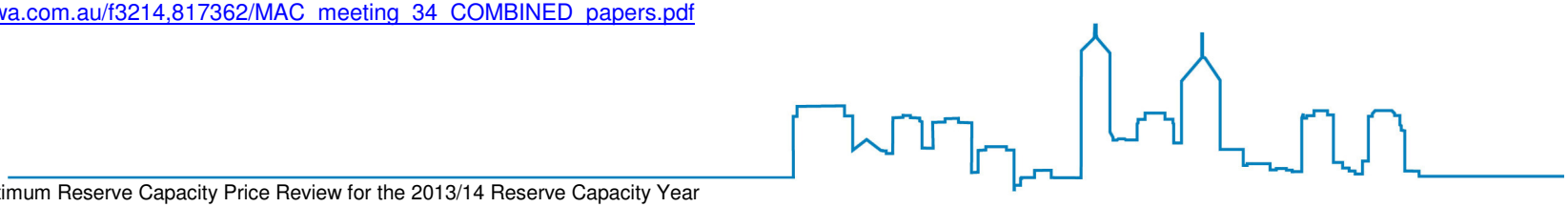
The IMO published the draft report and supporting documents for the 2011 MRCP on its website and initiated a consultation process on 16 November 2010. The IMO directly advised Rule Participants and other industry stakeholders and published announcements in the West Australian and the Australian Financial Review on 17 November 2010. The submission deadline was 15 December 2010.

During the public consultation period the IMO received responses from Infratil Energy Australia, Energy Response, Tesla Corporation and Perth Energy. A copy of each submission can be found on the IMO website (http://www.imowa.com.au/mrcp). A summary of the submissions and IMO responses is given in the following pages, listed in the order in which submissions were received.

Submitter	Component/Issue	Comment/Change Requested	IMO's response
Infratil Energy Australia	Escalation Factors	The determination of escalation factors through simple extrapolation of previous year's indices is a weak methodology. Observable forward prices for these commodities could provide a better estimate.	The IMO notes Infratil's comment. The IMO will investigate options for the use of observable forward prices for the purpose of cost escalation and will present these to the Maximum Reserve Capacity Price Working Group (MRCPWG).
Infratil Energy Australia	Power Station Capital Cost	Based on Perth Energy's recent experience in the construction of its Kwinana Power Station, Infratil would concur that the capital costs are reasonable.	The IMO notes Infratil's comment.
Infratil Energy Australia	Transmission Connection / Cost optimisation	Infratil notes that the IMO is seeking an optimal (least cost) solution, especially when considering location. Infratil submits that this approach, coupled with the 15% discount in arriving at the RCP will ultimately result, almost by definition, in the RCP being unable to support new capacity. The optimisation approach will drive participants to connect at the least cost location as nominated in the MRCP determination. The IMO then risks effectively signalling where new generating plant should be located, with the potential to create network access queues (and likely congestion) at these locations, causing	The MRCP is based on the notion of the marginal facility that is awarded Capacity Credits in the Reserve Capacity Auction and could be constructed in the two-year period between the Reserve Capacity Auction and the commencement of obligations for that facility. It is on this basis that the MRCP is based on a 160MW OCGT fuelled on diesel. It is on the same basis that the marginal location is selected through the optimisation of transmission connection costs and land costs. As acknowledged by Infratil, the IMO notes that the 15% discount, applied in the calculation of the Reserve Capacity Price, does not apply in the event that the

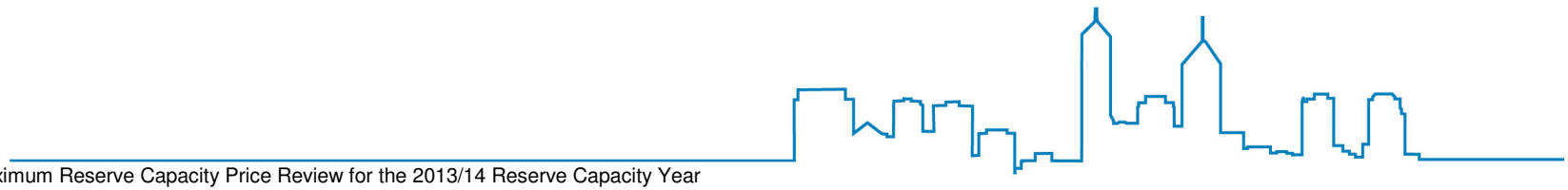
Submitter	Component/Issue	Comment/Change Requested	IMO's response
		issues for Western Power. The longer term consequence of this approach is the likely sub-economic development of the overall power system, resulting in greater system losses and ultimately higher overall energy costs to the consumer. Infratil suggests that the IMO use an average of the assessed locations, not the least cost.	Reserve Capacity Auction is held. The IMO notes that the optimisation approach has been endorsed by the MRCPWG[8], which is currently performing the Major Review of the MRCP methodology in accordance with clause 4.16.9 of the Market Rules. The IMO contends that it is the state of the transmission network that provides a price signal as to the location of new generating plant. In order to be granted Certified Reserve Capacity for a new facility, and then be eligible to enter the Reserve Capacity Auction, a Market Participant must provide evidence that it has (at least) accepted an Access Proposal from Western Power.
Infratil Energy Australia	Fixed O&M	Based on Perth Energy's, albeit brief, experience with its Kwinana Power Station, Infratil's view is that the O&M costs, though perhaps a little light, would appear reasonable.	The IMO notes Infratil's comment.

