Draft Rule Change Report
Title: Calculation of the Capacity Value of Intermittent Generation - Methodology 1 (IMO) and Methodology 2 (Griffin Energy)

Ref: RC_2010_25 & RC_2010_37
Standard Rule Change Process

Date: 18 August 2011

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1 INTRODUCTION

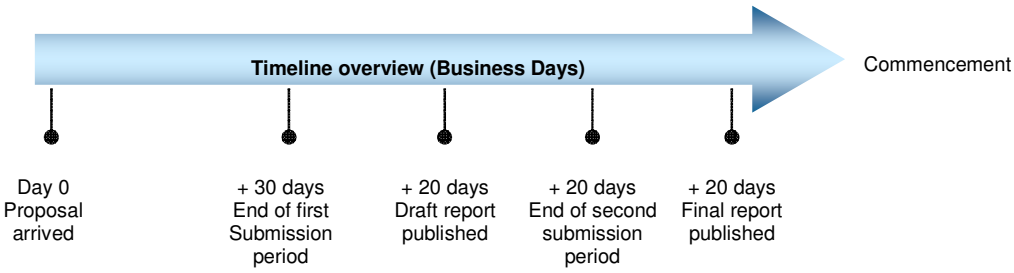
The IMO is currently progressing two Rule Change Proposals to amend the existing methodology for valuing the capacity of Intermittent Generation in the Wholesale Electricity Market (WEM):

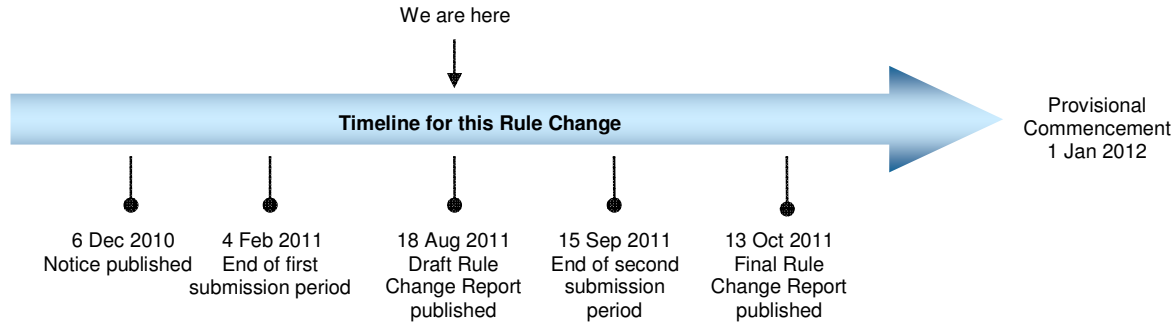
- Calculation of the Capacity Value of Intermittent Generation – Methodology 1 (IMO) (RC_2010_25)[1]; and
- Calculation of the Capacity Value of Intermittent Generation – Methodology 2 (Griffin Energy) (RC_2010_37)[2].

These two proposals are being processed using the Standard Rule Change Process, described in section 2.7 of the Market Rules.

In accordance with clause 2.5.10 of the Market Rules, the IMO decided to extend the end date for the first submission periods and the timeframe for preparing the Draft Rule Change Report for each proposal. Further details of the extensions are available on the IMO website.

To ensure that the two alternative methodologies could be considered in unison throughout the formal Rule Change Process, the IMO has ensured that the key dates for the two proposals were aligned. This allowed for interested stakeholders to comment on the two methodologies at the same time. The key dates in processing these Rule Change Proposals, as amended in the extension notices, are:





Please note the commencement date is provisional and may be subject to change in the Final Rule Change Report.

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[1] RC_2010_25 was formally submitted by the IMO on 29 November 2010 and proposes amendments to clauses 4.11.3A, 7.7.5A, 7.7.5B, 7.7.5C, 10.5.1 and new clause 4.11.3B and Appendix 9 of the Wholesale Electricity Market Rules (Market Rules);

[2] RC_2010_37 was formally submitted by Griffin Energy on 30 November 2010 and proposes amendments to clauses 4.11.3A, 7.7.5B, 7.7.5C, 7.7.5E, 7.13.1, 10.5.1 and the Glossary of the Market Rules.

