Independent Market Operator

Final Rule Change Report: Energy Price Limits Methodology and Consultation Process

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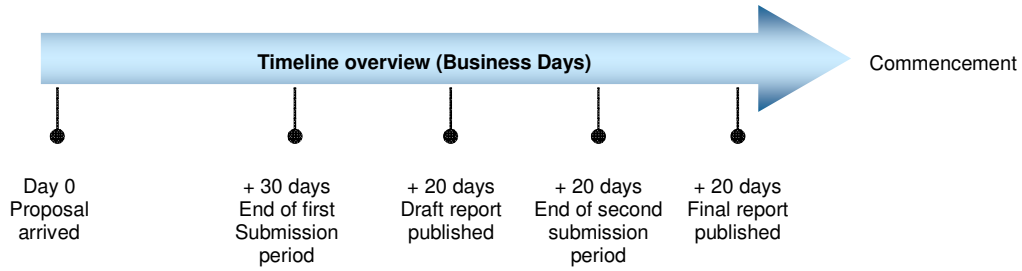
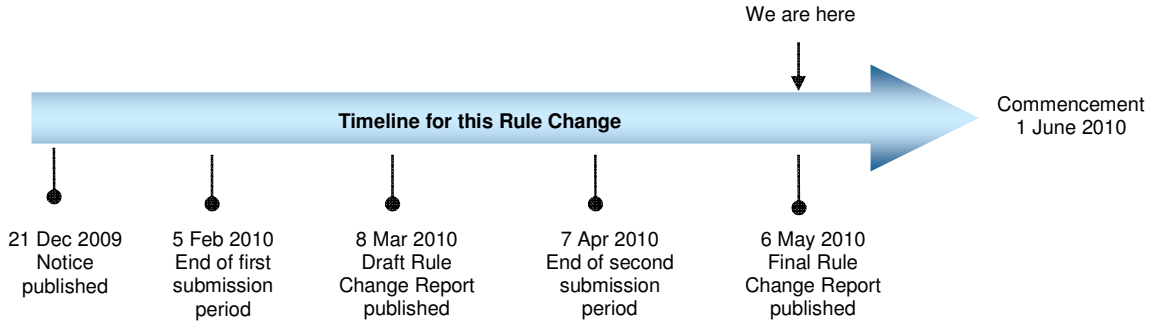
1. INTRODUCTION

On 21 December 2009 the Independent Market Operator (IMO) submitted a Rule Change Proposal regarding the amendment of clauses 6.20.7, 6.20.9, 6.20.10 and the proposed new clause 6.20.9A of the Wholesale Electricity Market Rules (Market Rules).

The proposal was processed using the Standard Rule Change Process, described in section 2.7 of the Market Rules. The standard process adheres to the following timelines:



The key dates in processing this Rule Change Proposal are:



The IMO's final decision is to accept the Rule Change Proposal in a modified form. The detailed reasons for the IMO's decision are set out in section 7 of this report.

In making its final decision on the Rule Change Proposal, the IMO has taken into account:

- the Wholesale Market Objectives;
- the practicality and cost of implementing the proposal;
- the views of the Market Advisory Committee (MAC); and
- the submissions received.

All documents related to this Rule Change Proposal can be found on the IMO website: http://www.imowa.com.au/RC_2009_35

2. THE RULE CHANGE PROPOSAL

2.1 Submission Details

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Date submitted:	21 December 2009
Urgency:	Standard Rule Change Process
Change Proposal title:	Energy Price Limits Methodology and Consultation Process
Market Rules affected:	6.20.7, 6.20.9, 6.20.10 and new clause 6.20.9A

2.2 Summary Details of the Proposal

Background

The IMO's Rule Change Proposal sought to amend the Market Rules to:

- replace "Profit Margin" with "Risk Margin"[1]. This is to allow for the uncertainty faced by the IMO in setting the price limits to be accurately reflected when annually reviewing its appropriateness (clause 6.20.7);
- clarify that the IMO will publish draft reports and seek public consultation only when undertaking the annual review required under clause 6.20.6 (clause 6.20.9); and
- allow for a second consultation period, if required, after submissions have been received on the draft report (new clause 6.20.9A and 6.20.10).

Full details of the Rule Change Proposal are available in Appendix 1 of this report.

2.3 The Proposal and the Wholesale Market Objectives

The IMO's assessment of the proposed changes against the Wholesale Market Objectives was as follows:

a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;

The IMO submitted that the proposed Amending Rules will better achieve Wholesale Market Objective (a) by transparently reflecting the current approach to calculating the price limits in the Market Rules. The IMO considered that by embedding current accepted practices into the Market Rules a more transparent and efficient approach to undertaking the review will result. This is because interested parties will no longer need to refer to the draft and final reports to understand the approach adopted in undertaking the review.

[1] Where Risk Margin refers to the margin between the price cap and the expected highest short run cost generating works in the South West interconnected system (SWIS)

The IMO considered that the proposed Amending Rules were consistent with the remaining Wholesale Market Objectives.

2.4 The Amending Rules Proposed by the IMO

The amendments to the Market Rules originally proposed by the IMO are available in the Rule Change Notice and presented in Appendix 2 of this report.

