Market Procedure for Maximum Reserve Capacity Price

1. BACKGROUND

The Maximum Reserve Capacity Price (MRCP) sets the maximum bid that can be made in a Reserve Capacity Auction and is used to determine an administered Reserve Capacity Price if no auction is required. The MRCP aims to reflect the cost of building the marginal peaking facility in the South West interconnected system – notionally a liquid fuelled 160MW Open Cycle Gas Turbine. Each year the IMO determines the MRCP.

Clause 4.16.9 of the Market Rules requires the IMO to review the *Market Procedure: Maximum Reserve Capacity Price* once in every five year period. To assist in undertaking this five year review, the MAC established the MRCP Working Group (MRCPWG) in 2010 to consider, assess and develop any recommendations for changes to the Market Procedure. The MRCPWG first met on 31 May 2010 and last met on 20 June 2010 with a total of ten meetings held.

Following extensive discussions up to that point, an updated Market Procedure was first tabled at the MRCPWG meeting held on 24 March 2011. The MRCPWG has reviewed the updated drafting of the Market Procedure at the subsequent meetings held on 5 May 2011 and 20 June 2011. Following these meetings, MRCPWG members have reviewed the updated draft Market Procedure and the draft Procedure Change Proposal and provided comments to the IMO. These documents have now been updated to take into account the latest comments from MRCPWG members, made in and out of session.

A record of the proceedings of the MRCPWG can be found at www.imowa.com.au/MRCPWG.

2. PROCEDURE CHANGE PROPOSAL

The MRCPWG Terms of Reference require the MRCPWG to "Develop an integrated suite of solutions, including drafted Procedure Change Proposals to be presented to the MAC by way of presentation/s and supporting discussion papers." The Terms of Reference also require a full impact assessment be conducted.

The draft Procedure Change Proposal and Market Procedure, attached as appendices to this paper, represent the culmination of the MRCPWG's review. The draft Procedure Change Proposal includes an assessment of the impact of the proposed changes to the Procedure agreed by the WG.

The most significant changes to the MRCP methodology endorsed by the MRCPWG are:

- the addition of inlet cooling to the power station. This has the effect of increasing the Capacity Credit allocation to the facility for a relatively small increase in capital cost, thus reducing the cost per MW. Sinclair Knight Merz (SKM), commissioned by the IMO to assess the impact of this change, has indicated that this would result in a reduction to the MRCP of approximately 11%; and
- an alternative method for estimating the transmission connection cost. The new method, developed by SKM and broadly endorsed by the MRCPWG, uses historical connection costs and current access offers to project future connection costs. SKM has indicated that this methodology would result in a reduction to the MRCP of approximately 12%.

Several other changes have been broadly endorsed by the MRCPWG and are listed in the draft Procedure Change Proposal. As shown in the impact assessment, the estimated impact of the proposed changes, had they been applied in the determination of the 2013/14 MRCP, is a reduction of 24% in the MRCP.

The IMO will submit the draft Procedure Change Proposal into the Procedure Change Process following presentation to the MAC. If accepted, it is anticipated that the amendments to the Market Procedure would commence prior to the publication of the draft 2014/15 MRCP report in late October.

3. RECOMMENDATIONS

The IMO recommends that the MAC:

- **Review and provide out of session comment** on:
  - the amendments proposed for the *Market Procedure: Maximum Reserve Capacity Price*;
  - the attached draft Procedure Change Proposal; and
- **Note** that the IMO will:
  - submit the draft Procedure Change Proposal into the process following its consideration and response to any out of session comments (tentatively scheduled for 17 August 2011); and
  - Hold a public workshop on the Procedure Change Proposal during the formal consultation period (tentatively scheduled for 1 September 2011).

The IMO requests that any out of session comments be provided by **5pm on Wednesday 10 August** to market.development@imowa.com.au

If you have any questions regarding the amended Market Procedure or draft Procedure Change Proposal please contact Greg Ruthven. (greg.ruthven@imowa.com.au)

Wholesale Electricity Market – Procedure Change Proposal

Procedure Change No: PC_2011_XX

Change requested by:

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Address:	Level 3, 197 St Georges Terrace, Perth, WA 6000
Date submitted:	XX XXXX 2011
Procedure change title:	5-yearly Review of the Methodology and Process for Determining the Maximum Reserve Capacity Price
Market Procedure affected:	Market Procedure for Maximum Reserve Capacity Price

Introduction

The Independent Market Operator (IMO) or System Management, as applicable, may initiate the Procedure Change Process by developing a Procedure Change Proposal. Rule Participants may notify the IMO or System Management, as applicable, where they consider an amendment or replacement of a Market Procedure would be appropriate.

If an Amending Rule requires the IMO or System Management to develop new Market Procedures or to amend or replace existing Market Procedures, then the IMO or System Management, as applicable, is responsible for the development, amendment, or replacement of Market Procedures so as to comply with the Amending Rule.

Market Procedures:

(a) must:

i. be developed, amended or replaced in accordance with the process in the Market Rules;

ii. be consistent with the Wholesale Market Objectives; and

iii. be consistent with the Market Rules, the Electricity Industry Act and Regulations; and

(b) may be amended or replaced in accordance with clause 2.10 and must be amended or replaced in accordance with clause 2.10 where a change is required to maintain consistency with Amending Rules.

The Wholesale Market Objectives are:

(a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;
(b) to encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors;
(c) to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;
(d) to minimise the long-term cost of electricity supplied to customers from the South West interconnected system; and
(e) to encourage the taking of measures to manage the amount of electricity used and when it is used.