The IMO Board's proposed decision is to:

- accept the IMO's Rule Change Proposal (RC_2010_25), as modified following the first submission period; and
- reject Griffin Energy's Rule Change Proposal (RC_2010_37).

In making its proposal on these Rule Change Proposals, the IMO Board has taken into account:

- the Wholesale Market Objectives;
- the alignment of each of the methodologies with the reliability criterion;
- the views of the Sapere Research Group, the independent expert appointed to undertake a technical study of the two methodologies and provide independent advice to the IMO;
- the practicality and cost of implementing the proposals;
- the views of the Market Advisory Committee (MAC) on the proposals; and
- the views expressed in the submissions received for the proposals.

All documents relating to each of the Rule Change Proposals can be found on the following IMO websites:

- RC_2010_25: http://www.imowa.com.au/RC_2010_25
- RC_2010_37: http://www.imowa.com.au/RC_2010_37

2 CALL FOR SECOND ROUND SUBMISSIONS AND INVITATION TO PUBLIC WORKSHOP

Second submission period

The IMO Board's decision, after taking into account the analysis of the proposals (refer to section 5 and the Sapere report) and submissions received (refer to Appendix 3), has relied on a number of findings and conclusions that it has reached with regard to the relevance and weight of the material before it. Given that there are clearly polarised views on the issue under consideration, the IMO invites interested stakeholders to provide submissions supported by further analysis/facts on the material presented in this Draft Rule Change Report during the second consultation period.

The submission period is 20 Business Days from the publication date of this report. Submissions must be delivered to the IMO by 5.00pm, **Thursday 15 September 2011**.

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

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

Independent Market Operator
Attn: Group Manager, Market Development
PO Box 7096
Cloisters Square, PERTH, WA 6850
Fax: (08) 9254 4399

Public workshop

During the submission period the IMO intends to hold a public workshop in order to present the analysis and recommendations outlined in the Sapere report.

Details of the public workshop are as follows:

Date: Thursday, 8 September 2011

Time: 3:00-5:00pm

Location: IMO Board Room
Level 3, Governor Stirling Tower
197 St Georges Terrace, Perth

If you would like to register for the workshop, please email your name and details to market.development@imowa.com.au by 12:00pm, Wednesday 31 August 2011.

A copy of the agenda will be provided to attendees closer to the date.

3 THE ORIGINAL RULE CHANGE PROPOSALS

3.1 Submission Details

The submission details for the Rule Change Proposal: Calculation of the Capacity Value of Intermittent Generation – Methodology 1 (IMO) (RC_2010_25) are as follows:

Name:	Troy Forward
Phone:	9254 4300
Fax:	9254 4399
Email:	troy.forward@imowa.com.au
Organisation:	IMO
Address:	Level 3, Governor Stirling Tower, 197 St Georges Terrace
Date submitted:	29 November 2010
Urgency:	Standard Rule Change Process
Change Proposal title:	Calculation of the Capacity Value of Intermittent Generation – Methodology 1
Market Rule affected:	Clause 4.11.3A, 7.7.5A, 7.7.5B, 7.7.5C, 10.5.1 and new clause 4.11.3B and Appendix 9.

The submission details for the Rule Change Proposal: Calculation of the Capacity Value of Intermittent Generation – Methodology 2 (Griffin Energy) (RC_2010_37) are as follows:

Name:	Shane Cremin
Phone:	9261 2908
Fax:	9486 7330
Email:	shane.cremin@thegriffingroup.com.au
Organisation:	Griffin Energy
Address:	L15, 28 The Esplanade, Perth, 6000
Date submitted:	30 November 2010
Urgency:	Standard Rule Change Process
Change Proposal title:	Calculation of the Capacity Value of Intermittent Generation – Methodology 2
Market Rule affected:	Clauses 4.11.3A, 7.7.5B, 7.7.5C, 7.7.5E, 7.13.1,10.5.1

	and the Glossary.

3.2 Summary Details

Given the momentum driving the growth in renewable energy providers on the South West interconnected system (SWIS) concerns have been raised by a number of stakeholders about the current Capacity Credit valuation methodology for Intermittent Generators. Specifically;

- doubts have been expressed as to whether the current 3 year average methodology for determining Capacity Credits for these facilities accurately reflects the capacity they can reliably deliver; and
- it is widely acknowledged that the current valuation methodology is unsuitable for solar generation and undervalues this capacity.