2.5 The IMO's Initial Assessment of the Proposal

The IMO decided to proceed with the proposal on the basis of its preliminary assessment, which indicated that the proposal was consistent with the Wholesale Market Objectives.

3. FIRST SUBMISSION PERIOD

The first submission period for this Rule Change Proposal was between 22 December 2009 and 5 February 2010.

3.1 Submissions received

The IMO received submissions from Landfill Gas & Power (LGP) and Perth Energy. The details of the submissions are summarised below, additional details along with the IMO's response are contained in Appendix 3 of this report. The full text of all submissions is available on the IMO website.

3.1.1 Submission from Landfill Gas & Power

LGP supported the Rule Change Proposal on the grounds that it harmonises the underlying philosophy and practice of the process without changing the substance of the outcome.

LGP noted that Short Term Energy Market (STEM) and Balancing prices now rarely attain the maximum value, in which case the LGP considered that the revised approach outlined in the Amending Rules would be of only academic consequence.

Wholesale Market Objectives

LGP supported the IMO's contention that the proposal enhances Wholesale Market Objective (a) by transparently reflecting the current practice in the Market Rules. LGP considered that the proposal was consistent with the other Wholesale Market Objectives.

3.1.2 Submission from Perth Energy

Perth Energy was of the view that price limits are not a natural part of any well functioning, competitive market. Perth Energy therefore supported measures which act to improve competition in the Wholesale Electricity Market (WEM) to the point where it is no longer necessary to limit prices.

Perth Energy made a number of comments regarding the Rule Change Proposal. These related to the:

- perceived conflict between the short run marginal cost (SRMC) bidding principle and the inclusion of a Profit Margin when calculating the price limits;

- approach adopted to calculate the Risk Margin, including the applicable statistical percentiles; and
- use of short run average cost (SRAC).

Perth Energy supported the IMO's proposal to allow for additional consultation on the price limits when the IMO considers it necessary.

Further details of Perth Energy's comments and the IMO's response are contained in the table in Appendix 3 of this report.

Wholesale Market Objectives

Perth Energy was concerned that the marginal generator in the SWIS will not in all instances be compensated for its marginal cost when called to generate. Perth Energy considered that this is a matter of interest to financiers of new generators and over time this may lead to a lessening of competition in the WEM. Perth Energy considered that this would be detrimental to Wholesale Market Objectives (a) and (b).

3.2 The IMO's assessment of First Submission period responses

The IMO received one submission in favour of the Rule Change Proposal during the first submission period.

Perth Energy raised some more fundamental issues regarding the use of price limits, in particular noting that price limits are not a natural part of any well functioning competitive market. Perth Energy supported the IMO's proposal to allow for additional consultation on the price limits when the IMO considers it necessary.

The IMO responded to each of the issues raised in the first submission period in the Draft Rule Change Report. For further details please refer to the Draft Rule change Report on the IMO website.

Update on the IMO's response to Perth Energy's query whether clause 6.20.7(b)i should be referring to SRMC:

In its response to Perth Energy's query over the SRAC reference, the IMO noted in the Draft Rule Change Report that short run marginal cost (SRMC) is not defined in the Market Rules, but rather a document prepared by the Economic Regulation Authority (ERA) outlines the costs which can be included in determining SRMC. The IMO noted in the Draft Rule Change Report that it was in discussion with the ERA on whether the development of a similar document addressing SRAC might be appropriate. The ERA has advised the IMO that it considers that defining SRAC in the Market Rules is not necessary, as it considers the meaning is sufficiently defined in the term itself.

3.3 Public Forums and Workshops

No public forums or workshops were held in relation to this Rule Change Proposal.

3.4 Additional Amendments

Following the first public submission period the IMO made some changes to the proposed Amending Rules to address some of the issues raised in submissions. The IMO also revised the drafting around the probability percentiles used in the calculation of the Risk Margin to remove the level of detail prescribed. These additional amendments are contained in Appendix 3 of this paper.

4. THE IMO'S DRAFT ASSESSMENT

The IMO's draft assessment, against clauses 2.4.2 and 2.4.3 of the Market Rules, and analysis of the Rule Change Proposal can be viewed in the Draft Rule Change Report (available on the IMO's website).

5. THE IMO'S DRAFT DECISION

Based on the matters set out in the Draft Rule Change Report, the IMO's draft decision, in accordance with clause 2.7.7(f), was to accept the Rule Change Proposal as modified following the first submission period.

The IMO made its decision on the basis that the Amending Rules:

- will allow the Market Rules to better address Wholesale Market Objective (a); and
- are consistent with the remaining Wholesale Market Objectives.

5.1 Addendum to the Draft Rule Change Report

Following the publication of the Draft Rule Change Report, the IMO identified a duplication of process associated with the calculation of the Maximum STEM Price:

- Clause 6.20.2: requires the IMO to complete a CPI based adjustment of the past year's Maximum STEM Price to apply from 1 October of each relevant year.
- Clause 6.20.6: requires the IMO to annually review the appropriateness of the values of the Energy Price Limits (which includes the Maximum STEM Price) and may propose a revised value. The Market Rules do not specifically define a completion date for the annual review.