[8] See page 112 of meeting papers for Market Advisory Committee Meeting #34, 15 December 2010, available at http://www.imowa.com.au/f3214,817362/MAC_meeting_34_COMBINED_papers.pdf



Submitter	Component/Issue	Comment/Change Requested	IMO's response
Infratil Energy Australia	Fixed O&M	Infratil notes that the cost of insurance has been omitted and estimates this cost to be in the order of $1m per annum.	Step 1.12.1(c) of the Market Procedure for: Determination of the Maximum Reserve Capacity Price, 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. The IMO will present Infratil's comment to the MRCPWG for its consideration.
Infratil Energy Australia	WACC	Infratil reiterates its previous position that generation capacity revenue does not have the same risk profile as regulated revenue earned by network businesses, and this should be reflected in the WACC.	The beta values in the WACC are fixed in the Market Procedure. These values are currently being considered in the Major Review of the MRCP methodology being undertaken by the MRCPWG.
Infratil Energy Australia	Volatility of RCP	The RCP is the only visible price for capacity available to investors and financiers. Year on year volatility in this price can undermine confidence in the allocation of capital to new capacity in the SWIS, Infratil recommends that the IMO give thought to methods for smoothing the annual price (without blunting price signals). These might include a rolling 3 year price or limiting the move (down) in price by, say, 5% from one year to the next.	The IMO notes Infratil's comments and suggestions. Concern around price volatility has been noted by the MRCPWG. Infratil's suggestion will be presented to the MRCPWG when it considers this issue in 2011.

Submitter	Component/Issue	Comment/Change Requested	IMO's response
Energy Response	MRCP Methodology	Using the amortised value of a 160MW open cycle generator and its associated costs is a most sensible approach to setting the MRCP.	The IMO notes Energy Response's comment.
Energy Response	MRCP Methodology	The process undertaken by the IMO is independent of the market, is transparent and meets all the WEM objectives, leading to a reasonable pricing outcome for reserve that is closely reflective of the cost of building reserve capacity, whether by power station or customer plant (for DSM use). The MRCP process is successful as it has provided a comfortable cushion of reserve, whereas most other electricity markets have struggled to meet reserve requirements.	The IMO notes Energy Response's comments.



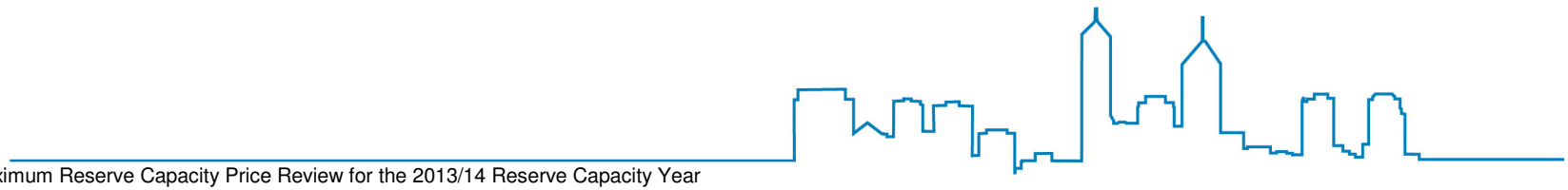
Submitter	Component/Issue	Comment/Change Requested	IMO's response
Tesla Corporation	Transmission Connection	It is difficult to understand the situation which occurs when the IMO report states that transmission costs rise sharply, coupled with Western Power stating the network is becoming saturated and operating at maximum capacity therefore requiring deep augmentation results in the calculated "connection" cost in the MRCP calculation to decrease year on year. It seems that qualitatively, it has become more expensive to connect to the network due to the requirement for augmentation, but at the same time, the quantitative contribution to the MRCP has decreased. There should be some bridge between the qualitative notes that the network is now at capacity (and therefore implying high costs to connect) to the actual costs (which have decreased) calculated to input into the MRCP calculation.	The IMO notes Tesla's comment. The statements in the IMO's draft report regarding transmission costs referred to the increase in costs since the first MRCP determination for the 2008/09 Capacity Year. The IMO has amended the wording in the Executive Summary, and Introduction of this final report to provide clarification.
Tesla Corporation	Transmission Connection	Tesla seeks clarity on how broadening the scope of augmentation from only the 330kV network to include the mesh effects (and subsequent augmentation requirements) of the 132kV network results in lower connection costs as a whole. Tesla understands that "un-meshing" the network is a significant project with	As noted by Tesla, the approach taken by Western Power has been refined from last year. The estimates provided in 2009 for the 2012/13 MRCP were based on augmentation of the 330kV network alone. However, as Western Power has flagged in its 2010/11 Annual Planning Report (APR), the 132kV network is "reaching the limit of its ability to transfer power across

Submitter	Component/Issue	Comment/Change Requested	IMO's response
		significant costs and long lead times. It seems the decreased Shared Costs are primarily driven by the change in strategy of connection – it may be cheaper to upgrade the 132kV network (un-mesh) as opposed to upgrading the 330kV as has been the strategy in previous capacity years (to feed into the MRCP). However, it is unlikely that a proponent attempting to connect for the 2013/14 capacity year would be able to take advantage of these theoretical lower costs due to timing. Un-meshing the network is likely to be a 5+ year project. Therefore the 2013/14 MRCP should not assume an "un-meshing" cost of connection as it is not likely to be available to a proponent to allow commissioning by October 2013. If Western Power can confirm the un-meshing can occur by this time and available to proponents for connection by October 2013, then this methodology may be valid.	the system whereas capacity remains on the 330kV bulk network"[9]. The transmission connection cost estimates provided this year reflect Western Power's development strategies as outlined in the APR. The IMO has consulted with Western Power in relation to the unmeshing of the 132kV network. The unmeshing of the 132kV network forms a part of Western Power's network development plan as outlined in APR and would be implemented gradually in line with other augmentation work, not as a standalone project. Consequently, this should not impede the delivery of network augmentations in time for the 2013/14 Capacity Year.

