

# Consultation Paper

## Review of methodology for setting the Maximum Reserve Capacity Price and the Energy Price Limits in the Wholesale Electricity Market

24 June 2013

Economic Regulation Authority

WESTERN AUSTRALIA

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## Contents

<b>1</b>	<b>Introduction</b>	<b>1</b>
1.1	The requirement	1
1.2	Invitation to make submissions	2
<b>2</b>	<b>Context</b>	<b>3</b>
2.1	Energy and Capacity market versus Energy Only market	3
2.2	Maximum Reserve Capacity Price	5
2.3	Energy Price Limits	6
2.4	Structure of the Consultation Paper	6
<b>3</b>	<b>Methodology for setting the Energy Price Limits</b>	<b>8</b>
3.1	Current methodology for setting the EPLs	8
3.2	The Role of the EPLs in curbing market power	9
3.2.1	Historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the EPLs	10
3.2.2	The performance of STEM Auctions in meeting the Wholesale Market Objectives	16
3.3	The appropriateness of the parameters and methodology for recalculating the EPLs	16
3.3.1	Requirements under clause 6.20	17
3.3.2	Requirements under clause 2.26	17
3.3.3	Evolution of the methodology	17
3.3.4	Current methodology for determining the EPLs	18
3.3.5	Variable O&M Cost	19
3.3.6	Heat Rate	19
3.3.7	Fuel Cost	20
3.3.8	Loss Factor	20
3.3.9	Risk Margin	20
3.4	Issues with the current methodology	21
3.4.1	No defined Market Procedure for the methodology	21
3.4.2	Internal inconsistency of the relevant clauses in the Market Rules	21
3.4.3	Lack of powers of the IMO to request for actual operational data	21
3.4.4	Approval of the Alternative Maximum STEM Price by the Authority	22
3.4.5	The use of the Singapore Gas Oil (0.5% sulphur) price in the calculation of the Alternative Maximum STEM Price	22
3.4.6	Adjustment rules for the calculation of the Alternative Maximum STEM Price	22
<b>4</b>	<b>Methodology for setting the Maximum Reserve Capacity Price</b>	<b>23</b>
4.1	Current methodology for setting the MRCP	23
4.2	The Role of MRCP in curbing market power	23
4.2.1	History of the Maximum Reserve Capacity Price	24
4.2.2	Historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to the MRCP	26
4.2.3	The performance of Reserve Capacity Auctions in meeting the Wholesale Market Objectives	26

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4.3	The appropriateness of the parameters and methodology in clause 4.16 and the Market Procedure referred to in clause 4.16.3 for recalculating the MRCP	26
4.3.1	Requirements under clause 4.16	26
4.3.2	The MRCP Market Procedure	28
4.4	Factors relating to the current methodology	30
4.4.1	Costs for the power station	30
4.4.2	Transmission connection works	31
4.4.3	Fixed O&M costs	32
4.4.4	Fixed fuel cost	33
4.4.5	Land costs	34
4.4.6	Legal, financing, approvals, contingencies and other costs (margin M)	34
4.4.7	Weighted average cost of capital (WACC)	35

# 1 Introduction

1. The *Wholesale Electricity Market Rules* (**Market Rules**) require that the Economic Regulation Authority (**Authority**) review the methodology for setting the Maximum Reserve Capacity Price (**MRCP**) and the Energy Price Limits (**EPLs**) under clause 2.26.3 of the Market Rules by no later than 1 October 2013.<sup>1</sup>

## 1.1 The requirement

2. The Market Rules require that the Authority's review of the methodology for setting the MRCP and the EPLs must examine:
  - the level of competition in the market;
  - the level of market power being exercised and the potential for the exercise of market power;
  - the effectiveness of the methodology in curbing the use of market power;
  - historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to the MRCP;
  - historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the EPLs;
  - the appropriateness of the parameters and methodology in clauses 4.16 and the Market Procedure referred to in clause 4.16.3 for recalculating the MRCP;
  - the appropriateness of the parameters and methodology in clause 6.20 for recalculating the EPLs;
  - the performance of Reserve Capacity Auctions, STEM Auctions and Balancing in meeting the Wholesale Market Objectives; and
  - other matters which the Authority considers relevant.
3. The Authority must provide a report to the Western Australian Minister for Energy (**Minister**) on this review conducted under clause 2.26.3 of the Market Rules.
4. In undertaking this review, the Authority intends to work with the electricity industry and the broader community through the public consultation process. The Authority will take into account the views expressed by stakeholders in the preparation of its report which will be delivered to the Minister.
5. The purpose of this Consultation Paper is to assist interested parties in making submissions to the Authority's review of the methodology for setting the MRCP and EPLs.
6. This Consultation Paper sets out the Authority's:

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<sup>1</sup>Clause 2.26.3 of the Market Rules requires that this review is undertaken not later than the fifth anniversary of the first Reserve Capacity Cycle and, subsequently, not later than the fifth anniversary of the completion of the preceding review. This anniversary date falls on 1 October 2013 based on the interpretation of the reference to the fifth anniversary of the first Reserve Capacity Cycle as a reference to the fifth anniversary of the completion of the first Reserve Capacity Cycle and the final year of the first Reserve Capacity Cycle was 2008.

- understanding of the requirements for the review and its broad approach to meeting the requirements;
  - process and timeline for consulting with stakeholders;
  - preliminary identification of the range of issues to be evaluated in the review.
7. For the purpose of this methodology review, the Authority assumes that the Wholesale Electricity Market (**WEM**) will be retained in its current form, that is, the energy trading market (both the STEM and the Balancing Market) and the Reserve Capacity Mechanism (**RCM**) will continue to function in their current form.

## 1.2 Invitation to make submissions

8. Interested parties are invited to make submissions on the Authority's Consultation Paper by **4:00 pm (WST) Monday, 22 July 2013** via:
- Email address: [publicsubmissions@erawa.com.au](mailto:publicsubmissions@erawa.com.au)  
Postal address: PO Box 8469, PERTH BC WA 6849  
Office address: Level 4, Albert Facey House, 469 Wellington Street, Perth WA 6000  
Fax: 61 8 6557 7999
9. In general, all submissions from interested parties will be treated as being in the public domain and placed on the Authority's website. Where an interested party wishes to make a submission in confidence, it should clearly indicate the parts of the submission for which confidentiality is claimed, and specify in reasonable detail the basis for the claim. Any claim of confidentiality will be considered in accordance with the provisions of section 55 of the Economic Regulation Authority Act 2003.
10. For further information, please contact Jeremy Cook on (08) 6557 7900 or email at [jeremy.cook@erawa.com.au](mailto:jeremy.cook@erawa.com.au)

## 2 Context

11. The MRCP and EPLs represent the price limits for the capacity market and the energy market, respectively. Price ceilings are typically put in place to protect customers from excessive prices that businesses may be able to charge.
12. Although excessive prices in the short term may occur due to a shortage of supply or a sudden and unexpected peak in demand, a sustained period of excessive pricing is likely to be the result of market power due to a lack of effective/workable competition.
13. Markets are rarely competitive from the outset and effective competition generally evolves over time. In explaining the concept of effective competition, the Hilmer report describes the effects on a market in which effective competition does not exist:

*“Where the conditions for workable competition are absent – such as where a firm has a legislated or natural monopoly, or the market is otherwise poorly contestable – firms may be able to charge prices above the efficient level for periods beyond those justified by past investments and risks taken or beyond a time when a competitive response might reasonably be expected.”<sup>2</sup>*

14. In the case of wholesale electricity markets, it is typical for there to be regulatory oversight of prices. Frank Wolak argues that:

*“The extreme susceptibility of wholesale electricity markets to the exercise of unilateral market power and the massive wealth transfers from consumers to producers that can occur in a very short period of time as result, make regulatory oversight beyond that provided by antitrust law essential”.*<sup>3</sup>

15. Accordingly, the Authority is tasked with providing regulatory oversight and approving the values for the MRCP and the EPLs that apply in the WEM. The level of market competition and subsequent restriction on the exercise and potential exercise of market power will be inherent in this methodology review.
16. Setting upper price limits ensures that customers do not experience sustained and unreasonably high prices. Setting upper price limits too high defeats this purpose. On the other hand, setting price caps too low can also have a detrimental impact. It can dilute the price signal for investment in a market, and inhibit innovation. In addition, price caps that are set too low prevent resources (in this case energy) from going to individuals who value it the most.

### 2.1 Energy and Capacity market versus Energy Only market

17. In reviewing the methodology for setting the MRCP and EPLs, clause 2.26.3 of the Market Rules requires that the Authority must examine, inter alia, the level of

<sup>2</sup> Hilmer Committee, *National Competition Policy: Report by the Independent Committee of Inquiry*, August 1993, p. 269. This passage was referred to by the Full Court of the Supreme Court of Western Australia in *Re: Dr Ken Michael AM; ex parte EPIC Energy (WA) Nominees Pty Ltd & Anor* [2002] WASCA 231 at para 144.

<sup>3</sup> Wolak, A Frank, (2013), *“Regulating Competition in Wholesale Electricity Supply”*, Department of Economics, Stanford University.

competition, level of market power being exercised and the effectiveness of the methodology in curbing the use of market power.

18. This implies that the role of the MRCP and EPLs is primarily to prevent the misuse of market power in the WEM. Accordingly, it is important to have a common understanding of market power within the context of the WEM, and how the maximum prices can be set to prevent any misuse of market power.
19. The AEMC has undertaken a review of potential generator market power in the NEM (as a result of a Rule Change proposal). Although the review relates to the NEM, it provides a good starting point and some underlying principles that could be applied to the WEM.
20. The AEMC review distinguishes between 'substantial market power' and 'transient pricing power'. It describes 'substantial market power' as:<sup>4</sup>

*Substantial market power in the context of the NEM is the ability of a generator or group of generators to increase annual average wholesale prices to a level that exceeds long-run marginal cost (LRMC), and sustain prices at that level due to the presence of significant barriers to entry.*

21. In contrast, the AEMC considers that 'transient pricing power' is an inherent feature of the NEM, which provides investors with a mechanism to recover their fixed costs. It states that:<sup>5</sup>

*The Commission considers that transient pricing power, manifesting itself through occasional price spikes, is an inherent feature of a workably competitive wholesale market, and is only a concern if it occurs frequently enough and to a significant enough magnitude to lead to average annual wholesale prices being above LRMC of generation.*

22. Whilst these concepts may be relevant to the NEM, there is an important point of differentiation between the NEM and the WEM. The NEM is an energy only market whereas the WEM is a market where energy and capacity are traded separately.
23. This difference between the two markets means that the transient price spikes do not serve the same purpose in the WEM as they do in the NEM. That is, the recovery of fixed costs by generators occurs through the capacity price in the WEM, rather than opportunistic short term spikes in the spot price for wholesale energy.
24. As such, the definition of market power may be different within the context of the WEM; even short term price spikes over and above the SRMC<sup>6</sup> may be an indication that market power is being exercised by a generator in the WEM.
25. In other words, unlike the NEM, if the WEM was an effectively competitive market, competition would prevent generators from pricing above the SRMC.
26. Accordingly, the role of the maximum price (at least for energy) in the WEM may be to prevent prices from going above the SRMC.

<sup>4</sup> AEMC 2013, *Potential Generator Market Power in the NEM*, Final Rule Determination, 26 April 2013, pp 20.

<sup>5</sup> *ibid*

<sup>6</sup> Refer to the Authority's Discussion paper on Short Run Marginal Cost, 11 Jan 2008, for a fuller discussion.



27. However, it is recognised that the SRMC may be different for different generators, may differ over time for a single generator, and may be dependent on a number of factors such as the period that a generator runs for, the market value of the fuel price at the time and other such input factors.
28. This makes it difficult to develop a cap that is suitable for all circumstances. As such, it may be appropriate to base the maximum price on the SRMC value that takes into account the higher range of all feasible inputs.

The Authority invites comments from stakeholders on the effectiveness of the methodology in curbing the use of market power.

## 2.2 Maximum Reserve Capacity Price

29. Apart from setting the maximum price for capacity, the MRCP plays another important role in the market under the existing Market Rules: It forms an input into the calculation of the price for capacity, i.e. the Reserve Capacity Price (RCP).
30. Within the WEM design, an auction arrangement was put in place to determine the market price for capacity. However, since its inception, there has never been an auction in the WEM because the Reserve Capacity Requirement for each Capacity Year has been met through intended bilateral trade nominations.
31. Clause 4.29.1 of the Market Rules sets out the method for determining the RCP when an auction has not taken place. It is set at 85% of the MRCP (with adjustment for any excess capacity). This makes the MRCP a critical parameter in the setting of the administered RCP.
32. The methodology for deriving RCP, and its role within the overall RCM, is an issue that was discussed in the Authority's 2012 Wholesale Electricity Market Report for the Minister for Energy. The Authority noted that: *"Given the significance of the issue, the Authority recommends that the PUO undertake a comprehensive, holistic review of the current market design of the RCM in its entirety, with a view to considering the long term evolution of the market and the realisation of efficient economic outcomes."*
33. Furthermore, the Authority also acknowledges the significant work that has been undertaken by the RCM Working Group (**RCMWG**), under the auspices of the IMO, on the formula for setting the administered price for capacity.
34. Accordingly, the Authority does not see this review of the MRCP methodology as replacing the review that it has recommended for the Public Utilities Office to undertake, nor the work that has been undertaken by the RCMWG.
35. For the MRCP, this review is thus limited to the methodology for setting the upper limit for the capacity price; that is, the emphasis is on the **Maximum** Reserve Capacity Price, rather than the MRCP's role in setting the administered capacity price.
36. Historically, the MRCP value has ranged from \$122,500 per MW per year (set for the 2008/2009 Capacity Year) to \$240,600 per MW per year (set for the 2013/2014 Capacity Year).