Once the annual review process (under clause 6.20.6) has been completed the value is approved by the ERA. Following this approval the previous Energy Price Limit is revised. The commencement date for the revised values resulting from the past two annual reviews has coincided with the applicable date for the commencement of the CPI adjusted value (1 October). This means that the annual review has simply superseded the CPI adjusted value immediately.

To avoid the duplication of process, the IMO proposed to remove the requirement to adjust the Maximum STEM Price for CPI changes contained in clause 6.20.2. To this end, the IMO issued an addendum to the Draft Rule Change Report on 15 March 2010, proposing an additional change to the Amending Rules.

In the addendum, the IMO acknowledged that, because the information was not contained in the Draft Rule Change Report, the addendum had no formal standing.

However, the IMO invited Rule Participants to make submissions on the Draft Rule Change Report as previously notified, and if considered appropriate the IMO invited Rule Participants to specifically submit on the information contained in the addendum during the second consultation period.

The IMO proposed to remove clause 6.20.2 in its entirety. For additional detail, please see the addendum published on the IMO's website.

6. SECOND SUBMISSION PERIOD

Following the publication of the Draft Rule Change Report on the IMO website, the second submission period was between 9 March 2010 and 7 April 2010.

6.1 Submissions received

The IMO received submissions from LGP and ERM Power. These submissions are summarised below with the full submissions available on the IMO website.

6.1.1 Submission from Landfill Gas & Power

LGP supports the IMO's draft decision to proceed with the Rule Changes as modified after the first round of consultation.

LGP queries whether there is a unique marginal loss factor for a 40 MW open cycle gas turbine generating station relative to the Reference Node (as outlined in clause 6.20.7(b)(v)). LGP notes that loss factors are location dependent and, in the spirit of assessing a maximum price, suggests using the highest loss factor relevant to an established generator.

6.1.2 Submission from ERM Power

ERM Power notes the changes to the proposed Amending Rules to reduce the level of detail prescribed for the calculation of Risk Margins. ERM Power considers that the original Rule Change Proposal was continuing a market failure whereby a generator can be compelled to operate at a loss. In the context of the WEM design, including the existing obligation to bid or offer at SRMC, ERM Power considers there is no need to constrain the price to the point where a peaking generator can lose money 10 to 20 percent of the time.

ERM Power notes that the STEM does not allow Market Generators to specify minimum generation, ramp rates and start costs. ERM Power considers that this creates the potential for events of lengthy dispatch at below minimum generation and multiple starts for short duration runs. The commercial consequences of these events include Capacity Cost Refunds, application of a Downward Deviation Administered Price (DDAP) and unrecoverable start costs.

ERM Power considers that the STEM encourages Market Generators with peaking units to avoid uneconomic dispatch by offering at the Maximum STEM Price. ERM Power considers that the balancing mechanism of dispatch via System Management makes provision for minimum generation and ramp rates and currently allows peaking units to make energy available at efficient pricing.

ERM Power supports the removal of the specific reference to the approach adopted in calculating the Risk Margin, but is concerned that the IMO may adopt this approach when carrying out the annual review. ERM Power asserts that the practical limitations of

the STEM and the application of Capacity Cost Refunds and DDAP should be included in the calculation of the Risk Margin.

ERM Power states that during the Varanus Island incident large volumes of gas were traded at $20/GJ. ERM Power considers that during this period the marginal cost of operating a 40MW gas fired peaking plant would have exceeded the Maximum STEM Price, which was based on a gas price of $8/GJ.

ERM Power considers that the amended Rule Change Proposal appears to be reasonable, on the basis that it has changed the Profit Margin to a Risk Margin, and has added the requirement for the draft report to include detail on how the IMO has determined the appropriate values. ERM Power, however, maintains that any further modifications of the Market Rules associated with the functioning of the STEM should be made only in the light of a clear understanding of the practical limitations of the current STEM design.

6.2 The IMO's assessment of the Second Submission period responses

The IMO received two submissions during the second submission period. Both submissions supported the Rule Change Proposal, albeit with some noted concerns and further suggestions.

The IMO's response to each of the issues identified during the second submission period is presented in the table over the page.