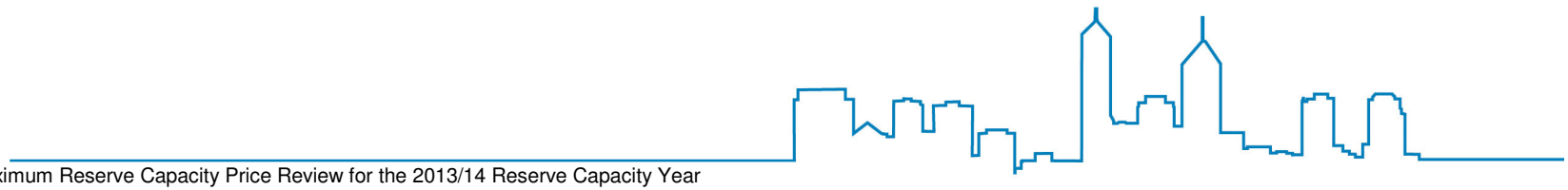
[9] Page 3, *Western Power Transmission and Distribution 2010/11 Annual Planning Report*, available at http://www.westernpower.com.au/aboutus/publications/Annual_planning_report_.html

Submitter	Component/Issue	Comment/Change Requested	IMO's response
Tesla Corporation	Transmission Connection	The documentation is not explicit as to the comparison of specific items (e.g. PSC, PDAC) from year to year. A comparison table (similar to those provided for the WACC inputs) would be useful to directly compare the Western Power transmission cost estimates.	The IMO has added this comparison into Appendix B of this final report. The IMO notes that direct comparison of these costs from the 2012/13 MRCP to the 2013/14 MRCP may not be particularly meaningful due to the refinement in Western Power's approach, as indicated above.
Tesla Corporation	Transmission Connection	The 2012/13 Western Power costing report stated the connection cost at Kemerton Industrial Park (the lowest cost location utilised for the purposes of the MRCP calculation) assumed no re-energisation of Muja A/B. This is now known not to be the case, with the Muja A/B project being awarded Capacity Credits for the 2012/13 Capacity Year. The presence of Muja A/B would theoretically increase the deep connection costs (not decrease) in 2013/14 as there is less excess capacity available due to Muja A/B coming back on-stream.	The IMO notes Tesla's comments in relation to Muja A/B. Notwithstanding the re-energisation of Muja A/B, the change of approach described above, considering augmentation of the 330kV and 132kV networks, results in lower augmentation cost estimates when compared to those developed for the 2012/13 MRCP. Western Power has confirmed to the IMO that the re-energisation of Muja A/B has been accounted for in the transmission cost estimates.

Submitter	Component/Issue	Comment/Change Requested	IMO's response
Tesla Corporation	Easement	The treatment of the cost of obtaining access to easements has changed from 2012/13 to 2013/14. It was previously assumed the 2km transmission line easement would be purchased, but now is assumed to be 50% purchased and 50% "secured rights". It is likely that to secure the "rights" to use the easement, a payment of some sort would be required. It is also likely that the Net Present Value of this "rental" payment would be greater than the actual acquisition cost over a 30 year period to convey some monetary benefit to the land owner. Using the above assumption, it may prove a lower cost outcome to purchase the land in line with the 2010 methodology.	The IMO consulted with Western Power prior to the publication of the draft report in order to verify the validity of SKM's approach in determining the easement cost. Based on its historical observations, Western Power advised that SKM's approach was valid and confirmed to the IMO that easement rights are typically obtained through a one-off payment, not a "rental" payment as suggested by Tesla. The IMO considers that SKM's approach more accurately reflects the cost faced by a project developer and has retained the value presented in the draft report. The IMO's philosophy with regards to cost reflectivity within the MRCP is further explained below.
Tesla Corporation	Changes to MRCP Methodology	Changing the methodology of the MRCP calculation from year to year also increases the perceived risk of the variability of the MRCP in the future. There is significant value in making the risks clear and apparent – the MRCPWG would be a good forum for this sort of change. Otherwise, there are unquantifiable risks to the MRCP that proponents cannot forecast and understand. It is Tesla's view that the treatment of easement costs should be maintained in a consistent manner and in line with 2010 methodology.	The MRCP methodology has evolved from year to year since market commencement. The IMO maintains that minor changes to the methodology should be pursued if they deliver cost estimates that more closely align with the costs faced by project developers. This methodological evolution avoids the perpetuation of errors from one year to the next. Examples of this philosophy include the addition of easement costs in the 2012/13 MRCP, which had not been included in the previous year, and the addition of Western Power tariff charges in the same year.