Details of Procedure Change Requested

1. Provide a reason for the proposed new, amended or replacement Market Procedure:

Background

The Maximum Reserve Capacity Price (MRCP) sets the maximum bid that can be made in a Reserve Capacity Auction and is used to determine an administered Reserve Capacity Price if no auction is required. The MRCP aims to reflect the marginal cost of providing additional Reserve Capacity. Each year the IMO determines the MRCP.

Clause 4.16.9 of the Market Rules requires the IMO to review the MRCP Market Procedure once in every five year period. To assist in undertaking this five year review, the MAC established the MRCP Working Group (WG) in 2010 to consider, assess and develop any recommendations for changes to the Market Procedure. The MRCPWG first met on 31 May 2010 and last met on 20 June 2011 with a total of ten meetings held. A record of the proceedings of the MRCPWG can be found at www.imowa.com.au/MRCPWG.

To enact the outcomes of the MRCPWG review, the IMO has made related amendments to the MRCP Market Procedure as detailed in the attached copy of the Market Procedure.

The MRCPWG's Review

Early in its review the MRCPWG agreed that the MRCP should continue to be based on the concept of a 160 MW Open Cycle Gas Turbine (OCGT) power plant. However the MRCPWG has agreed a number of changes, as follows, that will require amendments to the Market Procedure:

- where cost effective to do so the definition of the model power station is to include a provision for an inlet air cooling system which will affect power station capital costs and impact the summer de-rating factor. The likely capacity value for the model power station is also to be assessed annually in the consultant report on the power station capital costs. The MRCPWG agreed that a developer for a facility similar to the model plant would be likely to install inlet cooling as a cost effective method of boosting Capacity Credit income;

- the Fixed Fuel Cost should include an allowance to initially fill the fuel tank with sufficient distillate for 14 hours of operation, not 12 hours as currently indicated in the Market Procedure. This aligns the Market Procedure with the requirements for Certified Reserve Capacity under clause 4.11.1 of the Market Rules;
- where the minimum available land size in any particular location is greater than 3ha, a greater land size is to be considered for that location. In addition the IMO shall have the scope to include additional locations, where appropriate, for purposes of the MRCP. The MRCPWG adopted these changes to allow for instances where a minimum land size of 3ha is not available and the inclusion of additional regions to reflect the areas, within the South West interconnected system (SWIS), where generation projects are most likely to be proposed. With the Transmission Connection Cost estimate method being amended (described below) and decoupled from specific location, the calculation of the Capital Cost shall be made using the average of the Land Costs across all locations;
- the effective compensation period for the total investment costs for the generic power station cost, which was previously 2 years, is to be changed to 6 months. This was based on the assumption that the total investment cost of the generic power station will be incurred in even incremental amounts over the 12 month period immediately preceding the first Capacity Year. PricewaterhouseCoopers (PwC) recommended the change in assumed construction period in their report on the Weighted Average Cost of Capital (WACC)[1] methodology and the MRCPWG agreed the change. In relation to this it was agreed that the total investment costs for the generic power station shall be determined as at the same date, being April of Year 3 of the relevant Reserve Capacity Cycle;
- escalation of values in respect of power station, transmission, switchyard and Operating and Maintenance (O&M) costs to April of Year 3 is to be performed by the consultant(s) developing the cost estimates, with the methods to be explained;
- an allowance for annual asset insurance costs for the model power plant is to be included within Fixed O&M Costs. The MRCPWG agreed a provision should be made within the Market Procedure for the inclusion of annual asset insurance costs;
- the methodology for forecasting Transmission Connection Works costs is to be based on historical connection costs and relevant access offers determined by Western Power. The Sinclair Knight Merz (SKM)[2] report on determining Deep Connection Costs recommended the use of an alternative methodology of using historic connection costs to indicate future connection costs. The MRCPWG agreed to adopt the recommended methodology;
- debt issuance costs are to be included within the WACC and f corresponding debt financing costs are to be removed from within margin M. The Market Procedure will continue to maintain an allowance for financing costs associated with equity raising in the determination of margin M;
- the “Minor” and “Major” components as listed under procedure step 1.13.8 are to be been renamed as having “Annual” and “5-yearly” “Review Frequency” as the MRCPWG deemed that this would clarify the review status of the components listed under procedure step 1.13.8;

[1] Maximum Reserve Capacity Price – WACC methodology http://www.imowa.com.au/f2179,1210106/PwC_MRCP_WACC_-_Final_Report_28_February_2011.pdf

[2] Calculation Methodology to be Applied in Determining Deep Connection Costs http://www.imowa.com.au/f2179,1254370/WP04128_-_IMO041_MRCP_Deep_Connection_Cost_Calculation_Method_Interim_Report_Rev3.pdf

- the WACC components are to be re-classified to reflect the need for annual review. Specifically the Statutory Corporate tax rate is to be classified for "Annual" review (formerly classed as a "Minor" component) component as the rate of corporate tax can change from year to year. The Debt issuance costs are to be classified for "5-yearly" review (formerly classed as a "Major" component) component, with a fixed value of 0.125%, as they are not considered to be significantly volatile on an annual basis; and
- given the reducing availability of bond market data and current regulatory uncertainty, the IMO is to have discretion to nominate a method for determining the Debt Risk Premium (DRP) that is consistent with current accepted Australian regulatory practice. In addition the MRCPWG also agreed that the Market Procedure is to include a statement expressing the intent to amend the Procedure if the "Bond Yield Approach" developed by the Economic Regulation Authority (ERA)[3] becomes accepted Australian regulatory practice.