## 2.3 Energy Price Limits

37. Whereas the MRCP has a single value that represents the highest price, the EPLs comprise a maximum and a minimum (price floor) value.
38. A price floor is generally set when there is concern that the free market will set prices too low resulting in undesirable social outcomes. For example, Governments typically set a minimum wage to protect societal values.
39. The price floor is called the Minimum STEM Price. Until 30 June 2012, the Minimum STEM Price had been set as the negative value of the Maximum STEM Price of the same period. As part of the implementation of the new Balancing and Load Following Ancillary Service (**LFAS**) Market from 1 July 2012, the Minimum STEM Price was changed to negative \$1,000 as a hard-coded value in the Market Rules.
40. The reasons for setting a minimum EPL under the Market Rules is unclear. However, the value selected for the minimum EPL has some indirect implications for other aspects of the Market Rules. For example, they impact the calculation of “constrained off” payments<sup>7</sup>.
41. Another differentiating characteristic about the EPLs is that there are two upper limits that apply: one that applies to non-liquid fuel generators (called the Maximum STEM Price under the Market Rules) and another that applies to liquid fuel generators (called the Alternative Maximum Price under the Market Rules). The two upper limits reflect the fact that the short term operating costs of the two types of generators are significantly different.
42. Since the commencement of the market, the value of the Maximum STEM Price has varied between \$153.73/MWh (in 2006) to \$336.00/MWh (in 2010). This compares to the price cap of \$12,900/MWh<sup>8</sup> (as at May 2013) in the NEM.<sup>9</sup> The Alternative Maximum Stem price is currently about \$520/MWh.

## 2.4 Structure of the Consultation Paper

43. The Authority will examine the reasons for having price limits in markets and evaluate whether these reasons are relevant to the WEM.
44. As part of its methodology review, the Authority intends to consider the rationale for a maximum and a minimum EPL, within the context of the energy market in the WEM. The Authority intends to see whether the conditions for needing EPLs are being displayed in the energy market.
45. Consequent to this, the Authority will examine the process that is used to determine the EPLs. The Authority will review how the EPLs are calculated and examine the applicability of the parameters involved in this calculation. This is further explored in Chapter 3 of this Consultation Paper.
46. The MRCP methodology review will be undertaken in two steps. The Authority intends to consider the rationale behind having a MRCP and to see whether the

<sup>7</sup> Refer to clause 6.17.4 of the Market Rules for details on constrained off compensation.

<sup>8</sup> See <http://www.aemo.com.au/Electricity/Resources/Reports-and-Documents/Pricing-Event-Reports/May-2013>

<sup>9</sup> Unlike the WEM, the NEM is an energy only market.

conditions for needing a maximum capacity price limit are being displayed in the Capacity Market.

47. Once the need and role of a maximum capacity price limit is established, the review will then examine the process to determine the MRCP and the basis for its calculation. This will include examining the applicability of the parameters involved in its calculation. Further discussion on this is covered in Chapter 4.

## 3 Methodology for setting the Energy Price Limits

### 3.1 Current methodology for setting the EPLs

48. Clause 6.20 and clause 2.26 of the Market Rules set out the requirements and process for setting the EPLs.
49. Clause 6.20.6 of the Market Rules states that the IMO must annually review the appropriateness of the value of the Maximum STEM Price and Alternative Maximum STEM Price. In conducting this review, clause 6.20.7 of the Market Rules sets out the values the IMO may propose, being:

- the Maximum STEM Price, which is to be based on the IMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by natural gas; and
- the Alternative Maximum STEM Price, which is to be based on the IMO's estimate of the short run marginal cost of the highest cost generating works in the SWIS fuelled by distillate.

50. Clause 6.20.7 (b) of the Market Rules also sets out the following formula that the IMO must use in calculating the Maximum STEM Price or Alternative Maximum STEM Price:

$$(1 + \text{Risk Margin}) \times (\text{Variable O\&M} + (\text{Heat Rate} \times \text{Fuel Cost})) / \text{Loss Factor}$$

Where:

- i. Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40MW open cycle gas turbine generating station expressed as a fraction;
  - ii. Variable O&M is the variable operating and maintenance costs for a 40 MW open cycle gas turbine generating station expressed in \$/MWh, and includes, but is not limited to, start-up related costs;
  - iii. Heat Rate is the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station, expressed in GJ/MWh;
  - iv. Fuel Cost is the mean unit fixed and variable fuel cost for a 40 MW open cycle gas turbine generating station, expressed in \$/GJ; and
  - v. Loss Factor is the marginal loss factor for a 40MW open cycle gas turbine generating station relative to the Reference Node.
51. The IMO must determine appropriate values for the factors described in paragraphs (i) to (v) as applicable to the Maximum STEM Price and Alternative Maximum STEM Price.
52. In the 2009 Market Rules Evolution Plan, the IMO has identified a number of issues that need to be examined and prioritised based on stakeholder discussions and various stakeholder forums. One of the issues identified was whether both the Maximum STEM Price and the Alternative Maximum STEM Price are needed, or if the Maximum STEM Price can be removed.

## 3.2 The Role of the EPLs in curbing market power

53. The Authority is of the view that the primary purpose of the EPLs is to protect against the misuse/exercise of market power in the WEM.
54. Market power can be applied through actions that influence clearing prices such as by withholding generation to create conditions of shortage and push clearing prices up or by submitting offers at excessive prices. If the price of the marginal generator is higher, then this higher price will be received by all dispatched generators, thus creating a greater cost for the provision of electricity. Having a maximum price will limit the extent to which this price can be pushed upwards.
55. The objective when setting the maximum STEM prices is that it needs to be low enough to mitigate market power, but high enough to ensure that new entrants are not discouraged in times of high demand.
56. The Authority notes that to date there have been few instances where the STEM Clearing Price has reached either the Maximum STEM Price or the Alternative Maximum STEM Price, as discussed in section 3.2.1 below.
57. The Authority notes that there is no mention in the Market Rules as to the purpose of having a Minimum STEM Price in terms of market power mitigation.
58. The Minimum STEM Price was set as the negative value of the Maximum STEM Price of the same period until 30 June 2012. The Minimum STEM Price was changed to negative \$1,000 as a hard-coded value in the Market Rules as part of the implementation of the new Balancing and Load Following Ancillary Service Market from 1 July 2012. There is currently no method and process provided in the Market Rules to provide guidance as to what this price should be based on, how often this value should be reviewed and the process that the IMO should follow if such a review is required.

The Authority invites comments from stakeholders on the role of the EPLs in curbing the use of market power, with consideration given to the methodology employed in calculating these levels.

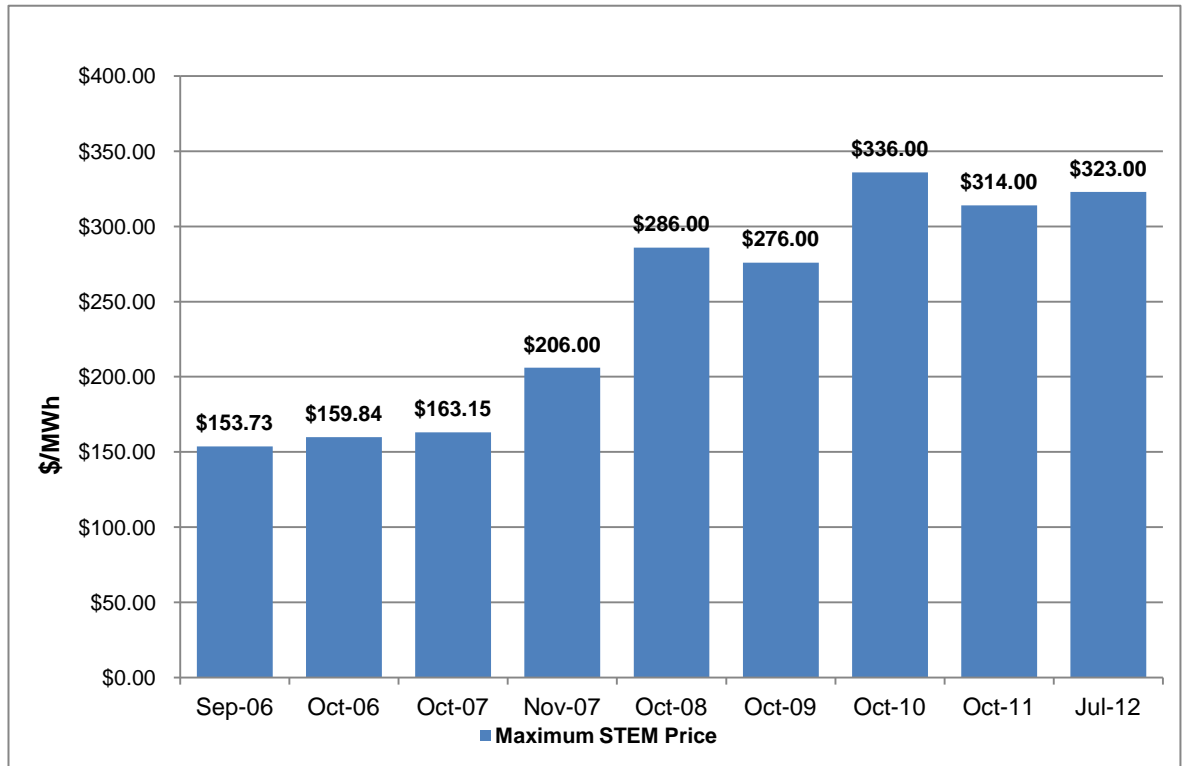
The Authority invites comments from stakeholders in relation to whether having a Maximum STEM price and an Alternative Maximum STEM Price is appropriate.

The Authority invites comments from stakeholders in relation to the appropriateness of having a minimum STEM price. The Authority also seeks stakeholder comments in relation to setting the Minimum STEM Price at negative \$1000 as a hard-coded number in the Market Rules with no process provided for the review of this value.

### 3.2.1 *Historical STEM Bids and STEM Offers and the proportion of STEM Bids and Offers with prices equal to the EPLs*

59. Generation capacity not running on liquid fuel must be priced at or below the Maximum STEM Price. The Market Rules specify that the Maximum STEM Price is adjusted annually subject to review by the IMO. The chart below illustrates the movement of the historical Maximum STEM price.

#### **Movement of the historical Maximum STEM price**



60. The major driver of the increase to the Maximum STEM Price in 2007 and 2008 was the increase in the price of gas in Western Australia. The increase in the Maximum STEM Price in 2010 was primarily due to the change in the probability distribution of the gas price based on spot market expectations (the gas price was based on contract price previously).
61. The figure below shows the proportion of Peak and Off-Peak Trading Intervals<sup>10</sup> during which STEM Clearing Prices were at the Maximum STEM Price (per calendar month) from market commencement to 30 April 2013. There were some incidences of STEM Clearing Prices reaching the Maximum STEM Price at the beginning of the market in late 2006. Since then, the highest incidence of both Peak and Off-Peak STEM Clearing Prices reaching the Maximum STEM Price occurred between June and September 2008, which coincided with the Varanus Island incident.<sup>11</sup> STEM

<sup>10</sup> Peak Trading Interval is a Trading Interval occurring between 8am and 10pm; and Off-Peak Trading Interval is a Trading Interval occurring between 10pm and 8am.

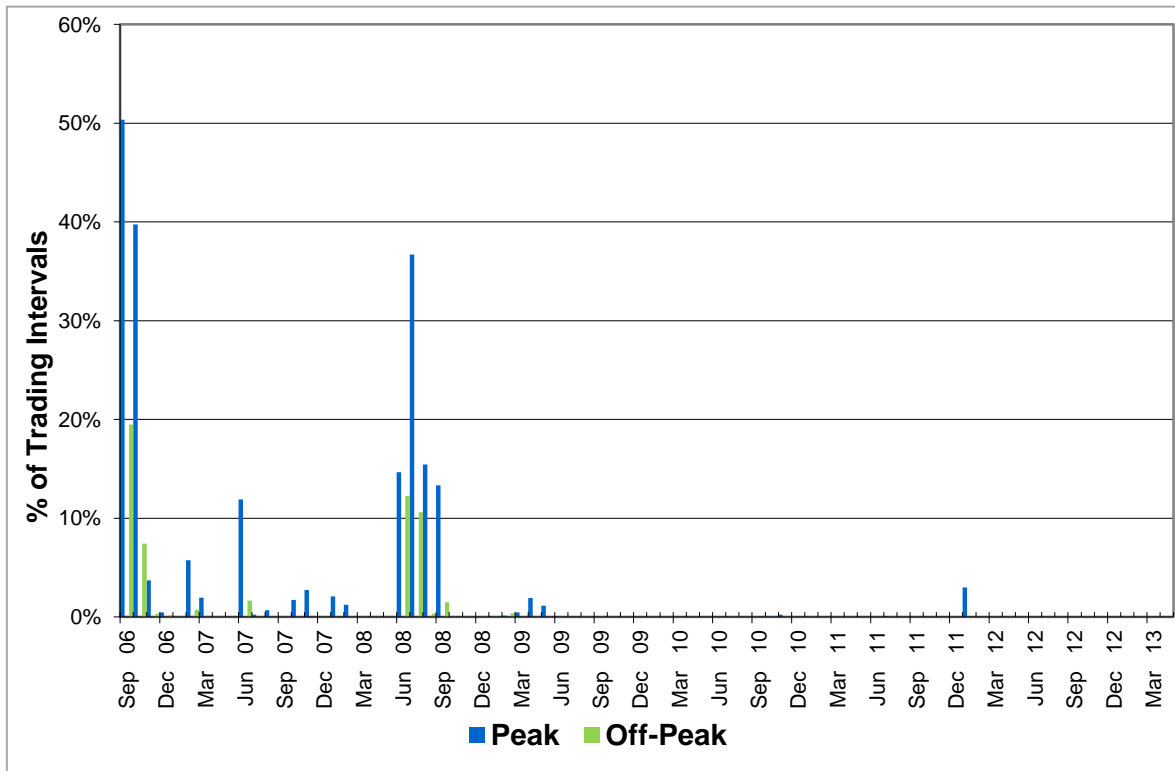
<sup>11</sup> The incident was caused by the rupture of a corroded pipeline and subsequent explosion at a processing plant on Varanus Island on 3 June 2008. The plant, operated by Apache Energy, which normally supplied a third of the State's gas, was shut down for almost two months while a detailed engineering investigation and major repairs were carried out. Gas supply from the plant partially resumed in late August. By mid-

Clearing Prices also reached the Maximum STEM Price during three Peak Trading Intervals between March and May 2009, twice on 3 November 2010, once on 6 July 2011, during 26 peak Trading Intervals in January 2012, during eight Trading Intervals on 25 January 2012, during eleven on 26 January 2012, and during seven on 28 January 2012.