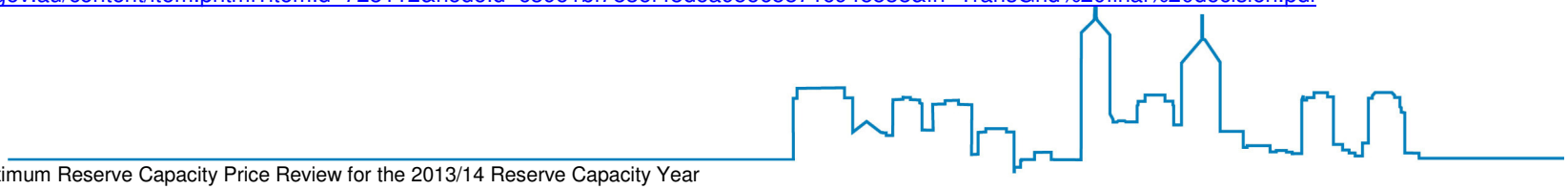


Submitter	Component/Issue	Comment/Change Requested	IMO's response
		Methodology changes similar to this should be addressed within the MRCPWG and not arbitrarily by consultants. Changing the methodology of calculation year to year increases the perceived risks and uncertainty of the Electricity Market.	
Tesla Corporation	Land	It is noted in the MRCP Landgate report that the minimum lot size within the Kemerton Industrial Park is 5 hectares. The land cost is based upon a lot size of 3 hectares. This is inconsistent with the estimate of transmission line distance. The lot size should be calculated on the basis of 5 hectares if Kemerton is to be used as the reference site as it is not possible (due to planning restrictions) to obtain a site smaller than 5 hectares within a 2km distance of any substation in the Kemerton region. Alternatively the 2km distance should be increased to a meaningful distance that allows a 3 hectare site to be utilised. The costs should reflect a model plant that is to build. It is not possible to build this model plant as planning rules (acknowledged by Landgate) prevent this from occurring.	The Market Procedure stipulates that the land size must be 3 hectares (where no buffer zone is required) and the transmission line must be 2km in length. Consequently, revision of these costs can not be considered for the 2013/14 MRCP. However, the IMO notes Tesla's comment and will refer this to the MRCPWG for its consideration.

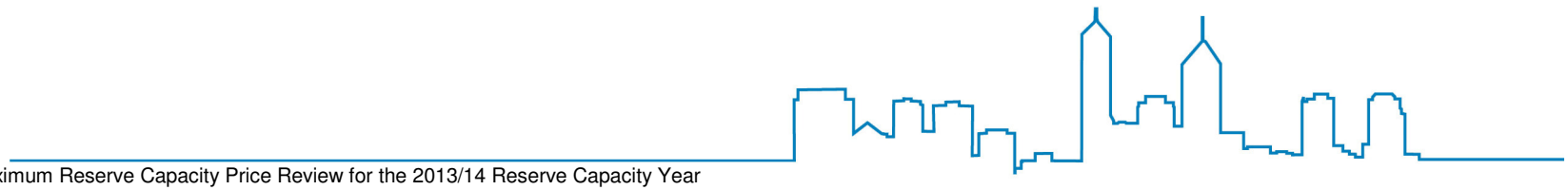


Submitter	Component/Issue	Comment/Change Requested	IMO's response
Tesla Corporation	Escalation Factors	While general base metal costs in AUD have decreased, Tesla has not observed a corresponding decrease in the cost of the actual equipment. Due to the rapid recovery of the world market, switchyard and transmission materials have not decreased in price in line with the base metal cost. Tesla asks that the cost escalation values be reviewed prior to acceptance into the final MRCP.	The IMO acknowledges that the escalation modelling does not include any allowance for producers' margins. The Australian Energy Regulator (AER) has similarly considered that the inherent uncertainties preclude their consideration in cost escalation factors[10].
Perth Energy	MRCP Methodology	Overall, Perth Energy is supportive of the MRCP determination of $232,500/MW for the 2013/14 year. Perth Energy also observes that as a result of the comprehensive reviews adopted in prior years, and the more recent operation of the MRCPWG, the process and methodology for calculating the MRCP now appear to have stabilised. This is a significant improvement on the experiences of prior years, in which the year on year variations were material. Perth Energy welcomes this development and highlights that a predictable and stable review process, leading to a predictable price outcome, is absolutely fundamental to maintaining investor confidence and enabling new power station projects to obtain finance.	The IMO notes Perth Energy's comment.

[10] Page 30 of *AER Final Decision, TransGrid Transmission Determination, 2009-10 to 2013-14*, 28 April 2009. Available at http://www.aer.gov.au/content/item.phtml?itemId=728112&nodeId=c39e1bf783ef48dea95e65871c945538&fn=TransGrid%20final%20decision.pdf