The MRCPWG considered the limitations of the existing DRP calculation methodology based data supplied by Bloomberg. The ERA presented an alternative approach that it has applied in a recent regulatory decision (WAGN[4]), however that decision is being challenged at the Australian Competition Tribunal by WAGN[5]. The MRCPWG noted the merits of the ERA's approach, but also noted that the method could not be considered as accepted regulatory practice whilst the decision was being challenged. Based on this the IMO considers it prudent to allow for the continued use of the current methodology with some minor amendments as recommended by PwC. However noting the in principle agreement by the MRCPWG of the merits of the ERA's approach the IMO intends to further amend the Market Procedure if and when the ERA's proposed methodology is adopted as accepted regulatory practice.

The MRCPWG has noted that the basis of the contingency cost in the calculation of Margin M was ambiguous and incompatible with the rest of the Market Procedure. As a result it was agreed that the Market Procedure should be updated, to clarify and align the contingency provision with the current practice of applying the contingency allowance to the full Power Station cost rather than the other components of margin M. The proposed revised Market Procedure reflects this agreement.

In addition it should also be noted that the IMO has made a number of minor changes to the format and wording of the Market Procedure. These changes are intended to improve clarity and the readability of the Market Procedure.

Impact of the proposed amendments to the Market Procedure

Analysis has been performed by the IMO to establish the estimated impact of an implementation of the agreed changes with regards to annual insurance costs, the increase in the fuel requirement from 12 to 14 hours, the allowance for a minimum land size above 3 ha, the application of a construction uplift factor, the inclusion of inlet cooling in the Power Station definition, the revised Transmission Connection Cost (TCC) methodology and the reduced effective construction period of 6 months.

[3] Debt Risk Premium – ERA Methodology http://www.imowa.com.au/f2179,1210187/Appendix_A_-_ERA_presentation_-_DRP_to_the_MRCPWG_-_24_March_2011.pdf
[4] ERA Final decision on WA Gas Networks Pty Ltd proposed revised access arrangement http://www.erawa.com.au/cproot/9382/2/20110228%20Final%20decision%20on%20WA%20Gas%20Networks%20Pty%20Ltd%20proposed%20revised%20access%20arrangement%20for%20the%20MW%20and%20SW%20GDS.pdf
[5] WA Gas Networks (WAGN) Media Release http://www.wagn.com.au/LinkClick.aspx?fileticket=RwkyI238dUs%3d&tabid=39

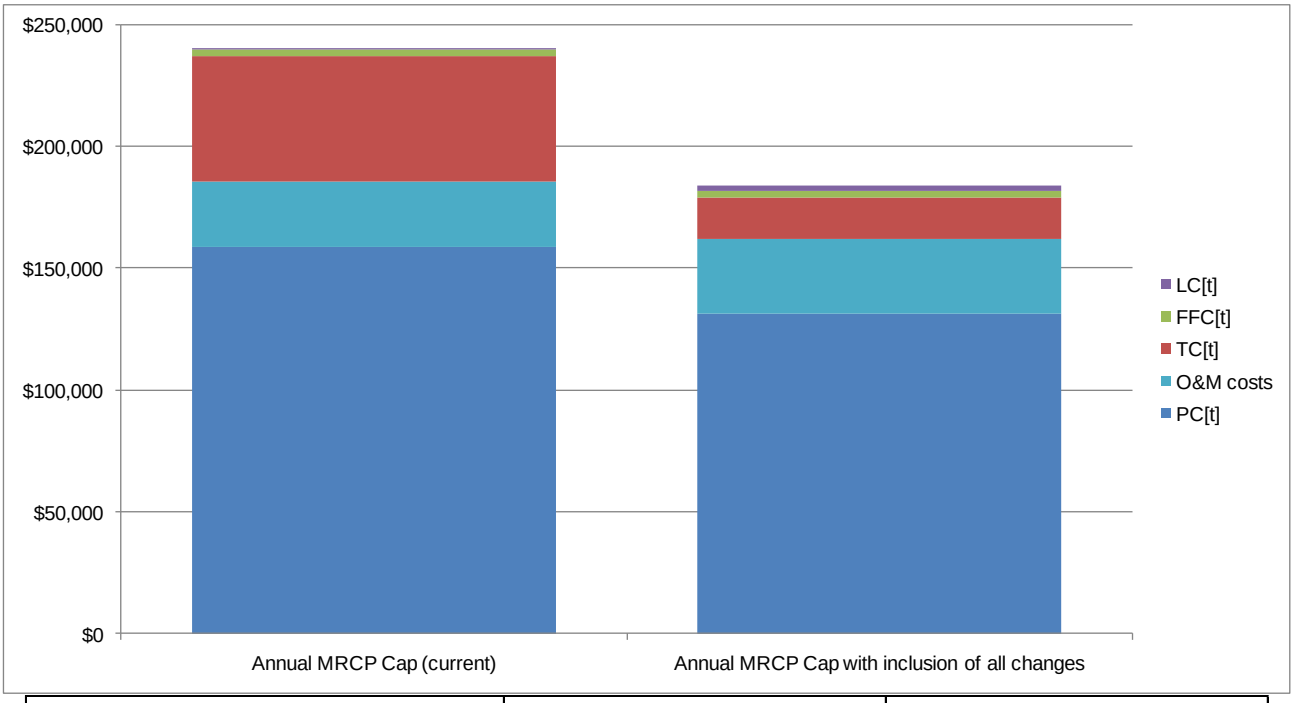
The comparison is based on the following assumed variations:

- The WACC has been applied to allow 6 months of return during the construction period (as proposed by PwC and endorsed by the MRCPWG) versus 2 years, as is currently applied. In order to calculate a value at 6 months prior to completion of construction (April of Year 3) an escalation rate of 3% has been estimated and applied for 22 months. The rate of 3% has purely been used for comparison purposes;
- The TCC methodology as proposed by SKM and endorsed by the MRCPWG, producing a TCC of $127,000 per MW versus the current value of $305,000 per MW has been used for comparison purposes;
- Inlet Cooling, including water injection, has been included in the Power Station definition increasing the estimated power station capital cost from $121.8M to $127.3M (+4.5%) and effective capacity at 41°C from 135.6MW to 159.9MW (+17.9%);
- The fuel requirement has been increased from 12 to 14 hours at full operation;
- The average land cost across all locations which increases the total Land Cost value used from $773,000 to $2,808,300; and
- The inclusion of annual insurance premiums within the fixed O&M cost as agreed by the MRCPWG. An estimated asset insurance cost of $2,500 per MW has been used for this exercise. This estimate is based on indicative quotations obtained from insurance brokers. This cost shall be determined on an annual basis.