Given these concerns, the appropriateness of the current capacity valuation methodology was reviewed by the Renewable Energy Generation Working Group (REGWG). While failing to reach a consensus position on the matter of valuing Capacity Credits for Intermittent Generation, the REGWG supported the proposal that the IMO would nominate the valuation methodology that it felt best served the Market Objectives.

3.2.1 Summary of the Methodology 1 (IMO)

Please note that Methodology 1 as proposed by the IMO in RC_2010_25 has been modified following the advice of the independent expert, Dr Richard Tooth of Sapere Research Group, appointed by the IMO to provide advice on the two methodologies. See section 5 below.

The IMO proposed the implementation of the following methodology for valuing the capacity of Intermittent Generators:

1. Identify in each of the 8 previous years the 12 Trading Intervals which experienced the highest Load for Scheduled Generation (LSG). For this purpose, the LSG is calculated for each Trading Interval by subtracting the output from Intermittent Generators (IGs) (measured output from existing facilities and modelled output where the facility had not yet entered service) from the total sent-out generation during that Trading Interval.

2. For each of the 8 years, determine the average output of the Intermittent Generator fleet during the 12 Trading Intervals with the highest LSG.

3. Determine the 95 percent Probability of Exceedance (PoE) level of the 8 annual averages. This is the Fleet Capacity Value.

4. Identify in each of the 3 previous years the 250 Trading Intervals which experienced the highest LSG.

5. Determine the average output of each individual Intermittent Generator facility for the 750 intervals determined in Step 4. This is denoted below as the Facility Performance Level.

6. Determine the sum of the facility performance levels determined in Step 5. This is denoted below as the Fleet Performance Level.

7. Apportion the fleet capacity value to each Intermittent Generator facility according to its performance over the 750 intervals.

Relevant Level = (Facility Performance Level) / (Fleet Performance Level) × Fleet Capacity Value

The IMO also proposed to include a requirement for the IMO to conduct a 5 year review of the methodology for determining the Relevant Level for a Facility to ensure it is effective in its application.

Full details of the IMO's Rule Change Proposal are contained within Appendix 1 of this report.

3.2.2 Summary of Methodology 2 (Griffin Energy)

Griffin Energy proposed the implementation of the following methodology for valuing the capacity of Intermittent Generators:

1. Identify the top 750 Trading intervals associated with the highest LSG output in each of the 3 previous years.

2. For each of the 2,250 intervals identified in Step 1, determine the metered output of the Intermittent Generator facility (or the estimated output if the facility is experiencing a Planned or Consequential Outage or where its output was curtailed following a request from System Management).

3. Double the value determined in Step 2 and divide this number by 2,250. The result is the Relevant Level for that Facility (or is the quantity of Capacity Credits allocated to that facility).

Full details of the Griffin Energy's Rule Change Proposal are contained within Appendix 2 of this report.

3.3 The Original Proposals and the Wholesale Market Objectives

The assessment of each of the proposals against the Wholesale Market Objectives as presented in the Rule Change Proposals is provided below.

3.3.1 Assessment of Methodology 1 (IMO)

In its proposal, the IMO contends that the proposed amendments are consistent with the Wholesale Market Objectives and better address the Wholesale Market Objectives (a) and (c). In particular, the IMO considers that the proposed changes will apply a methodology to the calculation of Capacity Credits for Intermittent Generators that more appropriately reflects the contribution of a renewable generator at times of high system demand. This will:

- Promote greater system security and reliability by providing certainty to System Management that the capacity available in the market can meet peak demand requirements (Market Objective (a)); and
- Remove a current source of discrimination between Scheduled Generators and Intermittent Generators by determining the level of certification of Intermittent Generators during peak demand periods (Market Objective (c))

The IMO considered that the proposed changes are consistent with the other market objectives.