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October, gas production was running at two-thirds of normal capacity, with 85 per cent of full output restored by December 2008.

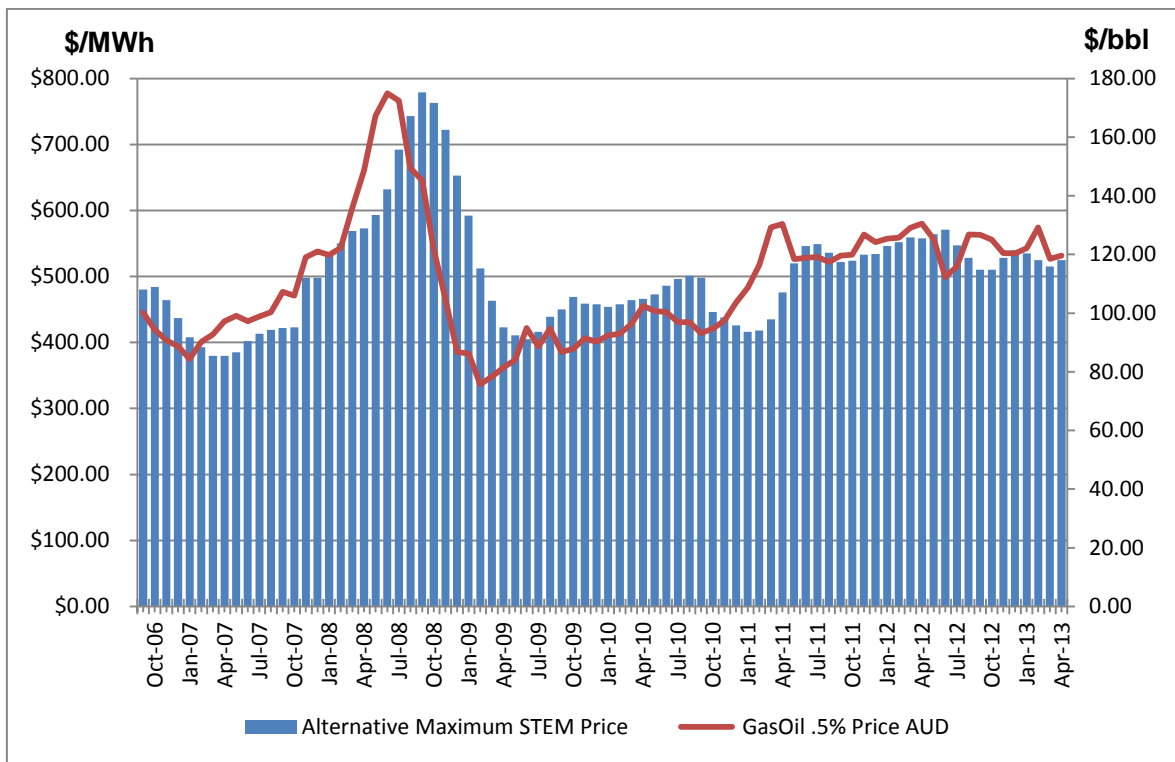
**The proportion of Peak and Off-Peak Trading Intervals during which STEM Clearing Prices were at the Maximum STEM Price (per calendar month)**



62. Generation facilities running on liquid fuel must not be priced above the Alternative Maximum STEM Price. The Market Rules specify that the Alternative Maximum STEM Price is adjusted monthly to reflect changes in oil prices and the Consumer Price Index (CPI), and is subject to review by the IMO. The price of Singapore Gas Oil (0.5% sulphur) is used in the calculation of the Alternative Maximum STEM Price. The figure below illustrates the movement of the historical Alternative Maximum STEM price and the Singapore Gas Oil (0.5% sulphur) price.



## The movement of the historical Alternative Maximum STEM price



63. The key driver for changes in the Alternative Maximum STEM Price is changes in oil prices.<sup>12</sup> There were other reasons for changes in the Alternative Maximum STEM Prices. For example, in the 2008 Energy Price Limits review, the main reason for the decrease in the Alternative Maximum STEM Price was a correction to the way in which the fixed and fuel components of the liquid fuel cost formula were calculated. This correction had the effect of offsetting any increase in the world prices for distillate fuels. In the 2010 Energy Price Limits review, the IMO decided to revise the Risk Margin for calculating the Alternative Maximum STEM Price from 90 percent to 80 percent. In the 2012 Energy Price Limits review, the most significant influence on the Alternative Maximum STEM Price was the increase due to the introduction of carbon pricing in July 2012.
64. Since market commencement, STEM Clearing Prices have only reached the Alternative Maximum STEM Price during Peak Trading Intervals in September 2006 and June 2007. During September 2006 the STEM Clearing Price was at the Alternative Maximum STEM Price 3.2% of the time. For June 2007, the STEM Clearing Price was at the Alternative STEM price 0.1% of the time. STEM Clearing Prices have not reached the Alternative Maximum STEM Price during any other period. The Authority understands from the IMO that the high proportion of STEM Clearing Prices reaching the Alternative Maximum STEM Price at the start of the WEM was mainly due to Market Participants being unfamiliar with the market.

<sup>12</sup> The chart shows a lag between the gas oil price and the Alternative Maximum STEM Price. This is a result of the way the Alternative Maximum STEM Price is calculated based on the gas oil price in the Market Rules.

65. Clause 2.26.3 of the Market Rules provides that the Authority's review must examine historical STEM Bids<sup>13</sup> and STEM Offers<sup>14</sup> and the proportion of STEM Bids and Offers with prices equal to the Energy Price Limits. Although this is a requirement under the Market Rules, the Authority is of the view that examining the Portfolio Supply Curves<sup>15</sup> and Portfolio Demand Curves<sup>16</sup> in the STEM may be more relevant for the purpose of reviewing the methodology for setting the EPLs as a tool for market power mitigation. This will enable a more accurate view of bid and offer behaviour by enabling the distinguishing between bilateral obligations and possible use of market power.<sup>17</sup>
66. Since market commencement, there were many instances where STEM Offers were equal to the Energy Price Limits, specifically, the Maximum STEM Price and Alternative Maximum STEM Price. From market commencement to 30 April 2013, approximately 0.2 per cent of the amount of energy offered in STEM was with offers equal to the Minimum STEM Price per Trading Day, approximately 44.6 per cent of the amount of energy offered in STEM was with offers equal to the Maximum STEM Price per Trading Day, and approximately 27.8 per cent of the amount of energy offered in STEM was with offers equal to the Alternative Maximum STEM Price per Trading Day.<sup>18</sup> This reflects the extent to which IPPs want to be dispatched. The figure below shows the proportion of energy offered into the STEM, with offers equal to the Energy Price Limits per Trading Day, from market commencement to 30 April 2013.

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<sup>13</sup> A STEM Bid is a bid to purchase energy from the IMO via the STEM Auction for a Trading Interval.

<sup>14</sup> A STEM Offer is an offer to provide energy through the STEM auction for a Trading Interval determined by the IMO in accordance with clause 6.9.3 of the Market Rules.

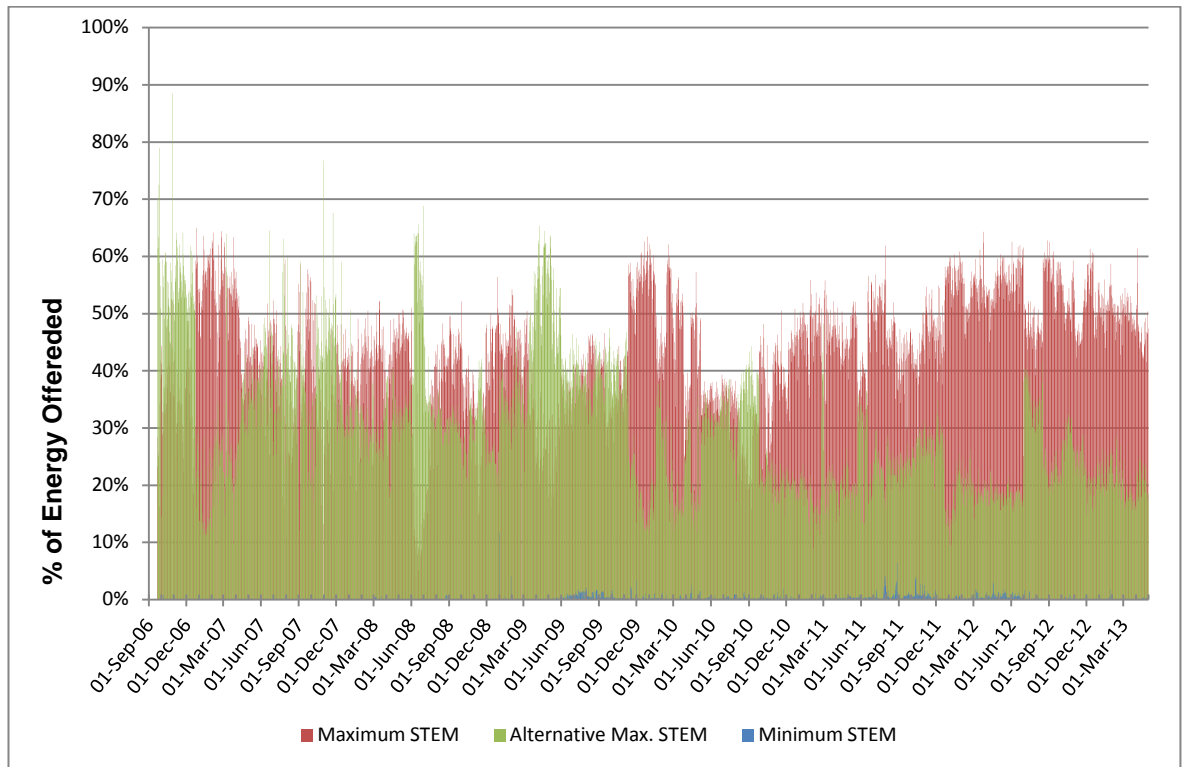
<sup>15</sup> A Market Participant's Portfolio Supply Curve represents energy it is offering into the market.

<sup>16</sup> A Market Participant's Portfolio Demand Curve represents energy it may potentially purchase from the market.

<sup>17</sup> The IMO converts a Market Participant's Portfolio Supply Curve, Portfolio Demand Curve and its Net Bilateral Position into STEM Offers and STEM Bids for that Market Participant. When determining STEM bids and STEM offers, a Market Customer's demand that is met through a bilateral contract is represented as a STEM offer at the Alternative Maximum STEM Price. This reflects the necessary delivery of energy rather than pricing through market power.

<sup>18</sup> These proportions exclude STEM Offers from Synergy as this reflects their bilateral obligations.