Clause	Submitter	Comment/Change Requested	IMO's response
6.20.7(b)(v)	LGP	LGP notes that loss factors are location dependent and suggests using the highest figure applicable to an established generator.	The review methodology applies a formula (clause 6.20.7(b)) to existing generating works in the SWIS, in order to identify which is the "highest cost generating works" in accordance with clause 6.20.7(a). In previous reviews McLennan Magasanik Associates (MMA) has used, for each calculation, the loss factor applicable to the specific unit under consideration. The proposed Amending Rules (as presented in section 9.2 of this report) require details of how the IMO has arrived at an appropriate value for the Loss Factor be presented in the draft report and subject to industry consultation. This will ensure transparency of this calculation and any underlying assumptions.
6.20.7(b)	ERM Power	In the context of the WEM design, including the existing obligation to bid or offer at SRMC, there is no need to constrain the price to the point where a peaking generator can lose money 10 to 20 percent of the time.	To be effective, the price limits must be low enough to mitigate market power and high enough to ensure that new entrant peaking plants are not discouraged. As noted by MMA in its most recent review, the range of 80-90% is typical of risk margins observed in electricity markets where traders cannot accurately predict future market conditions and yet must strike a fixed price for the purposes on managing uncertainty. The appropriateness of these percentiles will be re-examined in future reviews, to ensure that the price limits remain high enough to encourage new peaking generation.
6.20.7(b)(i)	ERM Power	While supporting the removal of the specific reference to the approach adopted in calculating the Risk Margin, ERM Power is concerned that the IMO may adopt this approach when carrying out the annual review.	The approach and parameters used to calculate Risk Margins will be reconsidered each year during the Energy Price Limit review. The proposed Amending Rules require the chosen approach to be published in the draft report on the Market Web Site and subject to industry consultation.
6.20.7(b)(i)	ERM Power	The practical limitations of the STEM and the application of Capacity Cost Refunds and DDAP should be included in the calculation of the Risk Margin.	The Market Rules require the ERA to review the methodology for setting the Energy Price Limits no later than the fifth anniversary of the first Reserve Capacity Cycle. The review must include an examination of the appropriateness of the parameters and methodology in clause 6.20 for recalculating the Energy Price Limits (clause 2.26.3(g)) and the performance of the Reserve Capacity Auctions, STEM Auctions and Balancing in meeting the Wholesale Market Objectives (clause 2.26.3(h)). The IMO considers the concerns of ERM Power would be best addressed during this review. The IMO will raise these issues with the ERA.
All	ERM Power	Any further modifications of the Market Rules associated with the functioning of the STEM should be made only in the light of a clear understanding of the practical limitations of the current STEM design.	The wider ERA review required under clause 2.26.3 of the Market Rules includes an examination of the performance of STEM Auctions in meeting the Wholesale Market Objectives. In addition, the current STEM design is being considered by Market Rules Design Team (Oates Review) and is also contained in the Market Rules Evolution Plan.

6.3 Additional amendments to the Amending Rules

Following the closure of the second submission period, the IMO made some additional changes to the proposed Amending Rules, to address minor drafting issues.

These changes are as follows (~~deleted text~~, added text):

6.20.2. The Maximum STEM Price is the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.

6.20.7. In conducting the review required by clause 6.20.6 the IMO:

(a) may propose revised values for the following:

i. the Maximum STEM Price, where this 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 is to be calculated using the formula in paragraph (b); and

ii. the Alternative Maximum STEM Price, where this 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 and is to be calculated using the formula in paragraph (b);

...

6.20.9 In conducting the review required by clause 6.20.6 the IMO must prepare a draft report describing how it has arrived at a proposed revised value of an Energy Price Limit. The draft report must also include details of how the IMO determined the appropriate values to apply for the factors described in clause 6.20.~~8~~7 (b)(i) to (v). The IMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users, within six weeks of the date of publication.

7. THE IMO'S FINAL ASSESSMENT

In preparing its Final Rule Change Report, the IMO must assess the Rule Change Proposal in light of clauses 2.4.2 and 2.4.3 of the Market Rules.

Clause 2.4.2 outlines that the IMO "*must not make Amending Rules unless it is satisfied that the Market Rules, as proposed to be amended or replaced, are consistent with the Wholesale Market Objectives*".

Additionally, clause 2.4.3 states, when deciding whether to make Amending Rules, the IMO must have regard to the following:

- Any applicable policy direction from the Minister regarding the development of the market;
- The practicality and cost of implementing the proposal;
- The views expressed in submissions and by the MAC; and

- Any technical studies that the IMO considers necessary to assist in assessing the Rule Change Proposal.

The IMO notes that there has not been any applicable policy direction from the Minister in respect of this Rule Change nor has it commissioned a technical review in respect of this Rule Change Proposal.

The IMO's assessment is outlined in the following sections.

7.1 Market Objectives

The IMO considers that the Market Rules as a whole, if amended, will be consistent with the Wholesale Market Objectives.

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

Further, the IMO considers that the Market Rules if amended would not only be consistent with the Wholesale Market Objectives but also allow the Market Rules to better address Wholesale Market Objective (a):

Impact	**Wholesale Market Objectives**
Allow the Market Rules to better address objective	a
Consistent with objective	b, c, d, e
Inconsistent with objective	-

(a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system

The proposed Amending Rules will better achieve market objective (a) by transparently reflecting the current approach to calculating the price limits in the Market Rules. The IMO considers that by clarifying the parameter definitions in the Market Rules and by enhancing the reporting and consultation requirements a more transparent and efficient approach to undertaking the review will result. In particular, increasing the transparency of the process is expected to result in price limits that are less likely to financially disadvantage Market Generators. The changes to clause 6.20.2 will eliminate an unnecessary step in the review/adjustment of the Maximum STEM Price, improving the efficiency of the overall process.

The IMO considers that the proposed changes are consistent with the remaining Market Objectives.