The table below provides indicative analysis of the impact of the changes listed above on the 2013/14 MRCP. However the IMO notes that if the changes are implemented through this Procedure Change Proposal, they would be applied for the first time in the determination of the 2014/15 MRCP.

	MRCP ($)	Percentage change (%)
Annual MRCP Cap (current)	240,621	0%
MRCP with Insurance costs	243,121	1%
MRCP with increase in fuel requirement from 12 to 14 hours	241,241	0.3%
MRCP using average land cost	242,614	0.8%
MRCP with WACC applied based on 6 months return	227,836	-5%
MRCP with inlet cooling (including water injection)	214,172	-11%
MRCP with new Transmission Cost methodology	210,657	-12%
MRCP with all changes incorporated	**184,035**	**-24%**

The graph shown below illustrates the relative contribution of the various component costs to the total MRCP, both under the current methodology and under a methodology where all of the changes listed in the table above are implemented. A comparison for implementation of the revised DRP methodology has not been included as the proposed amendments to the Market Procedure provide an option to use an alternative methodology rather than a requirement to do so.



Capacity Year	13/14 current	13/14 indicative
Power Station Cost	$ 158,710	$ 131,261
Transmission Costs	$ 51,621	$ 17,137
Fixed O& M	$ 26,649	$ 30,805
Fuel Costs	$ 2,825	$ 2,608
Land Costs	$ 818	$ 2,163
MRCP (nearest $100)	$ 240,600	$ 184,000

Request for public consultation

The IMO is seeking submissions regarding this proposal. The submission period is 20 Business Days from the publication of this Procedure Change Proposal. Submissions must be delivered to the IMO by **XX, XX XX XX.**

The IMO prefers to receive submissions by email to market.development@imowa.com.au using the submission form available on the IMO website: http://www.imowa.com.au/procedure-changes

Submissions may also be sent to the IMO by fax or post, addressed to:

Independent Market Operator
Attn: Group Manager, Market Development
PO Box 7096
Cloisters Square, Perth, WA 6850

2. Provide the wording of the Procedure

The proposed revised Market Procedure for Maximum Reserve Capacity Price is provided as an attachment to this proposal.

3. Describe how the proposed changes to the Market Procedure would be consistent with the Market Rules, the Electricity Industry Act and Regulations

The proposed new Market Procedure has been reviewed as a whole by the IMO to ensure compliance of the Market Procedure with the relevant provisions in the:

- Market Rules (including the Amending Rules currently proposed under the RC_2010_29);
- Electricity Industry Act 2004; and
- Regulations made under the Electricity Industry Act 2004.

4. Describe how the proposed changes to the Market Procedure would be consistent with the Wholesale Market Objectives

The IMO considers that the revised Market Procedure improves Market Objective (a), promoting economic efficiency through greater alignment with real-world costs.

The IMO considers that the steps are drafted in a way that does not change the operation or objectives of the Market Rules. As a result the IMO considers that the revised Market Procedure, as a whole, is consistent with the Wholesale Market Objectives.

MARKET PROCEDURE: Maximum Reserve Capacity Price

VERSION 5

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ELECTRICITY INDUSTRY ACT 2004

ELECTRICITY INDUSTRY (WHOLESALE ELECTRICITY MARKET) REGULATIONS 2004

WHOLESALE ELECTRICITY MARKET RULES

COMMENCEMENT:

This Market Procedure took effect from 8:00am (WST) on the same date as the Wholesale Electricity Market Rules.

VERSION HISTORY

VERSION	EFFECTIVE DATE	NOTES
1	13 October 2008	Market Procedure for Determination of the Maximum Reserve Capacity Price resulting from PC_2008_06
2	4 December 2008	Amended Market Procedure for Determination of the Maximum Reserve Capacity Price resulting from PC_2008_14
3	1 April 2010	Amendments to the Procedure resulting from Procedure Change Proposal PC_2009_12
4	11 October 2010	Amendments to the Procedure resulting from Procedure Change Proposal PC_2010_04
5	XXXX	Amendments to the Procedure resulting from XXXX

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1 PROCEDURE FOR DETERMINING THE MAXIMUM RESERVE CAPACITY PRICE

This procedure for determining the Maximum Reserve Capacity Price sets out the principles to be applied and steps to be taken by the Independent Market Operator (IMO) in order to develop and propose the Maximum Reserve Capacity Price as required under the Market Rules. Under the Market Rules, the Maximum Reserve Capacity Price is used as the price cap for the Reserve Capacity Auction in the event that one is held. It is also used as the basis of determining the price of uncontracted Capacity Credits in the case where the Reserve Capacity Auction is cancelled.