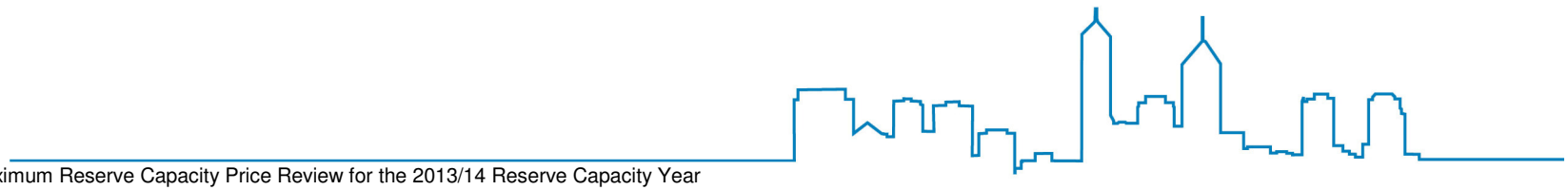
Submitter	Component/Issue	Comment/Change Requested	IMO's response
Perth Energy	Transmission Connection	Perth Energy observes that the transmission connection cost, a significant component in the cost stack, remains volatile. It is Perth Energy's understanding that this variance is mainly driven by changes in network configuration from the previous year (e.g. it has become more or less constrained), leading to different network augmentations being necessary, when compared to those that were required one year ago.	The IMO notes Perth Energy's comment and acknowledges the recent volatility in this component. As noted above, the approach taken by Western Power has been refined from last year. The estimates provided in 2009 for the 2012/13 MRCP were based on augmentation of the 330kV network alone. However, as Western Power has flagged in its 2010/11 APR, the 132kV network is "reaching the limit of its ability to transfer power across the system whereas capacity remains on the 330kV bulk network". The estimates provided this year reflect Western Power's development strategies as outlined in the APR.
Perth Energy	Transmission Connection	Perth Energy continues to support a change to the methodology adopted by Western Power's Access Arrangement to calculate Deep Connection Costs. In particular, Perth Energy would welcome a move towards a "shallow" connection costing methodology where appropriate, whereby a high proportion of the expenditure currently classified as being for "user specific" assets becomes part of the wider network and is included in Western Power's Regulatory Asset Base.	The IMO notes Perth Energy's comment and will pass this to Western Power. The Western Power Access Arrangement is beyond the scope of this review.



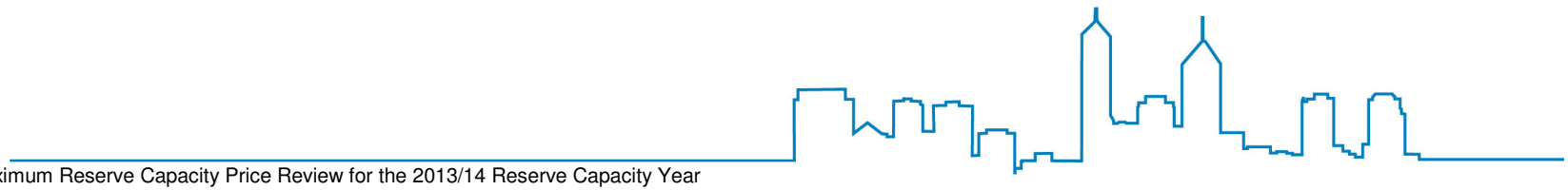
Submitter	Component/Issue	Comment/Change Requested	IMO's response
Perth Energy	Transmission Connection	Regarding the use of the least cost connection option as the basis for the Transmission Cost Component in the MRCP, Perth Energy is not sure of the reason. As evidenced by Western Power's report to the IMO, the cost estimates varied from $45 million to $586 million (more than a 13 fold increase from the lowest to the highest cost alternative) across the seven locations that were considered. Applying the lowest of these estimates would imply under-recovery of transmission costs.	The MRCP is based on the notion of the marginal facility that could be constructed in the two-year period between the Reserve Capacity Auction and the commencement of obligations for that facility. It is on this basis that the MRCP is based on a 160MW OCGT fuelled on diesel. It is on the same basis that the marginal location is selected through the optimisation of transmission connection costs and land costs. The IMO notes that the optimisation approach has been endorsed by the MRCPWG, which is currently performing the Major Review of the MRCP methodology in accordance with clause 4.16.9 of the Market Rules.
Perth Energy	Power Station Capital Cost	Perth Energy continues to advocate the benefits to system security of incentivising fuel diversity in the South West interconnected system (SWIS). To facilitate this, the MRCP should allow for the costs of constructing gas laterals in the cost stack. Perth Energy notes that this cost element was specifically allowed for within the MRCP at Market Commencement.	The costs of constructing gas laterals cannot be incorporated in this year's calculation of the MRCP under the current Market Procedure. Further, the MRCPWG has agreed that future MRCP determinations should be based on a diesel-fuelled facility without a gas lateral[11]. The IMO is currently investigating the role that dual-fuelled facilities play in the reliable delivery of electricity in the WEM and is exploring possible Reserve Capacity implications for dual fuelled facilities.

[11] See Page 6 of MRCPWG Meeting 4 minutes, available at http://www.imowa.com.au/f2179,714556/Minutes_Meeting_4_MRCPWG_Final.pdf

Submitter	Component/Issue	Comment/Change Requested	IMO's response
Perth Energy	Fixed O&M	Perth Energy notes that there remains no allowance for insurance costs in the MRCP. Insurance costs for a 160MW OCGT would be in the order of $1m per annum, or just over $6,000 per MW. Insurance is a necessary component for any prudent power station operator and Perth Energy suggests that such costs be explicitly provided for in any future MRCP reviews.	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. The IMO will present Perth Energy's comment to the MRCPWG for its consideration.
Perth Energy	Escalation Factors	Perth Energy notes that some indices to be applied to escalate certain cost parameters have been based on the actual movement in base metals prices between 2009 and 2010. This resulted in a decrease in these cost parameters. The MRCP is forward looking and is meant to reflect the cost of providing generation capacity in future years. Perth Energy would therefore suggest that historical price movements in base metal prices are not relevant for cost escalation purposes and suggests the IMO investigate the potential use of forward estimates for base metal prices for the next MRCP review.	The IMO notes Perth Energy's comment. The IMO will investigate options for the use of observable forward prices for the purpose of cost escalation and will present these to the MRCPWG.



Submitter	Component/Issue	Comment/Change Requested	IMO's response
Perth Energy	WACC	Wholesale funding costs, which drive lending margins, have continued to increase since the GFC, on top of the rises in the domestic cash rate. However, Perth Energy would like to note this as a word of caution rather than disagreeing with the WACC as proposed in the IMO Report.	The IMO notes Perth Energy's comment.