3.3.2 Assessment of Methodology 2 (Griffin Energy)

In its proposal, Griffin Energy considered that the proposed amendments would have the following effect on the Wholesale Market Objectives:

Objective	Impact
a)	The proposed changes will promote greater reliability as the quantity of Capacity Credits received by an Intermittent Generator is closely aligned with the peak summer demand periods, when system reliability is most at risk. The changes will also promote economic efficiency by rewarding Intermittent Generator facilities with a suitable quantity of Capacity Credits relative to other generation facilities, ensuring investment in generation technologies is optimised in the WEM.
b)	The proposed changes will promote competition among new entrant generators (including those with advanced intermittent projects under development) as it is relatively consistent with the current Capacity Credit allocation methodology and does not distort the market for new generation investment.
c)	The proposed changes lessen the discrimination between Scheduled Generators and Intermittent Generators in that Intermittent Generators is now also awarded Capacity Credits based on output during higher (summer) demand periods. The proposed changes also lessen the discrimination between Intermittent Generator technologies by ensuring all technologies have their capacity allocation assessed by their contribution during peak (summer) demand periods.
d)	The proposed changes will *prima facie* increase the long term cost of electricity in the WEM as any expected reduction in Capacity Credits from Intermittent Generator facilities (compared with the current allocation methodology) will mean that further generation facilities (or DSM) will need to be constructed (or contracted) to meet the same IMO forecast demand, hence, raising the cost to end users. The proposed changes may also assist in reducing the cost of electricity in that, assuming renewable energy facilities are to be constructed to meet federal MRET targets, intermittent facilities that are incentivised to produce energy during high demand periods will likely offset expensive peaking scheduled generation, bringing down wholesale energy prices in the STEM and balancing markets during the summer period.
e)	The proposed changes may lead to benefits in that energy storage options will be incentivised and implemented more quickly as storage technologies become economically viable.

Further details of Griffin Energy's assessment of its proposal against the Wholesale Market Objectives are provided in its Rule Change Notice.

3.4 Proposed Amending Rules

The amendments to the Market Rules originally proposed by the IMO and Griffin Energy are available in the respective Rule Change Notices and presented in Appendix 1 and 2 of this report, respectively.

3.5 The IMO's Initial Assessment of the Proposals

The IMO decided to proceed with both of the proposals on the basis that Market Participants should be given an opportunity to provide submissions on each proposal as part of the rule change process.

4 FIRST SUBMISSION PERIOD

The first submission period for the original IMO and Griffin Rule Change Proposals was between 7 December 2010 and 4 February 2011. The timeframes for the first

submission period were extended in accordance with the IMO's extension notice published on 6 December 2010.

4.1 Submissions received

The IMO received submissions for RC_2010_25 and RC_2010_37 from the following interested parties:

Submitter	Rule Change Proposals
AGL	RC_2010_25 and RC_2010_37
Alinta	RC_2010_25
Collgar Wind Farm	RC_2010_25 and RC_2010_37
Griffin Energy	RC_2010_25 and RC_2010_37
Infigen Energy	RC_2010_25
Landfill Gas & Power (LGP)	RC_2010_25 and RC_2010_37
Moonies Hill Energy (MHE)	RC_2010_25 and RC_2010_37
Office of Energy	RC_2010_25 and RC_2010_37
Pacific Hydro	RC_2010_25 and RC_2010_37
Perth Energy	RC_2010_25 and RC_2010_37
Sustainable Energy Association of Australia (SEA)	RC_2010_25
System Management	RC_2010_25 and RC_2010_37
Synergy	RC_2010_25 and RC_2010_37
Verve Energy	RC_2010_25
Vestas Wind Systems	RC_2010_25 and RC_2010_37

The main points raised in the submissions received for both proposals are summarised below, with a more detailed summary of the main points raised by each submitting party provided in Appendix 3 of this report. A copy of the full text of all submissions is available on the IMO website. Additional detail along with the IMO's response to issues raised in submissions is contained in Appendix 4 of this paper.

In summary, the views of submitting parties on the proposed changes under both RC_2010_25 and RC_2010_37 were polarised. The majority of submissions received did not support the IMO's proposed methodology noting the following general issues:

- it does not reflect the advice of McLennan Magasanik Associates (MMA), the expert appointed to derive an appropriate methodology;
- it will reduce investment in Intermittent Generators (barrier to entry);
- it is complicated and neither statistically sound or transparent;
- it introduces regulatory risk to the market; and

- it unfairly penalises existing Market Participants with Intermittent Generator assets (no grandfathering provisions included).

Submissions received on Griffin Energy's proposed methodology (Methodology 2) noted the following general points in comparison to Methodology 1:

- it has a lower associated regulatory risk to the market;
- it represents the most simple, transparent and logical option; and
- it more closely aligns with the advice of MMA.