1.1 Interpretation

1.1.1 In this procedure, unless the contrary intention is expressed:

(a) terms used in this procedure have the same meaning as those given in the Wholesale Electricity *Market Amending Rules* (made pursuant to Electricity Industry (Wholesale Electricity Market) Regulations 2004);

(b) to the extent that this procedure is contrary or inconsistent with the Market Rules, the Market Rules shall prevail to the extent of the inconsistency;

(c) a reference to the Market Rules or Market Procedures includes any associated forms required or contemplated by the Market Rules or Market Procedures; and

(d) words expressed in the singular include the plural or vice versa.

1.2 Purpose

The purpose of this procedure is to describe the steps that the IMO must undertake in determining the Maximum Reserve Capacity Price in each Reserve Capacity Cycle.

This procedure is made in accordance with clause 4.16.3 of the Market Rules.

1.3 Application

1.3.1 This procedure applies to:

(a) The IMO in determining the Maximum Reserve Capacity Price; and

(b) Western Power in developing estimates of the costs associated with connecting a notional Power Station to the 330 kV transmission system.

1.4 Overview of the Maximum Reserve Capacity Price

The Maximum Reserve Capacity Price sets the maximum offer price that can be submitted 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 the appropriateness of a number of the components that are used to determine the Maximum Reserve Capacity Price.

1.5 Definition of Power Station

1.5.1 The Power Station upon which the Maximum Reserve Capacity Price shall be based will:

(a) be representative of an industry standard liquid-fuelled Open Cycle Gas Turbine (OCGT) power station;

(b) have a nominal nameplate capacity of 160 MW prior to the addition of any inlet cooling system;

(c) operate on distillate as its fuel source;

(d) have a capacity factor of 2%;

(e) include low Nitrous Oxide (NOx) burners or associated technologies as would be required to demonstrate good practice in power station development; and

(f) include an inlet air cooling system where this would be cost effective.

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1.6 Scope of the Factors to Maximum Reserve Capacity Price

1.6.1 The Maximum Reserve Capacity Price is to include all reasonable costs expected to be incurred in the development of the Power Station, which will include estimation and determination of:

(a) Power Station balance of plant costs, which are those other ancillary and infrastructure costs that would normally be experienced when developing a project of this nature;

(b) land costs;

(c) costs associated with the development of liquid fuel storage and handling facilities;

(d) costs associated with the connection of the Power Station to the bulk transmission system;

(e) allowances for legal costs, insurance costs, financing costs and environmental approval costs;

(f) reasonable allowance for a contingency margin; and

(g) estimates of fixed operating and maintenance costs for the Power Station, fuel handling facilities and the transmission connection components.

1.7 Development of Costs for the Power Station

1.7.1 The IMO shall engage a consultant to provide advice, including an estimate of the costs associated with engineering, procurement and construction of the Power Station as at April in Year 3 of the Reserve Capacity Cycle.

This advice shall include:

(a) a summary of any escalation factors used in the determination.

(b) likely output at 41°C which will take into account available turbine and inlet cooling technology, likely humidity conditions and any other relevant factors.

1.7.2 The Power Station costs shall be determined with specific reference to the use of actual project-related data and shall take into account the specific conditions under which the Power Station will be developed. This may include direct reference to:

(a) Existing power stations, or power station projects under development, in Australia and more particularly Western Australia.

(b) Worldwide demand for gas turbine engines for power stations.

(c) The engineering, design and construction, environment and cost factors in Western Australia.

(d) The level of economic activity at the state, national and international level.

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1.7.3 Development of the Power Station costs shall include components for the gas turbine engines, and all Balance of Plant costs that would normally be applicable to such a Power Station. This must include, but will not be limited to the following items:

(a) Civil Works.

(b) Mechanical Works.

(c) Electrical Works.

(d) Buildings and Structures.

(e) Engineering and Plant Setup.

(f) Miscellaneous and other costs.

(g) Communications and Control equipment.

(h) Commissioning Costs.

1.8 Transmission Connection Works

1.8.1 Western Power will provide an estimate of the Total Transmission Costs in accordance with the methodology herein to connect the generator and deliver the output to loads consistent with the relevant planning criteria in the Technical Rules.

The estimated Total Transmission Costs are to be derived from capital contributions (either paid historically or expected to be paid to Western Power under Access Offers in accordance with the Access Code and Western Power's Capital Contribution Policy as approved by the ERA) only for generators that are capable of being gas or liquid fuelled. The estimate of Total Transmission Costs is to be made as follows:

(a) Historic and forecast capital contribution data shall be collated for all works required to connect relevant generators to the transmission network including:

- all transmission connection works required to connect from the terminals of generator step up transformers to the shared transmission network (including all miscellaneous costs such as procuring land easements etc.); and
- all transmission works to reinforce the shared transmission network where required in accordance with the Access Code and the Technical Rules.

If capital contributions paid or forecast to be paid to Western Power have not been calculated to cover the cost of the direct connection assets, Western

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Power shall include those additional costs estimated in accordance with section 1.8.2 of this procedure.

All costs shall be with reference to the year of commissioning of the generator.

(b) For years for which no historic data for relevant generators is available a connection cost will be calculated on the basis defined in clause 1.8.2.

(c) The sum of connection costs for each year is to be divided by the sum of the generators' certified capacity in that year to provide an "average per unit capacity" connection cost for each year.

(d) The average per unit capacity costs are to be escalated into the dollars of the year of calculation. The basis of escalation is to be the average change over 5 years in the estimates calculated consistent with clause 1.8.2.

Where 5 years of data calculated on a common basis is not available the escalation rate will be averaged over the period for which equivalent data is available.