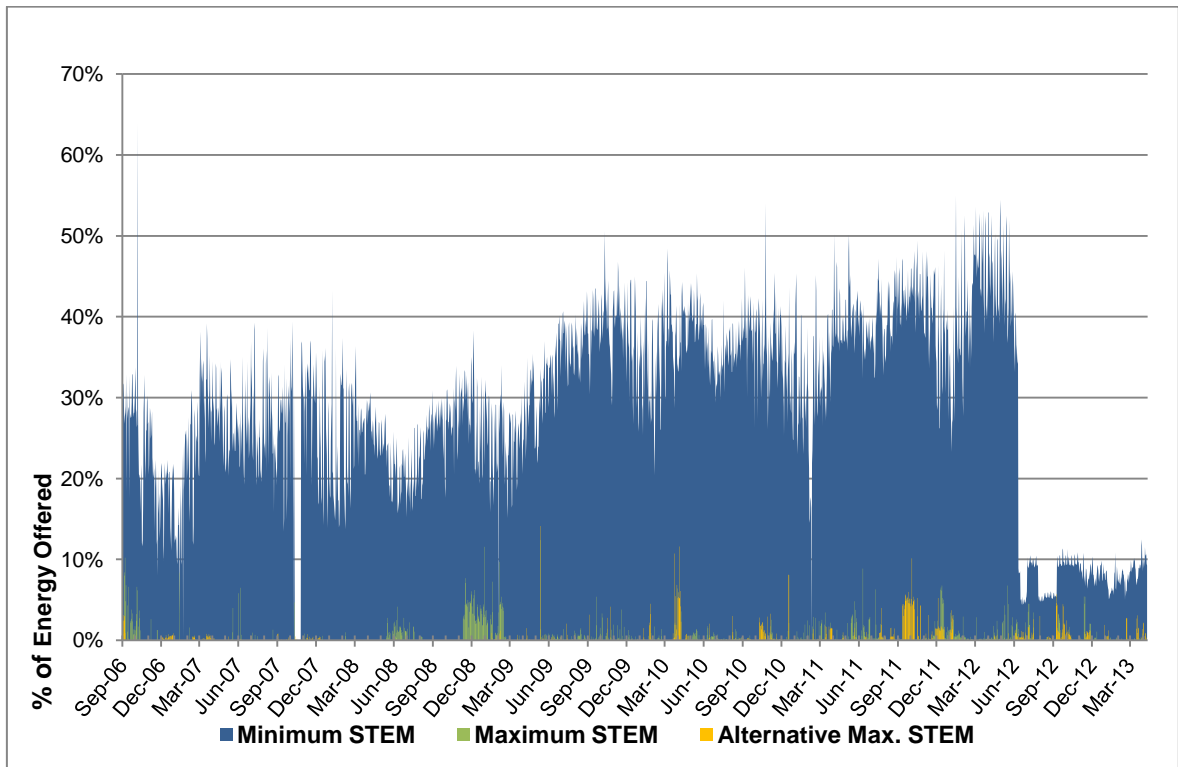
## The proportion of energy offered in STEM with prices equal to the Energy Price Limits per Trading Day



67. Since market commencement, there have been many instances where STEM Bids were equal to the Energy Price Limits, specifically, the Minimum STEM Price. From market commencement to 30 April 2013, approximately 28.54 per cent of the amount of energy bid into the STEM were with bids equal to the Minimum STEM Price per Trading Day, approximately 0.5 per cent of the amount of energy bid into the STEM were with bids equal to the Maximum STEM Price per Trading Day, and approximately 0.8 per cent of the amount of energy bid into the STEM were with bids equal to the Alternative Maximum STEM Price per Trading Day.<sup>19</sup> The figure below shows the proportion of the amount of energy bid into the STEM with bids equal to the Energy Price Limits per Trading Day, from market commencement to 30 April 2013.

<sup>19</sup> These proportions exclude STEM Offers from Synergy as the majority of Synergy's STEM Offers are at the Alternative Maximum STEM Price. This is due to Synergy requiring the energy to fulfil its bilateral obligations. Further analysis of the proportion of STEM Bids and Offers with prices being equal to the EPLs will be provided in the Authority's Final Report on the review of methodology for setting the MRCP and the EPLs in the WEM.

### The proportion of the amount of energy bid in STEM with prices equal to the Energy Price Limits per Trading Day



### 3.2.2 The performance of STEM Auctions in meeting the Wholesale Market Objectives

68. The STEM is a day-ahead market where a Market Participant can trade energy around its bilateral position. This is in contrast to the Balancing Market which provides the ability to trade energy in close to real time. The Authority considers that STEM Clearing Prices have generally reflected the balance of supply and demand and, in doing so, have provided useful price signals to Market Participants. The Authority has also noted the active trading activities in the STEM and the upward trend in the quantity traded since market commencement.

The Authority invites comments from stakeholders in relation to the effectiveness of STEM Auctions in meeting the Wholesale Market Objectives.

### 3.3 The appropriateness of the parameters and methodology for recalculating the EPLs

69. Clause 6.20 of the Market Rules sets the requirements and the steps that must be followed by the IMO for proposing revised values for the EPLs. Clause 2.26 of the Market Rules sets the requirements and the steps that must be followed by the Authority for approving revised values for the EPLs.

### 3.3.1 Requirements under clause 6.20

70. Clause 6.20.6 of the Market Rules states that the IMO must annually review the appropriateness of the value of the Maximum STEM Price and Alternative Maximum STEM Price.
71. Under clause 6.20.9 of the Market Rules, the IMO must prepare a Draft Report describing how it has arrived at the proposed revised values for the Maximum STEM Price and the Alternative Maximum STEM Price. The IMO must publish the Draft Report on the market website and advertise the report in newspapers widely distributed in Western Australia. It must request submissions from all sectors of the Western Australian energy industry, including end-users, within six weeks of the date of publication.
72. Under clause 6.20.10 of the Market Rules, after considering the submissions on the Draft Report described in clause 6.20.9 of the Market Rules, the IMO must propose a final revised value for any proposed change to the EPLs and publish these values in its Final Report, including submissions received on the Draft Report, on the market website.
73. Under clause 6.20.11 of the Market Rules, a proposed revised value for any EPL replaces the previous value after the Authority has approved the value in accordance with clause 2.26 of the Market Rules, and the IMO has posted a notice on the market website of the new value of the applicable EPL with effect from the time specified in the IMO's notice.

The Authority invites comments from stakeholders in relation to the appropriateness of clause 6.20 of the Market Rules. The Authority also seeks views from stakeholders on the appropriateness of the required annual review of the EPLs, and whether the IMO should be allowed to propose revised EPLs outside of the normal review cycle, in response to significant changes.

### 3.3.2 Requirements under clause 2.26

74. Under clause 2.26.1 of the Market Rules, where the IMO has proposed a change in the value of one or more EPLs in accordance with clause 6.20 of the Market Rules, the Authority must review the report provided by the IMO, including all submissions received by the IMO in preparation of the report, and make a decision as to whether or not to approve the revised value(s) comprising the EPLs.
75. In making its decision, the Authority must only consider whether the revised value(s) for the EPLs proposed by the IMO reasonably reflects the application of the method and guiding principles described in clause 6.20 of the Market Rules and whether the IMO has carried out an adequate public consultation process. The Authority must then notify the IMO as to whether or not it has approved the revised value(s).

The Authority invites comments from stakeholders in relation to the appropriateness of regulatory oversight provided under clause 2.26 of the Market Rules and whether any amendments should be considered.

### 3.3.3 Evolution of the methodology

76. Since market commencement, there have been two primary Rule Changes that altered the methodology in calculating the EPLs.

77. In February 2008, the IMO submitted a Rule Change proposal on the EPLs Methodology (RC\_2008\_07). The IMO proposed the following changes to the cost assumptions and methodology for determining the EPLs:
- At the time, the Market Rules prescribed the use of the average of the heat rates at minimum capacity and maximum capacity of a 40 MW open cycle gas turbine generating station in the calculation of the EPLs. It was proposed that the Market Rules be amended to instead prescribe the use of the heat rate at the relevant minimum capacity, to ensure that the resultant EPLs cover the cost of the marginal generator for all load levels.
  - The Market Rules were silent on any specific treatment of start up costs. The IMO proposed that the inclusion of the start up costs be prescribed so as to ensure that relevant costs associated with start up are not excluded in future reviews.
  - The IMO proposed that the clauses pertaining to the review of Maximum Shutdown Cost be deleted from the Market Rules, as the opportunity costs of a shutdown can be recovered through the pay-as-bid prices under the provisions of the Market Rules, and the cost of shutting down a unit would also be covered by the proposed inclusion of start up costs.
78. The changes proposed in RC\_2008\_07 were supported by Market Participants and these were approved by the IMO. The amendments to the Market Rules commenced operation in August 2008.
79. In December 2009, the IMO submitted a Rule Change proposal on the EPLs Methodology and Consultation Process (RC\_2009\_35). The IMO's Rule Change proposal sought to amend the Market Rules to:
- Replace "Profit Margin" with "Risk Margin", where "Risk Margin" refers to the margin between the price cap and the expected highest short run cost generating works in the SWIS, in order to allow for the uncertainty faced by the IMO in setting the price limits to be accurately reflected when annually reviewing its appropriateness.
  - Clarify that the IMO will publish Draft Reports and seek public consultation only when undertaking the annual review required under the Market Rules.
  - Allow for a second consultation period, if required, after submissions have been received on the Draft Report.
80. Following the publication of the IMO's draft Rule Change Report, the IMO also sought to remove the requirement to adjust the Maximum STEM Price for CPI changes. The proposed changes in RC\_2009\_35 were accepted and amendments to the Market Rules commenced operation in June 2010.

### 3.3.4 *Current methodology for determining the EPLs*

81. The methodology specified in the Market Rules relates to the costs of a 40 MW gas turbine generator that represents the "highest cost generating works in the SWIS". The Market Rules do not specify the type of gas turbine technology. In all past reviews, SKM (consulting to the IMO) calculated the EPLs for selected actual industrial gas turbines and aero derivative turbines, and selected the highest cost unit as the reference unit. SKM's analysis has shown that the Pinjar 40 MW gas

turbines have the highest cost for short dispatch periods and the Parkeston aero-derivative gas turbines are the next most costly to run for peaking purposes. This has consistently applied since the EPLs were first determined.

82. SKM identifies the likely variability in key inputs (Variable O&M, Heat Rate and Fuel Cost) to the calculation of EPLs under clause 6.20 of the Market Rules, and models the impact that the variability in the key inputs would have on the dispatch cycle cost of the reference unit. This method results in a probability distribution of possible costs from which the EPLs are selected to cover 80 per cent of the possible outcomes.
83. In the 2011 Energy Price Limits review, Synergy raised the concern that SKM did not create inputs required under the Market Rules to calculate the component parts that deliver the Energy Price Limits.
84. The IMO noted that under SKM's methodology, the cost component values represent outputs of the process rather than inputs. The IMO acknowledged that while the current methodology can be accommodated within the current requirements under the Market Rules, it would be beneficial if the Market Rules were amended to more transparently describe the accepted probabilistic methodology for the review, either in clause 6.20.7 itself or through a subordinate Market Procedure.

The Authority seeks views from stakeholders in respect of the appropriateness of the methodology used for determining the EPLs. The Authority also seeks views on whether any amendments to the methodology or process should be considered that would better achieve the market objectives. The Authority also seeks views as to whether the EPLs should continue to be based on the highest cost unit.

### 3.3.5 Variable O&M Cost

85. The determination of Variable O&M costs for the reference unit is based on engineering data. These costs are dependent on the duration for which the machine is operational and how heavily loaded the machine is while it is being dispatched. SKM uses the concept of the dispatch cycle to determine these items. SKM determines the characteristics of dispatch cycles experienced by the reference machine through the analysis of historic dispatch data obtained from the IMO.

The Authority seeks views from stakeholders in respect of the appropriateness of the methodology used for determining the Variable O&M cost. The Authority also seeks views on whether any amendments to the methodology should be considered.

### 3.3.6 Heat Rate

86. The Market Rules state that the Heat Rate should be determined as the “mean heat rate at minimum capacity”. To identify the appropriate minimum capacity reference, SKM reviews historic machine operation to determine an appropriate minimum load for the reference units. SKM uses a minimum load of 33 per cent of rated capacity and heat rates derived based on a linear approximation across the total operating range of the reference units. SKM extracts a heat rate from the manufacturer's data for that loading level, as well as the sensitivity of the average heat rate to the variation in output, for modelling the uncertainty in the minimum capacity level.

The Authority seeks views from stakeholders in respect of the appropriateness of the methodology used for determining the Heat Rate. The Authority also seeks views on whether any amendments to the methodology should be considered.

### 3.3.7 Fuel Cost

87. The Market Rules require the use of the “mean unit fixed and variable fuel cost for the calculation of the Maximum STEM Price.
88. SKM uses a modelled distribution of likely gas prices to determine the Maximum STEM Price. In addition, SKM models the carbon emission cost within the fuel cost component.
89. Since 2010, the IMO has engaged ACIL Tasman to assist it in undertaking a review of gas prices in the WEM. This included updating information on the likely gas prices faced by gas generators in the WEM to be used in the EPLs review; and determining the associated gas price range, gas transport cost and load factor to be included in the calculation of the Maximum STEM Price. SKM’s modelling of gas cost is based on recommendations from ACIL Tasman in its gas reviews. SKM uses a tri-lognormal distribution of spot gas prices over a pre defined range, and the upper bound of the distribution is defined by the gas cost that would give the same dispatch cycle cost as if distillate were used.
90. SKM also uses a modelled distribution of likely gas transport prices to determine the Maximum STEM Price, and bases its determination on recommendations from ACIL Tasman.
91. SKM models the impact of variation in daily forecast volume error through the inclusion of a daily gas load factor. This daily gas load factor is applied to the fixed transport cost and the gas cost.
92. SKM models the carbon cost by converting this to an equivalent fuel cost based on the specification of the carbon intensity of the WA gas supply using the National Greenhouse Gas Account Factors for gas and distillate.

The Authority seeks views from stakeholders in respect of the appropriateness of the methodology used for determining the Fuel Cost, and whether a more flexible approach to incorporating carbon costs is required. The Authority also seeks views on whether any amendments on the methodology should be considered.

### 3.3.8 Loss Factor

93. SKM uses the loss factor extracted from the published loss factors for the reference units.

The Authority seeks views from stakeholders in respect of the appropriateness of the methodology used for determining the Loss Factor. The Authority also seeks views on whether any amendments to the methodology should be considered.

### 3.3.9 Risk Margin

94. SKM identifies the likely variability in key inputs to the calculation of EPLs and models the impact that the variability in the key inputs would have on the dispatch



cycle cost. This methodology results in a probability distribution of possible costs from which the EPLs are selected to cover 80 per cent of the possible outcomes.

95. SKM calculates the Risk Margin as the percentage difference between the cost outcome that covers 80 per cent of possible outcomes and the cost derived from the mean values of the Variable O&M, Heat Rate and Fuel Cost. Hence, the Risk Margin is an output of the calculation rather than an input in determining the EPLs.

The Authority seeks views from stakeholders with regard to the appropriateness of the methodology used for determining the Risk Margin. The Authority also seeks views on whether any amendments to the methodology should be considered.