7.2 Practicality and cost of implementation

Cost:
The proposed changes do not require any change to the Wholesale Electricity Market Systems operated by the IMO or any of the systems operated by System Management. Further, the IMO notes that the proposal will not impact on the cost of annually completing the review as the proposed changes are implementing current practice.

In addition there have been no identified changes to other Rule Participants' compliance costs.

Practicality:
The IMO has not identified any issues with the practicality of implementing the proposed changes.

7.3 Views expressed in submissions

The IMO received submissions from LGP supporting the Rule Change Proposal in both the first and the second submission periods.

The IMO received two other submissions, one from Perth Energy during the first submission period, and the other from ERM Power during the second submission period. Both submissions raised issues about the current design of the STEM, and in particular about the use and determination of price limits. Perth Energy supported the IMO's proposal to allow for additional consultation on the price limits when the IMO considers it necessary. ERM Power considered that the Rule Change Proposal appears to be reasonable, following amendments made in response to issues raised in the first submission period.

The IMO will forward to the ERA any issues that are relevant to its 5 year review of the methodology for setting the Energy Price Limits.

7.4 Views expressed by the Market Advisory Committee

The MAC discussed the proposal at the 9 December 2009, 10 February 2010 and 10 March 2010 meetings. An overview of the MAC discussions is presented below. Further details are available in the MAC meeting minutes available on the IMO website: http://www.imowa.com.au/MAC

December 2009 MAC meeting

The IMO outlined its proposal for MAC members. In response to the proposal LGP queried:

- the reason for using the 80th percentile in the Maximum STEM Price calculation, but the 90th percentile in the Alternative Maximum STEM Price calculation; and
- whether the difference between "may" and "must" in proposed clause 6.20.9A regarding requests for submissions was deliberate.

The IMO responded to these two points after the MAC meeting, as follows:

- Point 1: The proposed changes to the Market Rules to refer to the 80th and 90th percentiles in the Maximum STEM Price and Alternative Maximum STEM Price

calculations, respectively, reflect the probabilities that the assessed cap price values would be higher than any particular random outcome in the market for 40 MW gas turbines. The proposed percentiles to apply for the Maximum and Alternative Maximum STEM prices reflect those adopted by MMA in past reviews. These percentiles were determined based on the IMO's understanding of uncertainty and current market operations. In particular, MMA notes in its Final Report for the 2009 review that a conservative risk margin based on 80th probability provides a risk margin of about 15 percent over the expected level of costs of peaking power from 40 MW gas turbines. Larger gas turbines would not be affected by these considerations because of their lower unit cost structure and typically longer run times.

In the case of the use of distillate (Alternative Maximum STEM Price calculations), the price is adjusted monthly to track changes in distillate prices and therefore the uncertainty only applies to the operating and maintenance costs and the heat rates. During the 2009 review MMA proposed that a 90% probability is suitable for assessing the parameters of the Alternative Maximum STEM Price, however suggested adopting an 80% probability for the liquids price cap for future reviews.
For more details refer to MMA's Final Report:
http://www.imowa.com.au/2009_EPL_Review

The IMO called for submissions on reducing the probability level during the formal public consultation process for the 2009 review. The IMO did not receive any submissions. During the clarification process the IMO did receive a submission from Synergy suggesting that the IMO should review the probability level to apply to the Alternative Maximum STEM Price calculation as part of the overall review process for the 2010/11 Capacity Year. The IMO noted that it has included this in the proposed scope for the 2010 EPL review.

- Point 2: To clarify, the use of the word "may" and "must" in the proposed Amending Rules is to reflect that the IMO may undertake a further consultation period if required and that if the IMO determines to undertake further consultation it must do so with all sectors of the Western Australian energy industry, including end-users. To further clarify this requirement the IMO amended the drafting as follows:

  6.20.9A. Prior to proposing a final revised value to an Energy Price Limit in accordance with clause 6.20.10, the IMO may publish a request for further submissions on the Market Web Site. Where the IMO publishes a request for further submissions in accordance with this clause, it must request submissions from all sectors of the Western Australia energy industry, including end-users.

February 2010 MAC meeting

The MAC noted the Rule Change Proposal at the 10 February 2010 meeting.

March 2010 MAC meeting

The MAC noted the Rule Change Proposal at the 10 March 2010 meeting.

8. THE IMO'S FINAL DECISION

Based on the matters set out in this report, the IMO's final decision, in accordance with clause 2.7.8 (e), is to accept the Rule Change Proposal as modified by the amendments specified in sections 3.4, 5.1 and 6.3 of this report.

8.1 Reasons for the Decision

The IMO has made its decision on the basis that the Amending Rules:

- will allow the Market Rules to better address Wholesale Market Objective (a);
- are consistent with the other Wholesale Market Objectives; and
- had the support of the majority of submissions received in the first and second submission periods.

Additional detail outlining the analysis behind the IMO's decision is outlined in section 7 of this Final Rule Change Report.

9. AMENDING RULES

9.1 Commencement

The amendments to the Market Rules resulting from this Rule Change Proposal will commence at **8.00am** on **1 June 2010**.