The submissions received from the Office of Energy, Perth Energy and System Management, however, supported the IMO's proposed changes, noting:

- the risks to system security and reliability associated with over allocation of Capacity Credit to wind farms;
- to date the SWIS has not experienced a 1 in 10 year load since the development of the major existing wind farms, therefore the wind contribution for this extreme event is not known and the IMO should err on the side of caution in evaluating the two proposals;
- the merits in reviewing the valuation methodology at a later date (consistent with the proposed 5 year review); and
- that providing cross subsidies via market mechanisms will in general lead to inefficient economic outcomes.

A summary of the assessment by the submitting parties as to whether each proposal would better achieve the Wholesale Market Objectives (Table 1) and an overview of participant submissions on the costs associated with implementing each of the proposed changes and the timeframe for implementation (Table 2) is presented below.

Table 1: Submitting parties' Wholesale Market Objective assessment

Submitter	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Grififfn Energy's proposal)
AGL	*None provided.*	*None provided.*
Alinta	The IMO can not be generally satisfied that the change to the methodology as proposed under RC_2010_25 is consistent with the Wholesale Market Objectives, and in any event it is likely to be inconsistent with the Wholesale Market Objectives. The likely effect of RC_2010_25 will be to increase the perceived level of risk associated with investing in the WEM. This is likely to lead to higher risk premiums and contingencies being included in any future investment in generation in the WEM, which would: • impede the efficient entry of new competitors; • increase the long-term cost of electricity supplied to customers; and • undermine the economically efficient, safe and reliable production and supply of electricity and electricity related services.	-[3]
Collgar	Will not operate to better facilitate the achievement of Market Objective (c). Collgar believes that the Rule Change Proposal will discriminate against renewable energy technologies, most particularly wind energy technologies.	Better achieves Market Objective (c)
Griffin Energy	Better achieves Market Objective (e) but inconsistent with Market Objectives (a), (b), (c) and (d).	Better achieves Market Objectives (a), (b) and (e). Consistent with Market Objectives (c) and (d).
Infigen Energy	Inconsistent with Market Objectives (a), (c) and (d).	-

[3] Note that a dash used in Table 1 and 2 indicates that a stakeholder did not submit on the proposal.

Submitter	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Grififfn Energy's proposal)
LGP	Conflicts with Market Objectives (a), (b), (c) and (d).	Conflicts with Market Objectives (a), (b), (c) and (d).
MHE	Fundamentally inconsistent with Market Objectives (b) and (d).	Fundamentally inconsistent with Market Objectives (b) and (d).
Office of Energy	*None provided.*	*None provided.*
Pacific Hydro	Inconsistent with Market Objective (d).	Inconsistent with Market Objective (d).
Perth Energy	Promotes Market Objective (a), assuming that the IMO is satisfied with System Management's background analysis and findings. Inconsistent with Market Objective (d), however this risk is not assessable and swamped by the risk associated with the absence of correct pricing signals.	Better achieves Market Objective (a), assuming that the IMO is satisfied with System Management's background analysis and findings. Inconsistent with Market Objective (d), however this risk is not assessable and swamped by the risk associated with the absence of correct pricing signals.
SEA	Better achieves Market Objective (a) but inconsistent with Market Objectives (b), (c) and (d).	-
System Management	Promotes Market Objectives (a) and (c).	Better achieves Market Objectives (a) and (c)
Synergy	Providing investors in Intermittent Generator projects with clear market investment signals will address a fundamental value that underwrites the market.	Providing investors in Intermittent Generator projects with clear market investment signals will address a fundamental value that underwrites the market.
Verve Energy	*None provided.*	-
Vestas	Inconsistent with Market Objectives (a), (b), (c) and (d). The impact on Market Objective (e) is uncertain as it may either: • act as a minor barrier to the early adoption of storage technologies for renewable energy generation; or • provide a price signal that helps to bring forward the wide spread	Better achieves Market Objectives (c) and (d), and consistent with Market Objective (e). RC_2010_37 facilitates the Market Objectives better than RC_2010_25, though it is noted that the proposed changes are less advantageous for new renewable energy generators than the

Submitter	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Grifiifn Energy's proposal)
	adoption of energy efficient technologies in homes and businesses.	present Market Rules (Market Objective (b)).