### 3.4 Issues with the current methodology

#### 3.4.1 *No defined Market Procedure for the methodology*

96. There is currently no requirement under the Market Rules to develop a Market Procedure for documenting the methodology the IMO uses and the process it follows in calculating the EPLs. The Market Rules could be amended to transparently describe the probabilistic methodology used for the EPLs review through the creation of a Market Procedure.

The Authority invites comments from stakeholders in relation to the requirement for developing a Market Procedure for documenting the methodology the IMO uses and the process it follows in calculating the EPLs under the Market Rules.

#### 3.4.2 *Internal inconsistency of the relevant clauses in the Market Rules*

97. The Authority has identified an inconsistency in clauses 6.20.7(a)(i) and 6.20.7(b) of the Market Rules. Clause 6.20.7(a)(i) refers to the Maximum STEM Price being based on the IMO's estimate of the **short run marginal cost** of the highest cost generating works in the SWIS fuelled by natural gas. In contrast, clause 6.20.7(b) refers to the Risk Margin used to calculate the Maximum STEM Price being a measure of uncertainty in the assessment of the mean **short run average cost** for a 40 MW open cycle gas turbine generating station.

The Authority invites comments from stakeholders in relation to the inconsistency between clauses 6.20.7(a)(i) and 6.20.7(b) of the Market Rules.

#### 3.4.3 *Lack of powers of the IMO to request for actual operational data*

98. Under the Market Rules, the IMO does not have power to request for confidential operational data from Market Participants for the EPLs reviews, and the IMO is required to use input assumptions for its modelling of Fuel Costs, Heat Rates and Variable O&M costs in calculating the EPLs.

The Authority invites stakeholders to provide their views on whether the Market Rules should be amended to extend powers to the IMO and the Authority to request for operational data from Market Participants on a confidential basis to provide more accurate inputs to the modelling process involved in calculating the EPLs.

### **3.4.4 Approval of the Alternative Maximum STEM Price by the Authority**

99. The Market Rules are unclear on whether a single value or the price components of the Alternative Maximum STEM Price is to be approved by the Authority. The Authority is of the view that it is more appropriate to approve the price components for the Alternative Maximum STEM Price rather than a single value. This is because the Alternative Maximum STEM Price is revised every month according to changes in the Singapore Gas Oil (0.5% sulphur) price as provided in clause 6.20.3(b) of the Market Rules.

The Authority invites comments from stakeholders on whether a single value or the price components of the Alternative Maximum STEM Price should be approved by the Authority pursuant to the Market Rules, and whether the Market Rules should be amended to provide clarity on this matter.

### **3.4.5 The use of the Singapore Gas Oil (0.5% sulphur) price in the calculation of the Alternative Maximum STEM Price**

100. The Market Rules refers to the use of the Singapore Gas Oil (0.5% sulphur) price in the calculation of the Alternative Maximum STEM Price. The Authority is interested in views regarding whether the Market Rules should be updated to refer to an alternative index such as the Perth Terminal Gate price or the Singapore Oil 10 ppm price.

The Authority invites comments from stakeholders on whether the Market Rules should be updated to an alternative index for calculating the Alternative Maximum STEM Price.

### **3.4.6 Adjustment rules for the calculation of the Alternative Maximum STEM Price**

101. The CPI adjustment rules for the calculation of the Alternative Maximum STEM Price in clause 6.20.3 is based on the assumption that each annual review would provide updated values that apply from 1 September. Since the 2012 EPLs review, the IMO has been proposing new values to take effect from 1 July, to reflect the impact of carbon pricing as part of the Clean Energy Scheme, which commenced on 1 July 2012.

The Authority invites comments from stakeholders on whether the Market Rules should be amended to apply CPI indexing after the revised value has been in effect for 12 months regardless of when the anniversary of the review falls.

102. As part of the 2011 Energy Price Limits review, Synergy questioned whether an annual review of the Energy Price Limits is necessary or whether this could be done less often (for example, every three to five years), with consideration given to what components of the prices would need to be escalated and on what basis.

The Authority invites comments from stakeholders on whether the Market Rules should be amended to reduce the frequency of the Energy Price Limits review, and to apply other parameters such as carbon prices, CPI indexing and exchange rate changes to the calculation of the Alternative Maximum STEM Price in between the reviews.

## 4 Methodology for setting the Maximum Reserve Capacity Price

### 4.1 Current methodology for setting the MRCP

103. Clause 4.16 of the Market Rules sets out the requirements and process for setting the MRCP.
104. The MRCP Market Procedure sets out the principles to be applied and the steps to be taken by the IMO in order to develop and propose the MRCP.
105. The MRCP is intended to reflect the marginal cost of providing additional Reserve Capacity in each Capacity Year. The methodology for determining the MRCP, as specified in the Market Procedure, includes a technical costing of the following components:
  - the capital cost of an industry standard, liquid-fuelled open cycle gas turbine (**OCGT**) with a nominal nameplate capacity of 160 MW with an inlet cooling system, located within the South West Interconnected System (**SWIS**);
  - the land cost associated with developing and constructing the power station;
  - the costs associated with the development of liquid fuel storage and handling facilities;
  - the costs associated with the connection of the power station to the bulk transmission system;
  - the fixed operating and maintenance (**O&M**) costs for the power station, fuel handling facilities and the transmission connection components;
  - a margin for legal, insurance, financing and environmental approval costs plus contingencies; and
  - the Weighted Average Cost of Capital (**WACC**).

### 4.2 The Role of MRCP in curbing market power

106. The reason for having a MRCP is to protect against the misuse of market power in the WEM. The IMO is required to purchase a minimum level of capacity in order to ensure sufficient capacity is provided for the SWIS. In a situation where capacity providers know that their capacity could be purchased regardless of the cost, there is an incentive to increase the price of their capacity offers. The use of a MRCP eliminates this possibility of generators offering capacity at excessive prices.
107. The Authority notes that to date, the price for capacity in the WEM has not reached the cap set by the MRCP value. This is merely a result of the operation of the RCM under the existing Market Rules. There has been no Reserve Capacity Auction held since market commencement. Hence, the price for capacity has been set administratively as a discounted value to the MRCP. There has therefore been little opportunity for any individual Market Participant to materially influence the price for capacity.

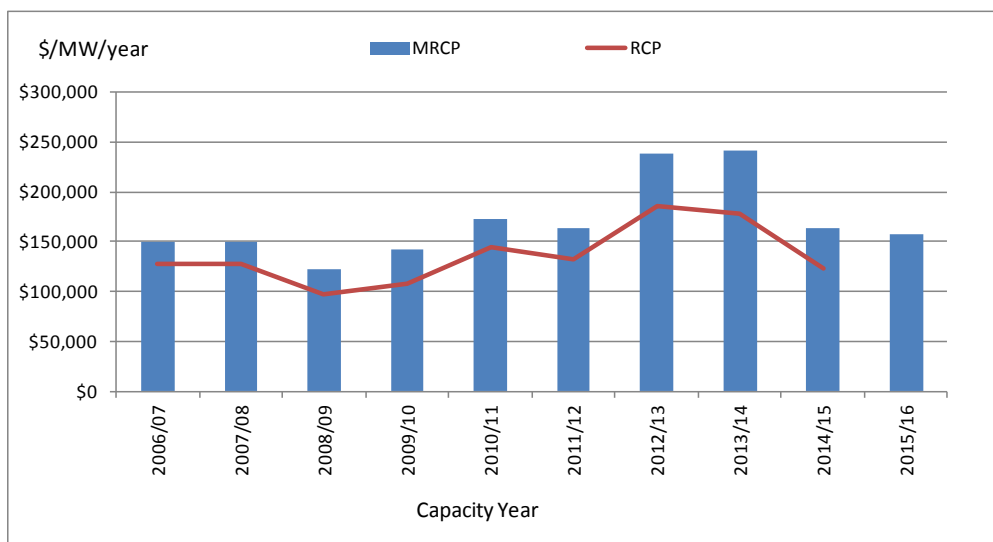
108. The amount of competition will influence the extent to which market power can be used. The Authority notes that greater competition has developed in the WEM. The number of generators in the WEM has increased from nine at inception to currently twenty-six. As a result, the spread of capacity across generators has increased.

The Authority invites comments from stakeholders on the role of the MRCP in curbing the use of market power, with consideration given to the methodology employed in calculating this price.

#### 4.2.1 *History of the Maximum Reserve Capacity Price*

109. The Market Rules set an initial MRCP value of \$150,000 per MW per year for the period from market commencement (21 September 2006) through to 1 October 2008.
110. The IMO initiated the first review of the MRCP at the end of 2005 for the 2006 Reserve Capacity Cycle for capacity available in the 2008/09 Capacity Year (i.e. from 1 October 2008 through 1 October 2009). Following this review, the MRCP value was set at \$122,500 per MW per year. The main reason for the price reduction was the adoption of the review process outlined in the Market Rules. Through the public consultation process, some stakeholders deemed that this outcome was not aligned with market expectations.
111. The review conducted at the end of 2006 resulted in a MRCP value of \$142,200 per MW per year for the 2007 Reserve Capacity Cycle for capacity available in the 2009/10 Capacity Year. The IMO noted this price was determined on the same basis as the 2006 MRCP and the difference in the value reflected the increases in the projected construction and development costs at the time.
112. Following changes to the Market Rules made in late 2007 to allow a more cost-reflective method to be used, the MRCP value determined for the 2008 Reserve Capacity Cycle for capacity available in the 2010/11 Capacity Year to be \$173,400 per MW per year. This value represented an increase of 22 per cent compared to the 2007 MRCP.
113. The value of the MRCP was determined at \$164,100 per MW per year for the 2011/12 Capacity Year following the application of a new MRCP Market Procedure established in October 2008. The new MRCP Market Procedure replaced Appendix 4 of the Market Rules following the approval of the IMO's Rule Change Proposal (RC\_2008\_11) regarding changes to the relevant clauses and Appendix 4 of the Market Rules for setting the MRCP. These proposed changes were made based on outcomes from the Maximum Reserve Capacity Advisory Group which was set up to assess the methodology and concepts surrounding the determination of the MRCP. The new MRCP Market Procedure also included the requirement for the IMO to undertake a structure review of the procedure at least once every five years.
114. The MRCP values were set at \$238,500 per MW per year in the 2010 Reserve Capacity Cycle (for capacity available in the 2012/13 Capacity Year) and \$240,600 per MW per year in the 2011 Reserve Capacity Cycle (for capacity available in the 2013/14 Capacity Year). The sharp increase was mainly due to changes in the methodology applied by Western Power to provide an estimate of the transmission connection cost.

115. To assist the IMO's five-yearly review of the MRCP Market Procedure, a MRCP Working Group was established in May 2010 to consider, assess and develop any necessary changes to the MRCP Market Procedure and in particular, the methodology for the determination of the associated Weighted Average Cost of Capital (WACC). As a result, the IMO submitted a Procedure Change Proposal (PC\_2011\_06) based on recommendations from the MRCP Working Group. The Procedure Change Proposal was approved and the amended MRCP Market Procedure commenced in October 2011.
116. The application of the amended MRCP Market Procedure in the 2012 Reserve Capacity Cycle (for capacity available in the 2014/15 Capacity Year) resulted in a MRCP value of \$163,900 per MW per year. This represented a reduction of over 30 per cent from the previous year. The main contributor to this reduction was the changes made in the MRCP Market Procedure in relation to the methodology for estimating the transmission connection cost by Western Power.
117. The MRCP value for the 2013 Reserve Capacity Cycle (for capacity available in the 2015/16 Capacity Year) was determined at \$157,000 per MW per year, a relatively small downward adjustment from the previous year. The reduction was largely due to a reduced bond yield which was partially off-set by the change in the gamma value (from 0.5 to 0.25) in the calculation of the WACC.
118. The chart below illustrates the history of the MRCP and the RCP.



119. The Authority notes that the volatility of the MRCP has been a concern raised by some market participants previously. The volatility in prices across Capacity Years 2012/13 and 2013/14 was largely a result of a change in calculation of the transmission cost component of the MRCP. The possibility of administrative changes to the calculation of this price is likely to increase the risk of investing in capacity.

#### **4.2.2 Historical Reserve Capacity Offers and the proportion of Reserve Capacity Offers with prices equal to the MRCP**

120. As no Reserve Capacity Auction has been held to date, there are no Reserve Capacity Offers submitted by Market Participants. The Authority is not in a position to comment on this item, which is required under clause 2.26.3(d) of the Market Rules.

#### **4.2.3 The performance of Reserve Capacity Auctions in meeting the Wholesale Market Objectives**

121. Given that no Reserve Capacity Auction has been held to date, the Authority is not in a position to comment on the performance of Reserve Capacity Auctions required under clause 2.26.3(h) of the Market Rules.

### **4.3 The appropriateness of the parameters and methodology in clause 4.16 and the Market Procedure referred to in clause 4.16.3 for recalculating the MRCP**

122. Clause 4.16 of the Market Rules sets the requirements and the steps that must be followed by the IMO for proposing a revised value for the MRCP. The methodology and the process for determining the MRCP value is documented in the MRCP Market Procedure.

#### **4.3.1 Requirements under clause 4.16**

##### **4.3.1.1 Publication of the MRCP value by the IMO**

123. Clause 4.16.1 of the Market Rules requires that, for each and every Reserve Capacity Cycle, the IMO must publish the MRCP value prior to the Request for Expression of Interest being advertised by the IMO.

124. Clause 4.16.8 of the Market Rules states that a proposed revised value for the MRCP becomes effective after the IMO has posted a notice on the Market Web Site of the new value of the MRCP from the time specified in the IMO's notice.

125. The Authority considers the publication requirement adds benefit to market transparency and assists market participants' decision process, particularly ahead of the IMO's Request for Expression of Interest process.

The Authority invites comments from stakeholders in relation to the appropriateness of the clauses 4.16.1 and 4.16.8 of the Market Rules.