(e) The escalated per unit capacity costs for the relevant Capacity Year and the 4 years preceding are to be multiplied by the corresponding weighting factors in the table below:

Year	Weighting
MRCP Calculation Year	7
MRCP Calculation Year - 1	5
MRCP Calculation Year - 2	3
MRCP Calculation Year - 3	1
MRCP Calculation Year – 4	1

The sum of the 5 years of scaled, escalated, average per unit capacity costs for the 5 years under consideration is to be divided by 17 to provide a weighted average per unit connection cost.

(f) The weighted average per unit cost is to be scaled up by 15% as an allowance for forecasting error margin and escalated forward to April of Year 3 of the Reserve Capacity Cycle to provide the forecast connection cost.

(g) Western Power must appoint a suitable auditor to review the application of the process in clause 1.8.1 on an independent and confidential basis. Western Power must provide the advice of the auditor to the IMO together with its

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estimate of Total Connection Costs, and the IMO must publish the auditor's advice.

1.8.2 For the purposes outlined in clause 1.8.1, Western Power will also estimate the direct transmission connection costs only required to connect the generator to the shared transmission network using the following assumptions:

(a) The capital cost (procurement, installation and commissioning, excluding land cost) of a generic, industry standard 330kV substation that facilitates the connection of the Power Station will be estimated.

(b) The estimate will include all the components and costs associated with a standard substation.

(c) The estimated cost will be based on a generic three breaker mesh substation configured in a breaker and a half arrangement.

(d) The substation will be located adjacent to an existing transmission line and include an allowance for 2km of 330kV overhead single circuit line to the power station that will have one road crossing.

(e) It shall be assumed that the transmission connection to the Power Station will be located on 50% flat - 50% undulating land, 50% rural - 50% urban location and there will be no unforeseen environmental or civil costs associated with the development.

(f) The connection of the substation into the existing transmission line will be turn-in, turn-out and will be based on the most economical (i.e. least cost) solution. It is assumed that the existing transmission line will not require modification to allow the connection with the exception of one new tower located at the substation to allow a point of connection.

(g) Costs associated with any staging works will not be considered.

(h) Shallow connection easement costs will be considered.

1.9 Fixed Operating and Maintenance Costs

1.9.1 The IMO shall engage a consultant to determine Fixed Operating and Maintenance (O&M) costs for the Power Station and the associated transmission connection works.

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1.9.2 The Fixed O&M costs may be separated into those costs associated with the Power Station, those costs associated with the transmission connection infrastructure and any other major components that are considered likely to be of sufficient magnitude so as to require separate determination.

1.9.3 Fixed O&M costs shall also include:

(a) fixed network access and/or ongoing charges, which are to be provided by Western Power; and

(b) An estimate of annual asset insurance costs required to insure the replacement of power station capital equipment and infrastructure.

1.9.4 To assist in the computation of annualised Fixed O&M costs, the costs associated with each major component shall be presented for each 5 year period up to 60 years.

1.9.5 The Fixed O&M costs shall be converted into an annualised Fixed O&M cost as required under the determination methodology in section 1.14.

1.9.6 Fixed O&M costs must be determined as at April in Year 3 of the Reserve Capacity Cycle. Where Fixed O&M costs have been determined at a different date, those costs must be escalated using the following escalation factors which shall be provided as part of the advice provided under clause 1.9.1 and applied to relevant components within the Fixed O&M cost:

(a) a Generation O&M Cost escalation factor for Generation O&M costs;

(b) a Labour cost escalation factor for transmission and switchyard O&M costs; and

(c) CPI for fixed network access and/or ongoing charges determined with regard to the forecasts of the Reserve Bank of Australia and, beyond the period of any such forecasts, the mid-point of the Reserve Bank's target range of inflation.

1.10 Fixed Fuel Cost

1.10.1 The IMO shall engage a consultant to determine appropriate and reasonable costs for the Liquid Fuel storage and handling facilities. Costs associated with the following items should be developed:

(a) A fuel tank of 1,000 t (nominal) capacity including foundations and spillage bund.

(b) Facilities to receive fuel from road tankers.

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(c) All associated pipework, pumping and control equipment.

1.10.2 The estimate should be based on the following assumptions:

(a) Land is available for use and all appropriate permits and approvals for both the power station and the use of liquid fuel have been received.

(b) Any costing components that may be time-varying in nature must be disclosed as part of the modelling. Such components might be the cost of the liquid fuel, which will vary over time and as a function of exchange rates etc.

1.10.3 The costing should only reflect fixed costs associated with the Fixed Fuel Cost (FFC) component and should include an allowance to initially supply fuel sufficient to allow for the Power Station to operate for 14 hours at maximum capacity.

1.10.4 Fixed Fuel Costs (FFC) must be determined as at April in Year 3 of the Reserve Capacity Cycle. Where Fixed Fuel Costs have been determined at a different date, those costs must be escalated using the annual CPI cost escalation factor determined in clause 1.9.6(c).

1.11 Land Costs

1.11.1 The IMO shall retain Landgate under a consultancy agreement each year to provide valuations on parcels of industrial land. The regions for which the analysis is to be conducted will include:

(a) Collie Region

(b) Kemerton Industrial Park Region

(c) Pinjar Region

(d) Kwinana Region

(e) North Country Region

(f) Kalgoorlie Region

These areas represent the regions within the South West interconnected system (SWIS) where generation projects are most likely to be proposed and should provide a broad cross-section of options. Where appropriate, the IMO may include additional locations.

1.11.2 The IMO will contract with Landgate to conduct the valuations on the same land parcel size, so as to provide a consistent method of valuing the cost of purchase of

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the land. The IMO will provide an indication as to the size of land required, which should be limited to the following options:

(a) One 3ha parcel of land in an industrial area of a standard size with consideration given to any requirements for a buffer zone in that specific location. Where the minimum land size available in any specific location is greater than 3ha, for the purpose of calculating the land cost for that specific location, the minimum available land size at that location shall be used.