6. CONCLUSION

The IMO has conducted a review of the main factors used to determine the MRCP. For the 2011 Reserve Capacity Cycle, the IMO proposes that the MRCP be set at $240,600 per MW per year.

The MRCP of $240,600 per MW per year represents an increase of 0.9% from the 2010 price. The main driver of the higher MRCP has been the higher WACC, though this has been partially offset by decreases in the Transmission Connection and Fixed O&M costs.

The 2011 MRCP computation has been included in Appendix C and a comparison between the 2010 and 2011 MRCP's can be found in Appendix D.

The MRCP has been set four times using the current methodology. Clause 4.16.9 of the Market Rules requires the IMO to conduct a review of the methodology and process for determining the MRCP at least once in every five year period. The Market Advisory Committee (MAC) constituted the Maximum Reserve Capacity Price Working Group (MRCPWG) to undertake this review, which is scheduled to be completed in early 2011. The review will lead to a Procedure Change Proposal for the Market Procedure for: Determination of the Maximum Reserve Capacity Price, with the revised Market Procedure to take effect before the publication of the 2012 MRCP.

APPENDIX A: WEIGHTED AVERAGE COST OF CAPITAL (WACC)

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

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

and

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

where the nominal Return on Equity is calculated as:

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

and the nominal Return on Debt is calculated as:

$$R_d = R_f + DRP$$

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 in Table A1 below. The volatile Minor parameters, highlighted in yellow, have been recalculated since the publication of the draft report in order to ensure that the most recent numbers are used.

Table A1: WACC parameters for 2010 and 2011

Parameter	Notation	2011 Value	2010 Value
Nominal Risk Free Rate of Return (%)	R_f	5.59	5.49
Expected Inflation (%)	i	2.9	3
Real risk free rate of return (%)	R_{fr}	2.65	2.8
Market Risk Premium (%)	MRP	6	6
Asset beta	β_a	0.5	0.5
Equity beta	β_e	0.83	0.83
Debt Margin / Debt Risk Premium (%)	DRP	5.25	4.3
Corporate tax rate (%)	t	30	30
Franking credit value	γ	0.5	0.5
Debt to total assets ratio (%)	D/V	40	40
Equity to total assets ratio (%)	E/V	60	60

For the purposes of the 2011 MRCP:

WACC = 8.65%

APPENDIX B: EQUATION FOR THE TC[2011] COMPONENT OF THE 2011 MRCP AND COMPARISON WITH 2010 VALUES

TC[2011] = Connection Assets + Shared Assets + Easement Costs

Where:

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

Where:

2KM = Cost of 2km 330kV single-circuit line from Western Power report;
DEA = Cost of Dedicated Connection Assets from Western Power report;
N-ME = Non-Metro Escalation as defined in the Western Power Report; and
TE = Transmission Escalation as defined in SKM Non-Power Station Elements report;

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

Where:

PSC = Proportionate 330 kV Substation Costs as defined below;
SE = Switchyard Escalation as defined in SKM Non-Power Station Elements report; and
PDAC= Proportionate Deep Augmentation costs as defined below;

Proportionate 330 kV substation costs (PSC) =
SC / (SC + DAC) * CCFSA

Where:

SC = Substation Cost from Western Power report multiplied by N-ME;
DAC = Deep Augmentation costs from Western Power report (labelled "Shared Network Cost for 160MW Generator" in table on page 15); and
CCFSA = Capital Contribution for Shared Assets from Western Power Report (labelled "Deep Connection Cost" in table on page 15); and

Proportionate Deep Augmentation Costs (PDAC) =
DAC / (SC + DAC) * CCFSA

Where:

DAC = Deep Augmentation costs from Western Power report (labelled "Shared Network Cost for 160MW Generator" in table on page 15);
SC = Substation Cost from Western Power report multiplied by N-ME; and

CCFSA = Capital Contribution for Shared Assets from Western Power Report (labelled “Deep Connection Cost” in table on page 15); and

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

Where:

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

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

Table B1: TC[t] parameters for 2010 and 2011

Parameter	Notation	2011 Value	2010 Value
Cost of 2km 330kV single-circuit line	*2KM*	$ 7,904,000	$ 2,700,000
Cost of Dedicated Connection Assets	*DEA*	$ 1,084,900	$ 1,500,000
Non-Metro Escalation	*N-ME*	1.05	1.05
Connection Assets		$ 9,181,622	$ 4,507,020
Transmission Escalation	*TE*	0.9728	1.022
Switchyard Escalation	*SE*	1.0082	1.048
Substation Cost	*SC*	$ 10,252,305	$ 15,750,000
Deep Augmentation Cost	*DAC*	$ 33,632,000	$ 35,200,000
Capital Contribution for Shared Assets	*CCFSA*	$ 36,704,000	$ 45,436,317
Proportionate 330kV Substation Costs	*PSC*	$ 8,574,833	$ 14,045,574
Proportionate Deep Augmentation Costs	*PDAC*	$ 28,129,167	$ 31,390,743
Shared Assets		$ 36,009,200	$ 46,801,101
Easement Costs		$ 3,606,886	$ 6,618,815

APPENDIX C: CALCULATION OF THE MAXIMUM RESERVE CAPACITY PRICE

The Maximum Reserve Capacity Price is calculated as described by the latest version of the Market Procedure for Determination of the Maximum 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 Australian dollars in year t, annualised over a 15 year period, using the Weighted Average Cost of Capital (WACC).