Table 2: Submitting parties' identified costs and implementation timeframes

Submitter	Identified Costs		Implementation Timeframe	
	RC_2010_25	RC_2010_37	RC_2010_25	RC_2010_37
AGL	*None provided*	*None provided*	*None provided*	*None provided*
Alinta	Reduction to Alinta's annual revenue of around $3.6 million, although this might be partially offset by increase in the Reserve Capacity Price. Reduction to EBITDA by up to $3.6 million	-	None identified	-
Collgar	N/A	N/A	N/A	N/A
Griffin Energy	Significant negative impact on the asset value of the Emu Downs Wind Farm	The adoption of RC_2010_37 may or may not have an impact on the value of the Emu Downs Wind Farm and will be unlikely to have any impact on the progression of the Badgingarra Wind Farm project.	No time sensitive implementation challenges.	No time sensitive implementation challenges.
Infigen Energy	The proposed change will have major impacts on our business. There will be an immediate negative effect on the CCs allocated to our existing wind farm and a significant negative effect on the potential revenue of our wind farms under development, which will necessarily lead to an	-	N/A	-

Submitter	Identified Costs		Implementation Timeframe	
	RC_2010_25	RC_2010_37	RC_2010_25	RC_2010_37
	evaluation of WA as an attractive jurisdiction for future investment capital.			
LGP	Unable to assess the impact of the proposal because of its lack of simplicity and transparency. However, if the impact is material, it would cause LGP to re-register its Intermittent Generator Facilities as Scheduled Generators.	Unable to assess the impact of the proposal because of its lack of simplicity and transparency. However, if the impact is material, it would cause LGP to re-register its Intermittent Generator Facilities as Scheduled Generators.	LGP would potentially need to re-register its facilities and would welcome facilitation of this as part of the proposal.	LGP would potentially need to re-register its facilities and would welcome facilitation of this as part of the proposal.
MHE	*None provided*	*None provided*	*None provided*	*None provided*
Office of Energy	*None provided*	*None provided*	*None provided*	*None provided*
Pacific Hydro	Development of its wind farm near Nilgen will be impacted by both proposals unless it can incorporate long-term contracting arrangements where the retailer assumes the risks of revenue variability and investment hurdles as still achieved.	Development of its wind farm near Nilgen will be impacted by both proposals unless it can incorporate long-term contracting arrangements where the retailer assumes the risks of revenue variability and investment hurdles as still achieved.	-	-
Perth Energy	None identified	None identified	None identified	None identified
SEA	N/A	-	N/A	-
System Management	Costs associated with both updating IT systems (anticipated	Costs associated with both updating IT systems (anticipated	System Management will work with the IMO to determine the	System Management will work with the IMO to determine the

Submitter	Identified Costs		Implementation Timeframe	
	RC_2010_25	RC_2010_37	RC_2010_25	RC_2010_37
	to be significant) and updating the PSOP (anticipated to be minimal).	to be significant) and updating the PSOP (anticipated to be minimal)[4]	implementation schedule of the required IT change. The need to change the PSOP at the same time as this rule change will provide a risk to the completion prior to the commencement date which will need to be managed.	implementation schedule of the required IT change. The need to change the PSOP at the same time as this rule change will provide a risk to the completion prior to the commencement date which will need to be managed.
Synergy	None identified	No changes required to IT or business systems, nor incur any organisational costs as a consequence of adopting the proposed change.	None identified	Should the proposal be accepted, Synergy could implement the changes immediately.
Verve Energy	N/A	-	N/A	-
Vestas Wind Systems	Does not expect any compliance or implementation issues with either RC_2010_25 or RC_2010_37, as it is a supplier to the energy industry rather than a Market Participant.	Does not expect any compliance or implementation issues with either RC_2010_25 or RC_2010_37, as it is a supplier to the energy industry rather than a Market Participant.	Does not expect any compliance or implementation issues with either RC_2010_25 or RC_2010_37, as it is a supplier to the energy industry rather than a Market Participant.	Does not expect any compliance or implementation issues with either RC_2010_25 or RC_2010_37, as it is a supplier to the energy industry rather than a Market Participant.