9.2 Amending Rules

The IMO's final decision is to amend the Market Rules. The following clauses are amended (~~deleted wording~~, new wording):

6.20.2. The Maximum STEM Price is the value published on the Market Web Site and revised in accordance with clauses 6.20.6 and 6.20.11.~~Subject to clause 6.20.11, the Maximum STEM Price to apply for:~~

~~(a) the Relevant Year commencing on 1 October 2004 is equal to $150/MWh.; and~~

~~(b) for subsequent Relevant Years is the Maximum STEM Price for the preceding Relevant Year multiplied by CPI[x] divided by CPI[x-1], where CPI[x] represents the weighted average of the Consumer Price Index All Groups values for the eight Australian State and Territory capital cities as determined by the Australian Bureau of Statistics for the quarter ending June 30 immediately preceding the start of the Relevant Year and CPI[x-1] represents the corresponding value for the quarter ending the preceding June 30;~~

~~with the exception that from the date and time that a revised Maximum STEM Price takes effect in accordance with clause 6.20.11, that revised value supersedes the current value and is to be the value used as the Maximum STEM Price for the remainder of the Relevant Year in which it takes effect and will be deemed to have applied for the whole of the preceding calendar year when applying paragraph (b) in respect of the following Relevant Year.~~

6.20.7. In conducting the review required by clause 6.20.6 the IMO:

(a) may propose revised values for the following:

i. the Maximum STEM Price, where this 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 is to be calculated using the ~~methodology described~~ formula in paragraph (b); and

ii. the Alternative Maximum STEM Price, where this 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 and is to be calculated using the ~~methodology described~~ formula in paragraph (b);

(b) must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following ~~methodology~~ formula:

(1 + ~~Profit Margin~~ Risk Margin)× (Variable O&M + (Heat Rate × Fuel Cost))/Loss Factor

Where

i. ~~Profit Margin is the allowable profit margin expressed as a fraction~~ Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station, expressed as a fraction;

ii. Variable O&M is the mean variable operating and maintenance cost 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 ~~based on~~ the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station~~'s, heat rate at minimum capacity,~~ 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 ~~the generator~~ a 40 MW open cycle gas turbine generating station relative to the Reference Node.

Where 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.

6.20.9. In conducting the review required by clause 6.20.6 ~~T~~the IMO must prepare a draft report describing how it has arrived at a proposed revised value of an Energy Price Limit. The draft report must also include details of how the IMO determined the appropriate values to apply for the factors described in clause 6.20.7 (b)(i) to (v). The IMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia

energy industry, including end-users, within six weeks of the date of publication.

6.20.9A. Prior to proposing a final revised value to an Energy Price Limit in accordance with clause 6.20.10, the IMO may publish a request for further submissions on the Market Web Site. Where the IMO publishes a request for further submission in accordance with this clause, it must request submissions from all sectors of the Western Australia energy industry, including end-users.

6.20.10 After considering the submissions on the draft report described in clause 6.20.9, and any submissions received under clause 6.20.9A, the IMO must propose a final revised value for any proposed change to an Energy Price Limit and submit those values and its final report, including any submissions received ~~on the draft report~~, to the Economic Regulation Authority for approval.

APPENDIX 1: FULL DETAILS OF THE PROPOSAL

Background

The Energy Price Limits (price limits) constitute a set of limits comprising the Maximum STEM Price, the Alternative Maximum STEM Price and the Minimum STEM Price. Clause 6.20.6 of the Market Rules requires the IMO to annually review the appropriateness of the price limits.

In undertaking an annual review the IMO may propose revised values for the Maximum STEM Price and the Alternative Maximum STEM Price. The Minimum STEM Price to apply at any time is the Maximum STEM Price multiplied by negative one.

The applicable formula for calculating the price limits is set out in clause 6.20.7 (b) and is as follows:

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

Further details pertaining to the definition of the price limits are provided in the Market Rules.

MMA, an independent consultant, was engaged by the IMO to undertake the 2009 Energy Price Limits review. MMA was also engaged in both 2007 and 2008 to undertake the review. One of the objectives of the 2009 review was to determine whether the cost assumptions, and previously used methodology for determining the price limits, are still suitable and if appropriate, recommend rule changes. The management of uncertainty in the calculations was also an important element of the review.

As an outcome of undertaking the 2009 review, MMA highlighted issues surrounding the use of Profit Margin when calculating the price limits and suggested that this should be replaced with Risk Margin. Further details pertaining to this issue are outlined below.

Issue

As first identified by MMA during the 2007 price limits review, the purpose of and basis for the use of a Profit Margin in clause 6.20.7(b) is seen to be problematic. In particular, it was considered that the reference to Profit Margin when calculating the price limits is inconsistent with the principle of generators bidding according to their SRMC.

The economic rationale for incorporating a Profit Margin in the calculation of the price limits, as outlined by MMA in the 2009 final report, is as follows:

> *In the presence of strong competition, a generator would be very near to its SRMC having regard to its operational decisions in order to maximise its profits. This works on the basis that bids above SRMC would be expected to miss out on profitable production as it could be displaced by lower priced bids. However, the last loaded generator having the highest costs has the opportunity to set the market prices without any competition from the supply side, since there are no lower cost generating resources available. While there may be some demand side competition this is often at much higher bid prices than incurred by the highest cost generator.*

As a result the level of competition under these extreme conditions when the Maximum STEM Price is likely to be applied is quite limited and therefore the perfect competition model is no longer applicable. This may provide some rationale for allowing for a Profit Margin to provide some additional incentive for the generator to generate since it would be setting the market price and therefore earning no profit on its output.