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

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

Table C1: PRICECAP[2011] and associated parameters

Parameter	Value	Unit
PRICECAP[2011]	**$240,600.00**	**A$/MW/Year**
Where		
ANNUALISED_FIXED_O&M[2011]	$26,648.64	A$/MW/Year
ANNUALISED_CAP_COST[2011]	$29,013,199.36	A$/Year
CAP	160	MW
SDF	1.18	N/A

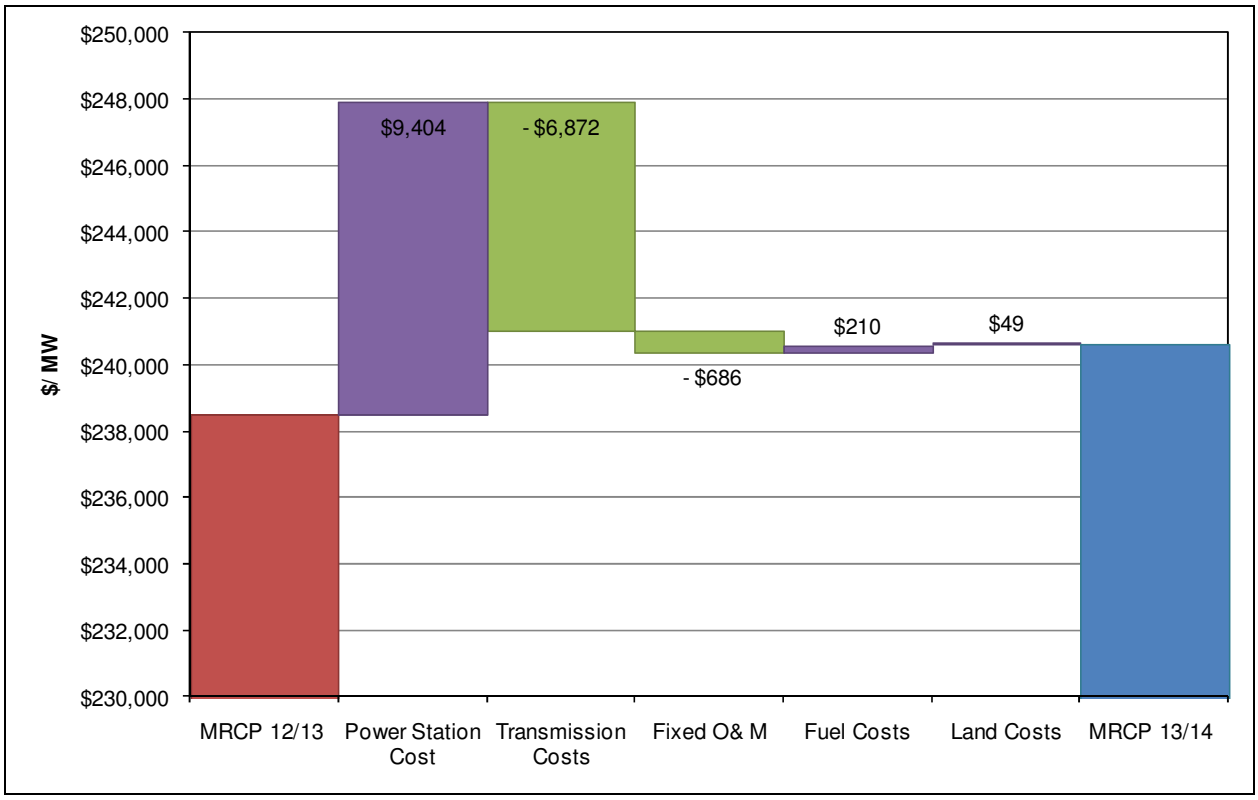
Table C2: ANNUALISED_CAP_COST[2011] and associated parameters

Parameter	Value	Unit
CAP_COST[2011]	**$238,777,908.78**	**A$**
Where		
PC[2011]	$790,634.25	A$/MW
M	18.60%	%
CAP	160	MW
TC[2011]	$48,797,708.54	A$
FFC[2011]	$2,670,126.35	A$
LC[2011]	$772,904.19	A$
WACC	8.65%	%
Annualisation		
ANNUALISED_CAP_COST[t]	**$29,013,199.36**	**A$/Year**
Where		
CAP_COST[2011]	$238,777,908.78	A$
WACC	8.65%	%
Term of Finance (Years)	15	Years