##### **4.3.1.2 Development of the MRCP Market Procedure**

126. Clause 4.16.3 of the Market Rules requires that the IMO must develop a Market Procedure documenting the methodology it uses and the process it follows in determining the MRCP.

127. Clause 4.16.5 of the Market Rules requires that the IMO must propose a revised value for the MRCP using the methodology described in the MRCP Market Procedure.
128. The Authority considers the development of a Market Procedure documenting the methodology that the IMO uses and the process it follows contributes to more transparency and consistency, minimises procedural uncertainty, and also provides confidence to Market Participants.

The Authority invites comments from stakeholders in relation to the requirement for developing a MRCP Market Procedure under clause 4.16.3 of the Market Rules.

#### 4.3.1.3 *Annual review of the MRCP value*

129. Clause 4.16.3(b) of the Market Rules requires that the IMO must follow the documented Market Procedure to annually review the value of the MRCP.

The Authority seeks views from stakeholders on the appropriateness of the required annual review of the MRCP value and whether the frequency of the review should be modified.

#### 4.3.1.4 *Public consultation*

130. Under clause 4.16.6 of the Market Rules, as part of the IMO annual review of the MRCP value, the IMO is required to prepare a Draft Report describing how it has arrived at a proposed revised value for the MRCP, publish the report on the Market Web Site, advertise the report in newspapers widely distributed in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users.
131. Clause 4.16.7 of the Market Rules states that, after consideration of the submissions on the Draft Report, the IMO must propose a final revised value for the MRCP and publish that value and its Final Report, including submissions received on the Draft Report, on the Market Web-Site.
132. The Authority considers the public consultation process provides an opportunity for the involvement of the broader public and enables a balanced consideration of all views expressed in the submissions.

The Authority invites comments from stakeholders in relation to the appropriateness of the way in which public consultation shall be conducted by the IMO in its determination of the MRCP value.

#### 4.3.1.5 *Five-yearly review of the MRCP Market Procedure*

133. Clause 4.16.9 of the Market Rules requires that at least once in every five year period, the IMO must review the Market Procedure for setting the MRCP and must undertake a public consultation process in respect of the outcome of the review. The last review of the MRCP Market Procedure was completed by the IMO in October 2011 which resulted in some significant changes to the MRCP Market Procedure and the methodology for setting the MRCP.<sup>20</sup> The application of the

<sup>20</sup> See IMO Procedure Change Report – 5 Yearly Review of the methodology and process for determining the Maximum Reserve Capacity Price (PC\_2011\_06), [http://www.imowa.com.au/f4668.1647770/PC\\_2011\\_06\\_Procedure\\_Change\\_Report\\_v4\\_FINAL1.pdf](http://www.imowa.com.au/f4668.1647770/PC_2011_06_Procedure_Change_Report_v4_FINAL1.pdf)

revised MRCP Market Procedure also resulted in a material reduction in the MRCP value for the 2014/15 Capacity Year.<sup>21</sup>

The Authority seeks views from stakeholders on the appropriateness of the required five-yearly review of the MRCP Market Procedure by the IMO and whether the frequency of the review should be modified.

#### 4.3.1.6 *Approval of proposed MRCP value by the Authority*

134. Where the IMO proposes a final revised value for the MRCP, clause 2.26.1 of the Market Rules requires the Authority:

- to review the final report provided by the IMO, including all submissions received by the IMO in preparation of the report;
- to make a decision as to whether or not to approve the revised value of the MRCP;
- in making its decision, to only consider:
  - whether the proposed revised value for the MRCP reasonably reflects the application of the method and guiding principles described in clause 4.16 of the Market Rules;
  - whether the IMO has carried out an adequate public consultation process; and
- notify the IMO that it has approved the revised value.

135. The Authority notes the limited scope of consideration defined in the Market Rules in relation to the Authority's decision making as to whether or not to approve the revised value of the MRCP, i.e. to only consider:

- whether the proposed revised value for the MRCP reasonably reflects the application of the method and guiding principles described in clause 4.16 of the Market Rules; and
- whether the IMO has carried out an adequate public consultation process.

The Authority invites comments from stakeholders in relation to the appropriateness of regulatory oversight provided under clause 2.26.1 of the Market Rules and whether any amendments should be considered.

#### 4.3.2 *The MRCP Market Procedure*

136. The MRCP Market Procedure details the methodology that the IMO must use and the steps that the IMO must undertake in determining a value for the MRCP.

137. The Authority is aware that the IMO initiated a number of amendments to the MRCP Market Procedure since it was put in place in 2008. A summary of the Procedure Change Proposals is provided below.

138. A summary of the changes made to the MRCP Market Procedure is provided in the table below.

<sup>21</sup> See ERA "Decision on the Maximum Reserve Capacity Price proposed by the Independent Market Operator for the 2014/15 Reserve Capacity Year", <http://www.erawa.com.au/cproot/10258/2/20120227%20Decision%20on%20the%20MRCP%20proposed%20by%20the%20IMO%20for%20the%202014-15%20Reserve%20Capacity%20Year.pdf>



Procedure Change Proposal	Date submitted	Date completed	Effective date	Key amendments
PC_2008_06	1/8/2008	10/10/2008	13/10/2008	<ul style="list-style-type: none"> <li>The new Market Procedure for determining the MRCP was developed following the approval of the Rule Change Proposal (RC_2008-11) in July 2008, amending a range of clauses in the Market Rules in respect of the determination of the MRCP based on outcomes from the working of the MRCP Advisory Group.</li> </ul>
PC_2008_14	30/10/2008	3/12/2008	4/12/2008	<ul style="list-style-type: none"> <li>Amended to correct a typographic error in the equation for the nominal return on debt in the WACC calculation.</li> </ul>
PC_2009_12	20/11/2009	30/3/2010	1/4/2010	<ul style="list-style-type: none"> <li>Removed the prescribed values of the Major components of the WACC to allow updated values to be included in the determination of the WACC.</li> </ul>
PC_2010_04	9/8/2010	4/10/2010	11/10/2010	<ul style="list-style-type: none"> <li>Restated the values for the Major components of the WACC that were removed under PC_2009_12.</li> </ul>
PC_2011_06	6/9/2011	21/10/2011	24/10/2011	<ul style="list-style-type: none"> <li>Included a provision for an inlet air cooling system in the definition of the model power station (step 2.1).</li> <li>Amended the Fixed Fuel Cost to include an allowance to initially fill the fuel tank with sufficient distillate for 14 hours of operation.</li> <li>Included in step 2.7.2(a) where the minimum land size available is greater than 3ha.</li> <li>Amended the effective compensation period for the total investment costs from 2 years to 6 months, after the escalation of values in the cost estimates in respect of power station, transmission, switchyard and O&amp;M costs is to be performed to April of Year 3.</li> <li>Included an allowance for annual asset insurance costs for the model power station within Fixed O&amp;M Costs.</li> <li>Amended the methodology for forecast Transmission Connections Works costs to be based on historical connection costs and relevant access offers determined by Western Power.</li> <li>Included debt issuance costs within the WACC and removed the corresponding debt financing costs from within margin M.</li> <li>Renamed the “Minor” and “Major” components of the WACC in step 2.9.8 to “Annual” and “5-yearly” and reclassified the Review Frequency of some WACC components.</li> <li>Provided the IMO with a discretion to nominate a method for determining the Debt Risk Premium that is consistent with current accepted Australian regulatory practice.</li> </ul>
PC_2012_08	12/11/2012	11/1/2013	15/1/2013	<ul style="list-style-type: none"> <li>Amended the value of Franking Credit (Gamma) used in the calculation of the WACC from 0.5 to 0.25.</li> <li>Amended the footnote on page 15 of the MRCP Market Procedure to note that the ‘Bond-Yield Approach’ methodology was broadly upheld on appeal to the Australian Competition Tribunal in June 2012 and the IMO’s intent to amend this Market Procedure in the near future to implement the ‘Bond-Yield Approach’.</li> <li>Other amendments of administrative nature to ensure consistency with the Amending Rules resulting from the Rule Change Proposal: Competitive Balancing and Load Following Market (RC_2011_10).</li> </ul>

## 4.4 Factors relating to the current methodology

139. The subsequent sections examine the current methodology relating to the calculation of the various components that comprise the Maximum Reserve Capacity Price and any issues with this methodology.

The Authority invites comments from stakeholders in relation to issues that should be considered as part of the methodology for setting the MRCP.

### 4.4.1 Costs for the power station

140. The MRCP Market Procedure states that the generic power station upon which the MRCP shall be based is a 160 MW open cycle gas turbine (**OCGT**), operating on liquid fuel, with a capacity factor of two per cent, utilising low Nitrous Oxide (NOx) burners, an inlet air cooling system and water relevel and storage facilities to allow 14 hours of continuous operation (where in the opinion of the IMO this would be cost effective).
141. The MRCP Market Procedure states that the IMO must engage a consultant to provide 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; a summary of any escalation factors used in the determination; and likely output at 41 degrees Celsius, which will take into account available turbine and inlet cooling technology, likely humidity conditions and any other relevant factors, which represents the expected Capacity Credit allocation of the power station.
142. The IMO engaged SKM to provide power station project capital cost estimates for a 160 MW OCGT power station located within the SWIS over the past several years. For the 2013 Reserve Capacity Cycle, the capital cost estimate for a 160 MW OCGT model power station was estimated at \$763 per kW (in June 2012 dollars).<sup>22</sup>
143. The Authority is aware that during the five-yearly review of the MRCP Market Procedure, the issue in regard to whether the 160 MW OCGT power station is appropriate for use as the basis in estimating the capital cost of a generic power station project was examined. It was concluded that no change was warranted at the time.<sup>23</sup>
144. The Authority is also aware that peaking capacity attracted to the market in recent years mostly came from Demand Side Management (**DSM**) providers and liquid generators of a much smaller scale (i.e. 40 MW or less).<sup>24</sup>

<sup>22</sup> See SKM, *Review of the Maximum Reserve Capacity Price 2013*, p.7  
[http://www.imowa.com.au/f175,3224117/WP04558-OSR-RP-0001\\_Rev\\_3\\_2013\\_IMO\\_MRCP\\_Report.pdf](http://www.imowa.com.au/f175,3224117/WP04558-OSR-RP-0001_Rev_3_2013_IMO_MRCP_Report.pdf)

<sup>23</sup> Refer to IMO, minutes of the 5th MRCP Working Group meeting,  
[http://www.imowa.com.au/f2179,1271137/MRCPWG\\_Meeting\\_7\\_Combined\\_Papers\\_-\\_complete.pdf](http://www.imowa.com.au/f2179,1271137/MRCPWG_Meeting_7_Combined_Papers_-_complete.pdf)

<sup>24</sup> Economic Regulation Authority, *2012 Wholesale Electricity Market Report for the Minister for Energy*, Add reference when it's published

The Authority invites comments from stakeholders in regard to the appropriateness of using a 160 MW OCGT as the basis in estimating the generic power station project capital cost and the approach applied by SKM in deriving this estimate.

#### 4.4.2 Transmission connection works

145. The MRCP Market Procedure requires Western Power to provide an estimate of the total transmission costs to connect the generator and deliver the output to loads consistent with the relevant planning criteria in the Technical Rules.<sup>25</sup> This estimate must be derived from capital contributions (either paid historically or expected to be paid by Western Power under Access Offers and Western Power's Contribution Policy as approved by the Authority) only for generators that are capable of being gas or liquid fuelled.<sup>26</sup> The MRCP Market Procedure sets the methodology and process that Western Power must follow in deriving the estimate of total transmission costs. Western Power is also required to provide an audit report verifying and confirming that Western Power has met the requirements under step 2.4.1 of the MRCP Market Procedure.
146. For the 2013 Reserve Capacity Cycle, Western Power proposed a value of \$115,124 per MW for transmission connection costs.<sup>27</sup> This value was accepted by the IMO and the Authority in the determination of the MRCP for the 2015/16 Capacity Year.
147. The Authority is aware of the changes made to the method for estimating the total transmission connection costs over recent years.
148. The method used by Western Power changed for the 2010 and 2011 Reserve Capacity Cycles following discussions between the IMO and Western Power. The IMO considered the estimates provided by Western Power for the previous years lacked detail and transparency. Based on its modified method, the estimate provided by Western Power for the shared connection cost at the cheapest location was more than 350 per cent higher than the indicative value Western Power provided for the 2009 Reserve Capacity Cycle. This resulted in a significantly higher MRCP value determined for the 2010 and 2011 Reserve Capacity Cycles.
149. As part of the five-yearly review of the MRCP Market Procedure, the IMO engaged SKM to review the methodology applied by Western Power in deriving its estimate of the total transmission connection costs. In its analysis, SKM highlighted that the method used by Western Power for the 2010 and 2011 Reserve Capacity Cycles required a broad range of assumptions that can lead to significant inaccuracies and year-to-year volatility. As a result, an amended methodology for estimating total transmission connection costs was included in the MRCP Market Procedure that took effect in October 2011. Western Power applied this new methodology and delivered a significantly lower estimate for the 2012 and 2013 Reserve Capacity Cycles (for the 2014/15 and 2015/16 Capacity Year respectively).

<sup>25</sup> See Western Power website, *Technical Rules web page*, [http://www.westernpower.com.au/aboutus/accessArrangement/Technical\\_Rules.html](http://www.westernpower.com.au/aboutus/accessArrangement/Technical_Rules.html)

<sup>26</sup> Refer to step 2.4.1. of the MRCP Market Procedure for further detail, [http://www.imowa.com.au/f711,3258850/PC\\_2012\\_08\\_Final\\_Amended\\_Market\\_Procedure\\_clean\\_.pdf](http://www.imowa.com.au/f711,3258850/PC_2012_08_Final_Amended_Market_Procedure_clean_.pdf)

<sup>27</sup> The connection transmission cost was \$109,821 per MW in last year's review.