[4] The IMO notes that System Management clarified out of session that the IT and PSOP impacts would be the same for both RC_2010_25 and RC_2010_37. Further, the identified IT costs associated with both proposals relate to the amended requirement under clause 7.7.5C which would require System Management to determine the output of each Facility has no Dispatch Instruction or request to deviate from its Dispatch Plan or change its commitment or output been issued. Currently System Management is only required to estimate the output of a wind farm where information has been made available to it. Under the amendment System Management will be required to forecast the output of a solar generation facility (and any other Non Scheduled Generator) which will require the development of a new model.

4.2 *The IMO's response to submissions received during the First Submission Period*

There were a number of common issues raised by respondents on the two proposals. These have been categorised as shown in the following table.

The IMO's response to each of the issues identified during the first submission period is presented in the table in Appendix 4.

Issues	Sub-issues	
• Investment impacts	• Investment Incentives • … and Impacts • … and Government Policy • Efficient investment • Viability of investment in the WEM	• External drivers of investment in Intermittent Generators • Broader Impacts of investment in Intermittent Generators • Incentives for Intermittent Generators performance
• The REGWG process	• Scope of the process • The MMA review	• Need for Holistic Review
• Regulatory risk	• Regulatory risk & grandfathering	
• Market objectives	• Balance of objectives • Market objective assessment • Reliability criteria • Energy shortfalls reliability criterion • Efficiency • Planning Criteria	• Discrimination for/ against Intermittent Generators • Long term costs • Price impacts • Incentives for Intermittent generators performance • Appropriate capacity allocation level
• Security and reliability impacts	• Changing reserve margin • Security and reliability impacts • Availability of data	• System Management analysis • Reserve Margin • Comparison with Scheduled Generation
• Methodology issues	• LSG methodology • The adjustment for fleet performance • Accuracy of methodology	• Simplicity • Volatility • Time period • PoE Factor
• General comments	• Simplicity of proposal • Calculation of Non-scheduled Generator Data used to calculate Curtailment Energy • Further suggestions • 5 year review of methodology	• Further suggestions • General position • Progression of rule change • Balancing and Ancillary Services • Definition of Intermittent Generator

4.3 Public Forums and Workshops

No public forums or workshops were held in relation to either of these Rule Change Proposals.

5 ANALYSIS OF THE PROPOSALS

5.1 Background to RC_2010_25 and RC_2010_37

This section begins with some background to the capacity requirements in the WEM that are of relevance to the proposals. This section then discusses the issue being considered and the nature of the decision before the IMO.

5.1.1 Capacity requirements in the WEM

The Rule Change Proposals being considered by the IMO in this Draft Rule Change Report relate to elements of the Reserve Capacity Mechanism (RCM). Certification of Reserve Capacity (CRC) is the supply-side aspect of the RCM and is generally well understood. Another element of the RCM, on the demand side of the equation, is the forecasting of electricity maximum demand and consumption and the assigning of obligations to Market Customers to purchase or procure the appropriate amount of Capacity Credits.

The current design of the WEM derives the required amount of capacity (Reserve Capacity Target) from the Planning Criterion. The Planning Criterion (clause 4.5.9) sets a minimum standard for the acceptable level of generating capacity and has 2 parts:

- A "defined event scenario" that sets out the requirement for reserve generating capacity which must be available during system peak as the greater of:
  - 8.2 percent of the forecast peak demand (including transmission losses and allowing for Intermittent Loads); and
  - the maximum capacity, measured at 41 degrees Celsius, of the largest generating unit,

  while maintaining Minimum Frequency Keeping Capacity for normal frequency control. The forecast peak demand should be calculated to a probability level that the forecast would not be expected to be exceeded in more than one year out of 10; and
- A requirement that there be sufficient reserve to ensure that expected energy shortfalls are restricted to 0.002 percent of annual energy consumption (including transmission losses).

The Reserve Capacity Target is set annually based on the most stringent element of the Planning Criterion (via the application of the test in clause 4.5.10(b)(i)).[5]

The determination of the expected energy shortfall for each Capacity Year involves modelling the need for plant maintenance and the anticipated level of Forced Outages during the Capacity Year. The result is an estimate of the percentage of demand that would not be met due to capacity not being available. This ensures that there is sufficient plant capacity to accommodate required maintenance throughout the year which is

[5] Note that the Planning Criterion applies to the provision of generation and Demand Side Management capability and does not include transmission reliability planning.

important because, although annual peak demand occurs in summer, the availability of capacity is essential for reliability of supply throughout the year.[6]

Since the market start, the application of the test in clause 4.5.10(b)(i) of the Market Rules has resulted in the first element of the Planning Criterion being determinative in setting the Reserve Capacity Target.