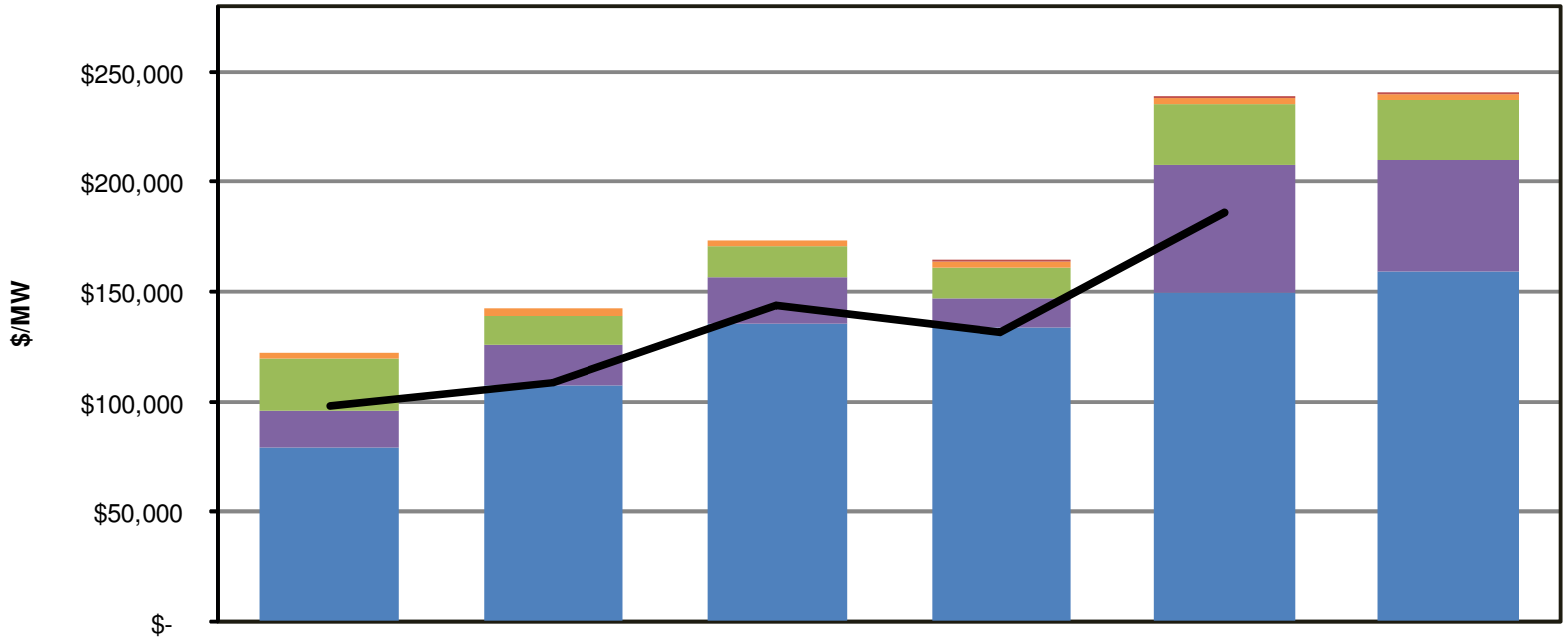
APPENDIX D: COMPARISON BETWEEN 2010 AND 2011 MAXIMUM RESERVE CAPACITY PRICES

Table D1: PRICECAP[2011] and associated parameters

Parameter	Reserve Capacity Year 2011	2010	Units
FFC[t]	$2,670,126.35	$2,590,280.00	A$
LC[t]	$772,904.19	$761,250.00	A$
TC[t]	$48,797,708.54	$57,926,935.90	A$
M	18.6%	18.6%	%
PC[t]	$790,634.25	$779,195.50	A$/MW
CAPCOST[t]	$238,777,908.78	$244,210,386.60	A$
Term of Finance	15	15	Years
WACC	8.65%	8.06%	%
ANNUALISED_CAP_COST[t]	**$29,013,199.36**	**$28,635,599.54**	**A$/Year**
CAP	160.00	160.00	MW
SDF	1.18	1.18	N/A
ANNUALISED_CAP_COST[t]	$29,013,199.36	$28,635,599.54	A$/Year
ANNUALISED_FIXED_O&M[t]	$26,648.64	$27,334.90	A$/MW/Year
PRICECAP[t]	**$240,600.00**	**$238,500.00**	**A$/MW/Year**


$250,000
$248,000
$246,000
$244,000
$242,000
$240,000
$238,000
$236,000
$234,000
$232,000
$230,000
$/ MW
$9,404
- $6,872
$210
$49
- $686
MRCP 12/13
Power Station Cost
Transmission Costs
Fixed O& M
Fuel Costs
Land Costs
MRCP 13/14

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



Capacity Year	08/09	09/10	10/11	11/12	12/13	13/14
Power Station Cost	$ 79,110	$ 107,404	$ 135,701	$ 134,091	$ 149,306	$ 158,710
Transmission Costs	$ 16,558	$ 18,017	$ 20,672	$ 13,151	$ 58,493	$ 51,621
Fixed O& M	$ 23,900	$ 13,363	$ 14,392	$ 13,431	$ 27,335	$ 26,649
Fuel Costs	$ 2,907	$ 3,456	$ 2,631	$ 3,151	$ 2,615	$ 2,825
Land Costs	$ -	$ -	$ -	$ 293	$ 769	$ 818
MRCP (nearest $100)	$ 122,500	$ 142,200	$ 173,400	$ 164,100	$ 238,500	$ 240,600
Excess Capacity	6.43%	11.44%	2.19%	5.83%	8.99%	NA
Reserve Capacity Price (per yr)	$ 97,837	$ 108,459	$ 144,235	$ 131,805	$ 186,001	NA

APPENDIX F: ABBREVIATIONS

ABS – Australian Bureau of Statistics

ACG – Allen Consulting Group

CPI – Consumer Price Index

ERA – Economic Regulation Authority

GST – Goods and Services Tax

IMO – Independent Market Operator

MAC – Market Advisory Committee

MRCP – Maximum Reserve Capacity Price

MRCPWG – Maximum Reserve Capacity Price Working Group

MW – Megawatt

OCGT – Open Cycle Gas Turbine

O&M – Operation and Maintenance

SKM – Sinclair Knight Merz

SWIS – South West interconnected system

WACC – Weighted Average Cost of Capital

WEM – Wholesale Electricity Market