(b) The summation of multiple smaller parcels of land as appropriate to meet the requirements above.

c)

1.11.3 The IMO shall determine the average cost of the land parcels described in steps 1.11.1 and 1.11.2.

1.11.4 The average Land Cost, LC, must be determined as at April in Year 3 of the Reserve Capacity Cycle. Where the average Land Cost has been determined at a different date this cost must be escalated using the CPI escalation factor determined in clause 1.9.6(c).

1.12 Legal, Financing, Insurance, Approvals, Other Costs and Contingencies (margin M)

1.12.1 The IMO shall shall engage a consultant to determine the value of margin M, which shall constitute the following costs associated with the development of the Power Station project:

(a) legal costs associated with the design and construction of the power station.

(b) financing costs associated with equity raising,

(c) insurance costs associated with the project development phase;

(d) approval costs including environmental consultancies and approvals, and local, state and federal licensing, planning and approval costs;

(e) other costsreasonably incurred in the design and management of the power station construction; and

(f) contingency costs,

1.13 Weighted Average Cost of Capital (WACC)

1.13.1 The IMO must determine the cost of capital to be applied to various costing components of the Maximum Reserve Capacity Price. This cost of capital shall be an

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appropriate WACC for the generic Power Station project considered, where that project is assumed to receive Capacity Credits through the Reserve Capacity Auction and be eligible to receive a Long-Term Special Price Arrangement through the Reserve Capacity Mechanism.

1.13.2 The WACC will be applied directly:

(a) in the annualisation process used to convert the Power Station project capital cost into an annualised capital cost; and

(b) to account for the cost of capital in the time period between when the Reserve Capacity Auction is held (i.e. when capital is raised), and when the payment stream is expected to be realised. To maintain computational simplicity it is assumed that the total investment cost of the generic power station will be incurred in even incremental amounts over the 12 month period immediately preceding the first Reserve Capacity Year. As a result the effective compensation period for the total investment cost for the generic power station will be six months as detailed in the CAPCOST formula in clause 1.14.1.

1.13.3 The methodology adopted by the IMO to determine the WACC will involve a number of components that require review. These components are classed as those which require review annually (called Annual components) and those structural components of the WACC which require review less frequently (called 5 Yearly components) as detailed in clause 1.13.8.

1.13.4 In determining the WACC, the IMO:

(a) must annually review and determine values for the Annual components; and.

(b) may review and determine values for the 5 Yearly components that differ from those in clause 1.13.8 if, in the IMO's opinion, a significant economic event has occurred since undertaking the last 5 yearly review of the Maximum Reserve Capacity Price in accordance with clause 4.16.9 of the Market Rules.

1.13.5 The IMO may engage a consultant to assist the IMO in reviewing the Major and Minor components of the WACC.

1.13.6 The IMO shall compute the WACC on the following basis:

(a) The WACC shall use the Capital Asset Pricing Model (CAPM) as the basis for calculating the return to equity.

(b) The WACC shall be computed on a Pre-Tax basis.

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(c) The WACC shall use the standard Officer WACC method as the basis of calculation.

1.13.7 The pre-tax real Officer WACC shall be calculated using the following formulae

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

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

Where:

(a) R_e is the nominal return on equity (determined using the Capital Asset Pricing Model) and is calculated as:

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

Where:

R_f is the nominal risk free rate for the Capacity Year;

β_e is the equity beta; and

MRP is the market risk premium.

(b) R_d is the nominal return on debt and is calculated as:

$$R_d = R_f + DM$$

Where:

R_f is the nominal risk free rate for the Capacity Year;

DM is the debt margin, which is calculated as the sum of the debt risk premium (DRP) and debt issuance cost (d).

(c) *t* is the benchmark rate of corporate income taxation, established at either an estimated effective rate or a value of the statutory taxation rate;

(d) γ is the value of franking credits;

(e) *E/V* is the market value of equity as a proportion of the market value of total assets;

(f) *D/V* is the market value of debt as a proportion of the market value of total assets; and

(g) The nominal risk free rate, R_f, for a Capacity Year is the rate determined for that Capacity Year by the IMO on a moving average basis from the annualised yield on Commonwealth Government bonds with a maturity of 10 years:

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– using the indicative mid rates published by the Reserve Bank of Australia;

and

– averaged over a 20-trading day period.

(h)

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

The IMO must determine the methodology to estimate the *DRP*, which should be consistent with current accepted Australian regulatory practice.

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

(h)

(i) If there are no Commonwealth Government bonds with a maturity of 10 years on any day in the period referred to in clause 1.1.1(g), the IMO must determine the nominal risk free rate by interpolating on a straight line basis from the two bonds closest to the 10 year term and which also straddle the 10 year expiry date.

(j) If the methods used in clause 1.13.7(i) cannot be applied due to suitable bond terms being unavailable, the IMO may determine the nominal risk free rate by means of an appropriate approximation.

(k) *i* is the forecast average rate of inflation for the 10 year period from the date of determination of the WACC. In establishing a forecast of inflation, the IMO is to have regard to the forecasts of the Reserve Bank of Australia and, beyond the period of any such forecasts, the mid-point of the Reserve Bank's target range of inflation.