150. In its submission to the IMO's draft report: *Maximum Reserve Capacity Price for the 2015/16 Capacity Year*, Perth Energy noted that "transmission network connection costs continue to be unpredictable, depending mainly on the location a new project happens to be, and a significant contributor to the overall level of the MRCP". It would prefer to see a transmission connection cost methodology that reflects the location (and degree of constraint present) of the connection on the network and the type of load to be supplied. Perth Energy considered such a change would see the connection costs charged to those users servicing the market as a whole being 'use of system' charges while those servicing special discrete loads would be charged on more of a user-pays, deeper connection, cost.<sup>28</sup>

The Authority invites comments from stakeholders in regard to the appropriateness of the methodology and process that Western Power must follow in deriving the estimate for the total transmission cost as described in the MRCP Market Procedure and whether any amendments should be considered.

#### 4.4.3 Fixed O&M costs

151. Fixed O&M costs consist of four key components, i.e. fixed generation O&M costs, fixed transmission connection O&M costs, fixed network access charges and annual insurance costs for a power station asset.<sup>29</sup> The MRCP Market Procedure states that:
- the IMO must determine fixed O&M costs for the power station and the associated transmission connection works;
  - fixed O&M costs must include fixed network access charges and an estimate of annual insurance costs as at 1 October in Year 3 of the Reserve Capacity Cycle; and
  - fixed O&M costs shall be converted into an annualised amount.
152. SKM was engaged by the IMO to provide an estimate of the generation fixed O&M costs for a generic power station and the associated transmission connection works for the past seven years.
153. SKM has estimated the total fixed generation O&M costs of the OCGT plant for each five year period of the 30 year operating life of the plant.<sup>30</sup> The IMO takes the cost for the first 15 years and annualises it using the Weighted Average Cost of Capital (**WACC**) which is then escalated forward (using the power station O&M escalation factors). For the 2013 Reserve Capacity Cycle, this has produced an annualised value of \$14,741 per MW per year (in October 2015 dollar terms).
154. The fixed O&M costs for transmission connection works include the switchyard and the transmission line O&M costs. SKM has estimated the total fixed O&M costs for the switchyard and transmission line assets based on recent data from a number of Australian transmission network service providers and the assumption that the assets represent an incremental addition to a large asset base. SKM's approach

<sup>28</sup> [http://www.imowa.com.au/f175.3224359/Perth\\_Energy\\_Submission\\_on\\_Draft\\_MRCP\\_2015-16.pdf](http://www.imowa.com.au/f175.3224359/Perth_Energy_Submission_on_Draft_MRCP_2015-16.pdf)

<sup>29</sup> The MRCP Market Procedure provides for power station asset replacement, business interruption and public and products liability insurance as required under network access arrangements with Western Power.

<sup>30</sup> See Table 3-2 of the SKM report *Review of the Maximum Reserve Capacity Price 2013*.  
[http://www.imowa.com.au/f175.3224117/WP04558-OSR-RP-0001\\_Rev\\_3\\_2013\\_IMO\\_MRCP\\_Report.pdf](http://www.imowa.com.au/f175.3224117/WP04558-OSR-RP-0001_Rev_3_2013_IMO_MRCP_Report.pdf)

assumes the average life of the 330kV switchyard is 50 years and the average life for the 330kV transmission line is 60 years and provided the cumulative annualised fixed O&M costs for these assets in five-yearly periods over the lifetime of these assets. The IMO calculates the annuity by taking the first 15 years of the O&M costs provided by SKM and escalates these costs forward (using the connection asset O&M escalation factor). For the 2013 Reserve Capacity Cycle, this has provided an annualised value of \$425 per MW per year (in October 2015 dollar terms).

155. The fixed network access charge has been calculated based on Western Power's most recent published Price List. For the 2013 Reserve Capacity Cycle, this charge is escalated to 1 October 2015 using the Consumer Price Index (CPI) in accordance with the MRCP Market Procedure, providing an annualised value of \$13,687 per MW per year.
156. For assessing the insurance costs for the power station assets, the IMO has taken the approach of engaging and seeking advice from insurance brokers, on a confidential basis, with regard to the insurance premium as a percentage of the limit of liability. The limit of liability has been determined as the sum of the capital construction cost, value of fuel, the potential refund liability during the period of reconstruction, and an allowance to meet the cost of an annual insurance survey. For the 2013 Reserve Capacity Cycle, this provided an annualised value of \$5,386 per MW per year (in October 2015 dollar terms).
157. The Authority is aware of the difficulty experienced by the IMO in finding a reputable insurance company that is willing to provide an estimate of the insurance costs in a report that the IMO can publish. The insurance companies/brokers contacted by the IMO all preferred to remain anonymous as they do not want to harm their competitive position. Engineering contractors are also not willing to share their insurance estimates publicly and there is no central insurance industry body to provide such information.

The Authority invites comments from stakeholders in regard to the appropriateness of the components included in the fixed O&M costs, the methods applied for deriving each of the cost components and whether any amendments should be considered.

#### 4.4.4 Fixed fuel cost

158. The MRCP Market Procedure states that the IMO must engage a consultant to determine an estimate of the costs for the liquid fuel storage and handling facilities of the generic power station. The costs should be those associated with a fuel tank of 1,000 tonne capacity, facilities to receive fuel from road tankers and all associated pipe work, pumping and control equipment.
159. The IMO previously engaged GHD Pty Ltd for the work and changed to SKM for the 2013 Reserve Capacity Cycle. SKM developed its estimate based on its recent project experience in WA and delivered an estimate of \$7.069 million (in April 2015 dollar terms), which represented a 122 per cent increase compared to the previous year. It was noted that the main driver of this increase was the inclusion of civil and structural costs<sup>31</sup> in SKM's estimate, which was not included previously. SKM based

<sup>31</sup> Civil and structural works include: (a) fuel oil road tanker unloading and oil spill containment area; (b) bulk fuel oil storage tank foundations and concrete containment bund area; (c) fuel unloading and forwarding

its estimate on a review of previous projects which included fixed fuel systems and allowed for bund<sup>32</sup> forming complexity and sealing, the costs associated with which are higher than the costs associated with the installation of a simple ground slab due to the nature of the bund, which has equipment foundations, walls and other complex footings. This estimate by SKM was accepted by the IMO and the Authority for the determination of the MRCP for the 2015/16 Capacity Year.

The Authority invites comments from stakeholders in regard to the appropriateness of including the fixed fuel costs in setting the MRCP and the approach applied by SKM as the consultant engaged by the IMO.

#### 4.4.5 Land costs

160. The MRCP Market Procedure states that the IMO must retain Landgate under a consultancy agreement to provide valuations on parcels of industrial land in regions within the SWIS where generation projects are most likely to be proposed.
161. The MRCP Market Procedure requires that the IMO provide an indication as to the size of land required, which should be limited to: a three hectare 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; and the summation of multiple smaller parcels of land as appropriate to meet these requirements.
162. The Authority is aware of the practice that Landgate employs in providing its estimate of the cost of each land parcel, and the IMO then adds the applicable stamp duty to each land parcel cost. The Authority notes that the inclusion of the stamp duty is not explicitly specified in the MRCP Market Procedure but considers that it is appropriate to include the stamp duty as part of the land costs calculation.

The Authority invites comments from stakeholders in regard to the appropriateness of the current method for deriving the land costs and whether the inclusion of the stamp duty should be explicitly stated in the MRCP Market Procedure.

#### 4.4.6 Legal, financing, approvals, contingencies and other costs (margin M)

163. The MRCP Market Procedure provides an allowance for legal costs, financing costs, insurance costs, approval costs, contingency costs and other costs reasonably incurred in the design and management of the power station construction. This allowance is referred to as margin M.
164. The IMO has engaged SKM to provide an estimate of margin M for each of the Reserve Capacity Cycles over the last five years. SKM's approach to estimating the cost components is based on its in-house data and knowledge of comparable developments, excluding any abnormal costs that may be particular to individual projects. For the 2013 Reserve Capacity Cycle, SKM proposed a value for margin

pump area foundations and spill containment area; (d) weather protection canopies or similar structures; and (e) miscellaneous equipment and piping supports and structures.

<sup>32</sup> The bund describes the overall fixed fuel oil unloading, storage and processing facility's oil spillage and equipment failure containment compounds and structures, including the main above ground storage tank compound.

M of 18.87 per cent which was accepted by the IMO and the Authority for the determination of the MRCP for the 2015/16 Capacity Year.

The Authority invites comments from stakeholders in regard to the appropriateness of the cost components covered under the margin M parameter and the approach adopted by SKM in deriving its estimate.

#### 4.4.7 *Weighted average cost of capital (WACC)*

165. The MRCP Market Procedure states that the IMO must determine the cost of capital (i.e. WACC) to be applied to various cost components of the MRCP. This cost of capital must be appropriate for the generic power station project that is considered.
166. The WACC is applied directly in the annualisation process used to convert the generic power station project capital cost into an annualised capital cost, and to account for the cost of capital in the time period between when capital is raised and when the payment stream is expected to be realised (i.e. six months between 1 April to 1 October included in the CAPCOST formula in step 2.10.1).
167. The WACC parameters have been classified into two categories in the MRCP Market Procedure, i.e. the annual components and the five-yearly components. In determining the WACC, the IMO must review and determine values for the annual components; and may review and determine values for the five-yearly components that differ from those in step 2.9.8 of the procedure if, in the IMO's opinion, a significant economic event has occurred since undertaking the last five-yearly review of the MRCP in accordance with clause 4.16.9 of the Market Rules.
168. The MRCP Market Procedure requires that the IMO compute the WACC on the basis of:
- the Capital Asset Pricing Model (CAPM) for calculating the return to equity;
  - the defined formulae for calculating the pre-tax real Officer WACC.
169. Step 2.11.2 of the MRCP Market Procedure provides that, in conducting the annual review of the WACC, where the IMO considers that any of the comparator companies used in the most recent five-yearly review are no longer available or that their characteristics have significantly changed, the IMO may select a different set of comparator companies for determination of relevant WACC parameters, applying the following criteria:
- the company must be a power generator, energy transmitter or distributor;
  - market capitalisation must be more than \$200 million in Australian dollars; and
  - the company must be listed on Bloomberg.
170. The Authority is aware of the view expressed by Perth Energy in its submission to the IMO's draft report for the Maximum Reserve Capacity Price for the 2015/16 Capacity Year that, whilst the CAPM is a widely accepted model for determining benchmark rates of return for both commercial and regulatory purposes and provides a reasoned transparent approach, its use requires commercial judgment to determine a number of critical parameters, and it is by no means an exclusive means of determining returns. This method can be complemented and corroborated by comparisons and financial analysis such as financability testing.

171. The Authority is also aware of the views expressed by some stakeholders in relation to the lack of clarity of the definition of a “significant economic event” based on which the IMO will decide to review and determine values for the five-yearly components of the WACC under the MRCP Market Procedure.
172. The Authority notes that, under the Australian Energy Market Commission's recent changes to the National Gas Rules, the Authority is required to produce Rate of Return (**RoR**) guidelines at least every three years. The new rules require that the RoR guidelines set out the methodologies, estimation methods, financial models, market data and other evidence that the Authority proposes to take into account in estimating the return on equity, the return on debt and the value of imputation credits. The Authority started this process last year and published a Consultation Paper on 21 December 2012. The Authority's first RoR guidelines will be finalised and published by 29 November 2013.
173. Whilst the underlying principles for determining the WACC may remain the same, the Authority recognises there may be differences in risk profiles between regulated assets (i.e. gas network and electricity network) and electricity generation assets. This difference will have implications for forming the benchmark portfolio for estimating some of the WACC parameters. There may be also differences in the time periods over which some of the parameters are determined. Regulatory decisions often cover a period of five years. Hence the RoR is also often determined using five year period data. On the other hand, the application of the WACC for the MRCP is primarily to annualise the relevant cost components over a period of 15 years.

The Authority seeks views from stakeholders in respect of the appropriateness of the provision under step 2.11.2 of the MRCP Market Procedure that provides the IMO's discretion during the annual review of the WACC to change the five-yearly parameters based on a selection of a different set of comparator companies for the determination of relevant WACC parameters and the criteria to be applied for the selection. The Authority also seeks views on the use of the CAPM for the estimation of the cost of capital and whether any amendments should be considered.

#### 4.4.7.1 *Nominal risk free rate of return*

174. Nominal risk free rate of return ( $R_f$ ) is a key input parameter to the estimation of return on equity and return on debt in the computation of the WACC. This parameter is classified as an annual component in the MRCP Market Procedure. Pursuant to step 2.9.7 of the MRCP Market Procedure, this rate is determined based on a moving average of the annualised yield on Commonwealth Government bonds with a maturity of 10 years:
- using the indicative mid rates published by the Reserve Bank of Australia; and
  - averaged over a 20-trading day period.
175. Step 2.9.7(i) of the MRCP Market Procedure provides that, if there are no Commonwealth Government bonds with a maturity of 10 years on any day in the 20-trading day period, 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. In the case this method of interpolating cannot be applied, the IMO may determine the nominal risk free rate by means of an appropriate approximation under step 2.9.7(j).