A Market Generator is required, under clause 2.16.9G of the Market Rules, to bid at its reasonable expectation of the SRMC of generating the relevant electricity. To apply a Profit Margin when determining the price limits would be inconsistent with the application of the SRMC bidding requirements. Instead, MMA suggest that the Profit Margin is actually a Risk Margin as it makes provision for uncertainty in the assessment rather than a profit on a known cost.

In particular, MMA recommend assessing the uncertainty to the IMO of the short run average cost of peaking power and striking a value that results in a price limit that exceeds the majority (for example 80 to 90 percent) of potential circumstances. MMA notes that this range is typical of Risk Margins observed in electricity markets where traders cannot accurately predict future market conditions and yet must strike a fixed price for trading purposes to manage uncertainty.

By adopting a Risk Margin when calculating the price limits rather than a Profit Margin, in the event that future market conditions prove that the Maximum STEM Price is constraining economic operation of peaking plant, the price settings will be able to be reviewed to reflect prevailing market conditions. Thus the risk that generators would be financially disadvantaged by the price cap is very low.

MMA outlined the following four potential methods for defining a Risk Margin:

1. The uncertainty could be ignored and expected costs and quantities could be used to determine the Maximum STEM Price. This approach creates the risk that the Maximum STEM Price is too low in many circumstances so as to discourage efficient operations and new entry in peaking services, potentially resulting in inefficient operations when system conditions are unfavourable for short-term running.

2. Addressing uncertainty by using the values of all parameters at the extreme end of their range, so that the Maximum STEM Price reflects the worst possible outcome. This approach would almost certainly result in a very high Maximum STEM Price that would have no practical use in mitigating market power.

3. The expected values could be applied in the cost assessment and the Profit Margin could be used to assess the impact of uncertainty from the viewpoint of the generator. This approach would be reflective of the uncertainty in the cost factors in a general manner. It does not rigorously represent the way the factors can work together to create uncertainty in the maximum cost as observed at the Market level.

v. The uncertainty of the input variables and how they work in combination could be assessed in the assessment of the Maximum STEM Price. The Profit Margin could be set to zero or interpreted as a Risk Margin so as to make the Maximum STEM Price realistic from a commercial perspective. The Risk Margin of the assessed price over the expected or most probable price would be confirmed to ensure that it is not excessive in relation to the

objective of market power mitigation. This represents a more rigorous test of uncertainty than option 3.

For the purposes of undertaking the 2007, 2008 and 2009 price limits reviews the fourth method was the preferred approach proposed by MMA and endorsed by the IMO. This was on the basis that assigning a single value to a cost parameter as defined in the Market Rules assumes a known cost with no margin of uncertainty. However, in setting the price limits, a likely range of costs with an expected value and a margin of uncertainty are assessed. Consequently, the Risk Margin was applied by MMA to the expected cost to ensure that the imposition of a capped price does not impede participation of high cost generators in the market under high demand or low reserve supply conditions.

Proposal

The IMO considers that MMA's interpretation is appropriate as perfect knowledge of all the possible conditions that determine the cost of generation at any particular time is unavailable to the IMO. The IMO notes the work of Mosquera, Reneses, Baraquin and Sanchez-Ubeda (2006) which identified that the main variables likely to be subject to uncertainty include system demand, hydro conditions[2] and fuel costs.[3] In the case of the determination of the price limits for the Wholesale Electricity Market, the IMO notes that fuel costs, and in particular gas costs, are likely to be the greatest cause of uncertainty.

Given this uncertainty in the input data, the IMO considers that a margin for uncertainty is needed when applying the expected costs to set the price limits. The IMO therefore proposes that the Market Rules be amended 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 South West interconnected system (SWIS).

The IMO contends that this will allow for the uncertainty faced by the IMO in setting the price limits to be accurately reflected when annually reviewing its appropriateness. The IMO also considers that by including a Risk Margin between the price cap and the expected highest short run cost generating works in the SWIS in the calculation of the price limits, a price limit suitable for mitigating market power without inhibiting efficient operations will be achieved.

The IMO notes that this amendment would be reflective of the approach adopted in undertaking the review in previous years.

The IMO also proposes to amend clause 6.20.9 to clarify that the IMO will publish draft reports and seek public consultation only when undertaking the annual review required under clause 6.20.6 of the Market Rules. The IMO contends that currently there is uncertainty in the application of clause 6.20.9 with regards to the monthly recalculation of the Alternative Maximum STEM Price under clause 6.20.3 of the Market Rules. The IMO considers that it would be inefficient to undertake a public consultation process every month when the Alternative Maximum STEM Price is revised, and that the annual review and consultation process provides sufficient scope for interested stakeholders to express any concerns they might have with the values calculated for the Alternative Maximum STEM Price.