1.13.8 The CAPM shall use the following parameters as variables each year.

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<#>– using the predicted yields for corporate bonds published by Bloomberg;the nominal risk free rate calculated as directed above; and¶

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CAPM Parameter	Notation/Determination	Review Frequency	Value
Nominal risk free rate of return (%)	R_f	Annual	TBD
Expected inflation (%)	i	Annual	TBD
Real risk free rate of return (%)	R_{fr}	Annual	TBD
Market risk premium (%)	*MRP*	5-Yearly	6.00
Asset beta	β_a	5-Yearly	0.5
Equity beta	B_e	5-Yearly	0.83
Debt risk premium (%)	*DRP*	Annual	TBD
Debt issuance costs (%)	d	5-Yearly	0.125
Corporate tax rate (%)	*t*	Annual	TBD
Franking credit value	γ	5-Yearly	0.5
Debt to total assets ratio (%)	*D/V*	5-Yearly	40
Equity to total assets ratio (%)	*E/V*	5-Yearly	60

1.14 Determination of the Maximum Reserve Capacity Price

1.14.1 The IMO shall use the following formulae to determine the Maximum Reserve Capacity Price:

MRCP = (ANNUALISED_FIXED_O&M + ANNUALISED_CAPCOST / CC)

Where:

MRCP is the Maximum Reserve Capacity Price to apply in a Reserve Capacity Auction;

ANNUALISED_CAPCOST is the CAPCOST, expressed in Australian dollars, annualised over a 15 year period, using a Weighted Average Cost of Capital (WACC) as determined in clause 1.13;

CC is the expected Capacity Credit allocation determined in conjunction with Power Station costs in clause 1.7.1 (b);

CAPCOST is the total capital cost, expressed in million Australian dollars, estimated for an open cycle gas turbine power station of capacity CAP; and

ANNUALISED_FIXED_O&M is the annualised fixed operating and maintenance costs for a typical open cycle gas turbine power station and any associated electricity transmission facilities determined in clause 1.9 and expressed in Australian dollars in year t, per MW per year.

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The value of CAPCOST is to be calculated as:

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

Where:

PC is the capital cost of an open cycle gas turbine power station, expressed in Australian dollars per MW as determined in clause 1.7 for that location;

M is a margin to cover legal, approval, financing and other costs and contingencies as detailed in clause 1.12;

TC is the Transmission Connection Cost Estimate as determined in clause 1.8;

FFC is the Fixed Fuel Cost as determined in clause 1.9; LC is the Land Cost as determined in clause 1.11; and

WACC is the Weighted Average Cost of Capital as determined in clause 1.13.

1.14.2 Once the IMO has determined a revised value for the Maximum Reserve Capacity Price, the IMO must publish a draft report describing how it has arrived at the proposed revised value **[MR4.16.6]**. In preparing the draft report, the IMO must include details of how it has arrived at any proposed revised values for the Annual and 5 Yearly components used in calculating the WACC.

1.14.3 The IMO must publish the draft report on the Market Web-site and advertise the report in newspapers widely distributed in Western Australia and request submissions from all sectors of the Western Australian energy industry, including end users. The IMO must publish any supporting consultant reports.

1.14.4 After considering any submissions on the draft report the IMO must propose a final value for the Maximum Reserve Capacity Price and submit the report to the Economic Regulation Authority (ERA) of Western Australia for approval.

1.14.5 Once the final value for the Maximum Reserve Capacity Price, with any updates, has been approved by the ERA, the IMO shall post a final report on the IMO website advising of the revised Maximum Reserve Capacity Price.

1.14.6 The IMO shall publish the Maximum Reserve Capacity Price in the Request for Expressions of Interest document which must be published before 31 January of Year 1 of the relevant Reserve Capacity Cycle.

1.15 Major Review

1.15.1 In accordance with clause 4.16.9, the IMO must conduct a review of the methodology used to determine the Maximum Reserve Capacity Price at least once every five

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years ("Major Review"). This process will review the basis for determining the Maximum Reserve Capacity Price, the structural methodology by which the Maximum Reserve Capacity Price is computed each year and the method the IMO uses to estimate each of the constituent components of the Maximum Reserve Capacity Price.

1.15.2 In conducting the annual review of the WACC, where the IMO considers that any of the comparator companies used in the most recent Major Review are no longer available or that its characteristics have significantly changed, the IMO may select a different set of comparator companies for determination of relevant WACC parameters, applying the following criteria:

(a) the company must be a power generator, energy transmitter or distributor;

(b) market capitalisation must be more than $200m AUD; and

(c) the company must be listed on Bloomberg.

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¶
1.15.3 The basis of determining the Maximum Reserve Capacity Price shall be reviewed by the IMO with particular reference to the following factors:¶
<#>The type of power station¶
<#>The size of the power station¶
<#>The expected load factor of the power station ¶
<#>Primary and secondary fuel types of the power station.¶
1.15.4 . The above review must give consideration to the Wholesale Electricity Market Objectives.¶
¶
Power Station ¶
¶
1.15.5 In accordance with Market Rule 4.16.9, the IMO must conduct a review of the definition of the Power Station and its associated components. The IMO is required to take into consideration the following factors:¶
<#>The method used to determine the Power Station price¶
<#>The summer derating factor applied to the Power Station ¶
<#>The capacity factor of the Power Station.¶
Transmission Connection ¶
¶
1.15.6 . In accordance with Market Rule 4.16.9, the IMO must conduct a review of the type of connection used to connect the Power Station to the bulk transmission network. The IMO is required to take into consideration the following factors:¶
<#>Which part of the bulk transmission system the Power Station will be connected to (eg 330kV / 220 kV/ 132 kV).¶
<#>Land use type assumptions (rural/urban options).¶
<#>The switchyard configuration.¶
<#>The number of road crossings.¶
¶
Fixed Fuel Costs¶
¶
1.15.7 In accordance with Market Rule 4.16.9 the IMO must conduct a review of the fixed fuel costs with direct reference to the outcome of the review of the Maximum Reserve Capacity Price in Step 0 above.