176. There are three key components involved in the determination of the nominal risk free rate of return: (a) the choice of proxy for the “risk free” assets, (b) the term to maturity, and (c) the averaging period.
177. The Authority notes that Commonwealth Government bonds are generally accepted as a proxy for risk free assets among regulators in Australia.
178. The Authority is aware that different terms to maturity have been applied by regulators. Some regulators use a 10 year term to maturity whereas others use a 5 year term to maturity.
179. The Authority notes that Australian economic regulators have to date adopted an averaging period of 10 to 40 trading days just prior to the release of the regulatory decisions. The Authority has used a 20 trading day average just prior to the release of the regulatory decisions and considers this is the best proxy for the forward looking estimate of the risk free rate for the subsequent regulatory period of five years.
180. The Authority is aware of the suggestion made by some stakeholders that a long-term average sampling period of 5 years or so for the risk free rate is more appropriate than the 20 trading day average.

The Authority seeks views from stakeholders in respect to the appropriateness of the method for determining the nominal risk free rate of return and whether any amendments should be considered.

#### 4.4.7.2 *Expected inflation*

181. Expected inflation (i) is classified as an annual component in the MRCP Market Procedure. It is the forecast average rate of inflation for the 10 year period from the date of the determination of the WACC. Step 2.9.7(k) of the MRCP Market Procedure requires that, in establishing the expected inflation, the IMO must have regard to the forecasts of the Reserve Bank of Australia and, beyond the period of any such forecast, the mid-point of the Reserve Bank’s target range of inflation.

The Authority seeks views from stakeholders in respect of the appropriateness of the method for determining the expected inflation and whether any amendments should be considered.

#### 4.4.7.3 *Corporate tax rate*

182. Corporate tax rate (t) is classified as an annual component in the MRCP Market Procedure. It is defined as the benchmark rate of corporate income taxation, established at either an estimated effective rate or a value of the statutory taxation rate.
183. The Authority notes that a corporate tax rate of 30 per cent has been used in the calculation of the WACC for setting the MRCP over the last three years.

The Authority seeks views from stakeholders in respect of the appropriateness of the method for determining the corporate tax rate and whether any amendments should be considered.

#### 4.4.7.4 Debt risk premium

184. Debt risk premium (DRP) is a parameter for calculating the return on debt. It is also referred to as the debt margin, i.e. a margin above the risk free rate of return that reflects the risk in providing the debt finance. DRP is classified as an annual component in the MRCP Market Procedure.
185. The MRCP Market Procedure provides that, in determining the WACC, the IMO must determine the methodology to estimate the DRP which, in the opinion of the IMO, is consistent with current Australian accepted regulatory practice. For the 2014/15 MRCP the DRP was determined from the seven-year Bloomberg BBB fair value curve, extrapolated to ten years using the difference between the AAA seven-year and ten-year fair value curves. In June 2012 the Australian Competition Tribunal upheld the 'bond-yield approach' methodology developed by the Authority. Consequently, the IMO considers that the Authority's 'bond-yield approach' now represents current accepted regulatory practice in Australia, and PwC has applied this approach in determining the DRP. In the IMO's final report on the MRCP for the 2015/16 Capacity Year, it calculated the DRP from BBB rated bonds only with a term to maturity of at least two years.
186. The Authority adopted its 'bond-yield approach' in deriving the debt risk premium, following the Final Decision on Western Australian Gas Network (now known as ATCO) in 2011. The fundamental principle of the 'bond-yield approach' is to form the benchmark sample based on selected Australian corporate bonds, which satisfy a set of unbiased selection criteria. The observed yields of the bonds included in the benchmark sample are used as the basis for the estimate of the debt risk premium for regulated businesses.<sup>33</sup>

The Authority seeks views from stakeholders in respect of the appropriateness of the method applied by the IMO in estimating the DPR and whether any amendments should be considered.

#### 4.4.7.5 Market risk premium

187. The market risk premium (MRP) measures the average expected return of the market in excess of the risk free rate that is required by investors in return for their investment. This parameter is classified as a five-yearly component with a prescribed value of 6 per cent in the MRCP Market Procedure.
188. The Authority is aware of the various methods applied by regulators in Australia and overseas in estimating this parameter. However, the Authority has adopted a market risk premium of 6 per cent in its recent decisions as a long term forward looking estimate.
189. The Authority has noted that while the risk free rate has been at a relatively low level over the last two years, the market risk premium has been kept unchanged at 6 per cent in regulatory decisions over the period.
190. The Authority is aware of the view expressed by some stakeholders that there is a negative relationship between the risk free rate of return and the market risk

<sup>33</sup> Economic Regulation Authority 2011, *Final Decision on WA Gas Networks Pty Ltd Proposed Revised Access Arrangement for the Mid-West and South-West Gas Distribution Systems*, February, pp. 78-79.

premium, and that the market risk premium must be revised upwards to compensate for a decrease in the estimated risk free rate.

The Authority seeks views from stakeholders in respect of the appropriateness of classifying the market risk premium as a five-yearly component with a prescribed value of 6 per cent in the MRCP Market procedure, and whether any amendments should be considered.

#### 4.4.7.6 Asset beta and Equity beta

191. The asset beta parameter ( $\beta_a$ ) is classified as a five-yearly component with a prescribed value of 0.5 in the MRCP Market Procedure.
192. It appears that the asset beta is not explicitly used in the calculation of the WACC but it has an implicit interrelationship with equity beta.<sup>34</sup>
193. The equity beta parameter ( $\beta_e$ ) is classified as a five-yearly component with a prescribed value of 0.83 in the MRCP Market Procedure.
194. Equity beta is a parameter for the calculation of the return on equity. The MRCP Market Procedure requires that the return on equity is calculated using the CAPM (i.e. the risk free rate plus the product of the equity beta and the market risk premium).<sup>35</sup>
195. The Authority's method for estimating the equity beta follows the work by Professor Henry from the University of Melbourne for the AER.<sup>36</sup>
196. In its submission to the IMO draft report for the Maximum Reserve Capacity Price for the 2015/16 Capacity Year, Perth Energy raised its concern that the IMO relied on and narrowly referred to, precedents and parameters set by regulators of monopoly businesses in applying the CAPM approach to determining the WACC for the MRCP. Perth Energy considered generation businesses may share some risks by virtue of participating in the same market as network assets, but it is not reasonable or realistic to assume that the risks are identical. Perth Energy stated that the IMO's approach appeared to have resulted in a material misstatement of, and internally inconsistent, WACC parameters. In particular, Perth Energy noted that members of certain pairs of WACC parameters are interrelated, however, the IMO's approach updates one member of a pair and holds the other unchanged, e.g. the risk free rate is updated annually and the market risk premium is only reviewed every five years; the debt risk premium is updated annually and debt issuance costs are reviewed every five years. Perth Energy also pointed out that the IMO focused heavily on the WACC parameters, but not on the resulting WACC and suggested that the resulting WACC should be calibrated against expectations of industry norms and the objectives of the pricing regime, to help check and test that all the parameters are appropriate.

<sup>34</sup> Henry, O. 2009, Estimating Beta; advice submitted to the ACCC, 23 April 2009, p.9.

<sup>35</sup> Step 2.9.7 of the MRCP Market Procedure. See [http://www.imowa.com.au/f711,3258850/PC\\_2012\\_08\\_Final\\_Amended\\_Market\\_Procedure\\_clean.pdf](http://www.imowa.com.au/f711,3258850/PC_2012_08_Final_Amended_Market_Procedure_clean.pdf)

<sup>36</sup> Henry Olan, 2009, Estimating Beta, *Advice Submitted to the Australian Competition and Consumer Commission*.

The Authority seeks views from stakeholders in respect to the appropriateness of classifying the asset beta parameter as a five-yearly component with a prescribed value of 0.5 in the MRCP Market procedure and whether any amendments should be considered. The Authority also seeks views from stakeholders in respect of the appropriateness of classifying the equity beta parameter as a five-yearly component, with a prescribed value of 0.83 in the MRCP Market procedure, and whether any amendments should be considered.

#### 4.4.7.7 Debt issuance costs

197. The debt issuance costs (d) are provided for as a prescribed percentage value of 0.125 per cent, which is classified as a five-yearly component in the MRCP Market Procedure. This parameter forms part of the debt margin (i.e. the sum of the debt risk premium and debt issuance costs) in calculating the nominal return on debt.
198. The debt issuance costs may include underwriting fees, legal fees, company credit rating fees and any other costs incurred in raising debt finance. Regulators across Australia have typically set the provision at 0.125 per cent based on the benchmark study undertaken by the Allen Consulting Group for the Australian Competition and Consumer Commission in 2004.

The Authority seeks views from stakeholders as to the appropriateness of the approach for setting the debt issuance costs as a percentage value of 0.125 per cent and as a five-yearly component in the MRCP Market Procedure, and whether any amendments should be considered.

#### 4.4.7.8 Franking credit value

199. The value for franking credit ( $\gamma$ ) is a prescribed value and is classified as a five-yearly component in the MRCP Market Procedure. During the process for determining the MRCP value for the 2015/16 Capacity Year, in November 2012, the IMO submitted a Procedure Change Proposal (PC\_2012\_08) and proposed to amend the franking credit value used in the calculation of the WACC from 0.5 to 0.25. The IMO noted its reason for this change was to align with recent Australian regulatory practice as both the Australian Energy Regulator and the Authority have regularly applied a franking credit value of 0.25 in regulatory decisions. This Procedure Change Proposal went through and became effective on 15 January 2013 for the finalisation of the proposed value for the MRCP, for the 2015/16 Capacity Year.
200. In its decision paper on the approval of the MRCP value proposed by the IMO for the 2015/16 Capacity Year, the Authority noted its concerns over the manner in which the IMO changed the franking credit value in the MRCP Market Procedure.<sup>37</sup> The Authority expressed its view that the franking credit value should be reviewed as part of the IMO's five-yearly review of the MRCP Market Procedure.
201. The MRCP Market Procedure states that in determining the WACC, the IMO must review and determine values for the annual components; and may review and

<sup>37</sup> Economic Regulation Authority, 2013, *Decision on the Maximum Reserve Capacity Price proposed by the Independent Market Operator for the 2015/16 Capacity Year*, <http://www.erawa.com.au/cproot/11117/2/20130130%20-%20Decision%20on%20the%20Maximum%20Reserve%20Capacity%20Price%20proposed%20by%20the%20Independent%20Market%20Operator%20for%20the%202015-16%20Capacity%20Year.pdf>

determine values for the 5-yearly components that differ from those in step 2.9.8 of the MRCP Market Procedure if, in the IMO's opinion, a significant economic event has occurred since undertaking the last 5-yearly review of the MRCP in accordance with clause 4.16.9 of the Market Rules. The Authority was concerned that rather than changing a five-yearly component according to the requirements outlined in the MRCP Market Procedure, the IMO changed a five-yearly component through a Procedure Change Proposal. This is not consistent with providing continued confidence to investors that a five-yearly component will not change unless a significant economic event has occurred.

202. The Authority is required by the new National Gas Rules to set out its approach to estimating the value of imputation credits. In its Consultation Paper: *Guidelines for the Rate of Return for Gas Transmission and Distribution*, the Authority noted the varying approach applied by Australian regulators and the need to revisit the issue. In particular, the Authority noted the estimation of theta, using the dividend drop-off technique, had attracted considerable debate among parties involved for an extensive period of time and the results varied significant from study to study.

The Authority invites comments from stakeholders in respect of the appropriateness of the approach in classifying the gamma parameter as a five-yearly component and setting the prescribed value at 0.25 in the MRCP Market Procedure.

#### 4.4.7.9 Debt to total assets ratio and equity to total assets ratio

203. The debt to total assets ratio (D/V) and the equity to total assets ratio (E/V) are classified as five-yearly components with prescribed values of 40 per cent and 60 per cent, respectively, in the MRCP Market Procedure. In its 2012 decision on the approval of the MRCP value for the 2014/15 Capacity Year, the Authority noted that a debt to total asset ratio of 60 per cent is widely used in regulation. The ratio of 40 per cent debt to total asset ratio specified in the MRCP Market Procedure is inconsistent with common regulatory practices.<sup>38</sup>
204. The Authority notes that the relative proportion of debt and equity that a firm decides to have constitute its capital structure. Choices of capital structure differ across industries, as well as for different companies within the same industry. An optimal debt-equity ratio would minimise the overall cost of capital. However, the actual optimal value of debt and equity for any given firm is likely to be dynamic and dependent on a number of business specific factors. It is expected that firms will move towards this optimal debt-equity ratio in the long run.
205. The debt-equity ratio also influences the (unlevered) asset beta and the (levered) equity beta. This process allows for the equity beta to be determined on a basis that is consistent with the assumed debt-equity ratio of the benchmark efficient firm. In addition, the debt-equity ratio is also a factor in determining the credit rating of the benchmark firm for the purpose of determining the debt risk premium (DRP).
206. In its submission to the IMO's draft report for the Maximum Reserve Capacity Price for the 2015/16 Capacity Year, Perth Energy noted that a gearing of 40 per cent debt is more consistent with the typical structures of generation businesses and its

<sup>38</sup> Economic Regulation Authority, 2012, *Decision on the Maximum Reserve Capacity Price proposed by the Independent Market Operator for the 2014/15 Reserve Capacity Year*, <http://www.erawa.com.au/cproot/10258/2/20120227%20Decision%20on%20the%20MRCP%20proposed%20by%20the%20IMO%20for%20the%202014-15%20Reserve%20Capacity%20Year.pdf>

own research into listed Australian generators (Energy Developments Ltd, Energy World Corp Ltd and Pacific Energy Ltd) identified an average debt of 27 per cent and 28 per cent for two year average and five year average observations.

The Authority invites comments from stakeholders in respect of the appropriateness of the approach in classifying the debt to total assets ratio (D/V) and the equity to total assets ratio (E/V) as five-yearly components and setting the prescribed value at 40 per cent and 60 per cent, respectively, in the MRCP Market Procedure.