The IMO also proposes the addition of new clause 6.20.9A to allow for a second consultation period, if required, after submissions have been received on the draft report.

[2] Noting that this is not relevant in the case of Western Australia

[3] N. Mosquera, J. Reneses,J. Baraquin, E.F. Sanchez-Ubeda (2006): Risk Analysis in Electricity Markets by using decision trees, 9th International Conference on Probabilistic Methods Applied to Power Systems KTGH, Stockholm, Sweden.

This will allow the IMO to gauge industry views on any outstanding issues identified either during or following the first consultation period.

APPENDIX 2: PROPOSED AMENDING RULES IN THE RULE CHANGE PROPOSAL

The IMO proposed the following amendments to the Market Rules in its Rule Change Proposal (~~deleted text~~, added text):

6.20.7. In conducting the review required by clause 6.20.6 the IMO:

(a) may propose revised values for the following:

i. the Maximum STEM Price, where this 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 is to be calculated using the ~~methodology described~~ formula in paragraph (b); and

ii. the Alternative Maximum STEM, where this 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 and is to be calculated using the ~~methodology described~~ formula in paragraph (b);

(b) must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following ~~methodology~~ formula:

(1 + ~~Profit Margin~~ Risk Margin)× (Variable O&M + (Heat Rate × Fuel Cost))/Loss Factor

Where

ii. ~~Profit Margin is the allowable profit margin expressed as a fraction~~ Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station calculated using a statistical distribution of its various cost related parameters in accordance with clause 6.20.7(b), where:

a. the Risk Margin is calculated for the Maximum STEM Price as the proportion by which the 80th percentile of the probability distribution for the short run average cost exceeds the mean short run average cost; and

b. the Risk Margin is calculated for the Alternative Maximum STEM Price as the proportion by which the 90th percentile of the probability distribution for the short run average cost exceeds the mean short run average cost;

v. Variable O&M is the mean variable operating and maintenance cost 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 ~~based on~~ the mean heat rate at minimum capacity for a 40 MW open cycle gas turbine generating station~~'s~~, ~~heat rate at minimum capacity,~~ 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 the generator relative to the Reference Node.

Where 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.

6.20.9. In conducting the review required by clause 6.20.6 ~~T~~the IMO must prepare a draft report describing how it has arrived at a proposed revised value of an Energy Price Limit. The IMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users, within six weeks of the date of publication.

6.20.9A. Prior to proposing a final revised value to an Energy Price Limit in accordance with clause 6.20.10, the IMO may publish a request for further submissions on the Market Web Site. Where the IMO publishes a request for further submission in accordance with this clause, it must request submissions from all sectors of the Western Australia energy industry, including end-users.

6.20.10 After considering the submissions on the draft report described in clause 6.20.9, and any submissions received under clause 6.20.9A, the IMO must propose a final revised value for any proposed change to an Energy Price Limit and submit those values and its final report, including any submissions received ~~on the draft report~~, to the Economic Regulation Authority for approval.

APPENDIX 3: ADDITIONAL AMENDMENTS MADE BY THE IMO FOLLOWING THE FIRST SUBMISSION PERIOD

The IMO made some amendments to the proposed Amending Rules following its assessment of first submission period responses. These changes were as follows (~~deleted text~~, added text):

6.20.7. In conducting the review required by clause 6.20.6 the IMO:

(a) may propose revised values for the following:

i. the Maximum STEM Price, where this 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 is to be calculated using the formula in paragraph (b); and

ii. the Alternative Maximum STEM, where this 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 and is to be calculated using the formula in paragraph (b);

(b) must calculate the Maximum STEM Price or Alternative Maximum STEM Price using the following formula:

(1 + Risk Margin)× (Variable O&M + (Heat Rate × Fuel Cost))/Loss Factor

Where

~~i.~~ Risk Margin is a measure of uncertainty in the assessment of the mean short run average cost for a 40 MW open cycle gas turbine generating station, expressed as a fraction. ~~calculated using a statistical distribution of its various cost related parameters in accordance with clause 6.20.7(b), where:~~

~~a. the Risk Margin is calculated for the Maximum STEM Price as the proportion by which the 80th percentile of the probability distribution for the short run average cost exceeds the mean short run average cost; and~~

~~b. the Risk Margin is calculated for the Alternative Maximum STEM Price as the proportion by which the 90th percentile of the probability distribution for the short run average cost exceeds the mean short run average cost;~~

v. Variable O&M is the mean variable operating and maintenance cost 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 ~~the generator~~ a 40 MW open cycle gas turbine generating station relative to the Reference Node.

Where 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.

6.20.9 In conducting the review required by clause 6.20.6 the IMO must prepare a draft report describing how it has arrived at a proposed revised value of an Energy Price Limit. The draft report must also include details of how the IMO determined the appropriate values to apply for the factors described in clause 6.20.8 (b)(i) to (v). The IMO must publish the draft report on the Market Web Site and advertise the report in newspapers widely published in Western Australia and request submissions from all sectors of the Western Australia energy industry, including end-users, within six weeks of the date of publication.