5.1.2 Concerns with the current methodology

The current methodology for valuing the capacity of Intermittent Generators based on the 3-year average output, does not focus on peak demand times. It is therefore not obviously aligned with the objectives of the RCM. The capacity of an Intermittent Generator is subject to technology-specific constraints and risks such as weather conditions which impact on its ability to provide the required capacity during peak periods.

Given the momentum driving the growth in renewable energy providers on the SWIS, concerns have been raised by market stakeholders regarding the current Capacity Credit valuation methodology for Intermittent Generators. Specifically:

- doubts have been expressed as to whether the 3-year average accurately represents the capacity that can be reliably delivered by wind generators. System Management, in particular, has expressed concern that excessively high valuations for wind farms could reduce the capacity available during a peak demand event and jeopardise the security of the power system; and
- it has been widely acknowledged that the current valuation methodology is unsuitable for solar generation and undervalues this capacity. The current method includes overnight and winter periods that are outside peak demand times and during which solar output is low.

These concerns highlight the importance of ensuring that the investment signals provided by the RCM strike a balance between providing appropriate remuneration for Intermittent Generators and ensuring system security and reliability can be maintained.

For Intermittent Generators, selecting the method to determine CRC assignment is difficult to determine with accuracy (refer to section 5.1.3). The Market Rules provide a much clearer framework for assigning CRC to Scheduled Generators. There are a number of factors that affect the way CRC is assigned to Scheduled Generators:

- For Scheduled Generators, the IMO assigns CRC based on its reasonable expectation of the amount of capacity likely to be available by the Facility assuming an ambient temperature of 41 degrees Celsius.[7]
- To determine this amount, the IMO uses independently verified temperature de-rate curves[8] to:
    - estimate the level for new facilities; or
    - verify actual performance for existing facilities.

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[6] To ensure reliability standards are upheld in the WEM, it is necessary for plant to be regularly taken out of service for maintenance to ensure its ongoing reliability. The outage scheduling process is designed to ensure orderly planning of these outages, predominantly during winter, so that sufficient capacity is available at all times.

[7] See Market Rule 4.11.1a for full details.

[8] Temperature derate curves provide the relationship between temperature and generator output.

This forms the basis of the IMO's expectation of the ability of the facility to deliver capacity during hot weather events.

The requirements of the Market Rules and the IMO's approach to certification and the assignment of Capacity Credits are conservative so that there can be a high level of confidence that capacity will be available and delivered during an extreme peak demand event (1 in 10 year event).

By their very nature, Intermittent Generators have less control over output. This makes it more difficult to accurately estimate available capacity on which the assignment of CRC and Capacity Credits is based.

5.1.3 Availability of evidence and data

Analysis has been undertaken by various entities throughout the REGWG process and by others in different jurisdictions on the reliability of Intermittent Generators. Unfortunately, no data is available for the existing large scale Intermittent Generators in the WEM during a one in 10 year peak demand event.

Some data is available for Albany wind farm and the smaller landfill gas sites but there is no real historical data which would give guidance to the actual performance of other facilities during such an extreme peak event.

The IMO notes that a wind farm investing in the National Electricity Market (NEM) is assumed to receive in the order of 5 percent of nameplate capacity for reliability planning purposes. This is compared to the WEM where Capacity Credits assigned to Intermittent Generators have historically equated to valuing wind farms at 38 to 42 percent of their nameplate capacity. It should be noted that the NEM does not have a capacity market.

5.1.4 Consideration of modifications

Following feedback on the initial proposals, the IMO sought to assess whether improvements could be made to the proposed methodologies. The IMO Board commissioned Sapere Research Group (Sapere), an independent expert, to examine the IMO (Methodology 1) and Griffin (Methodology 2) proposals and to identify whether adjustments could be made to make them simpler in application and more accurate, though acknowledging there would be a balance between these two objectives. The IMO Board also requested Sapere to consider any options for the implementation of a glide path transition.

The results of the technical study by Sapere are summarised in section 5.2. Details of the IMO Board's considerations in light of this study are provided in section 5.3.

5.2 Technical Study by the Sapere Research Group

The study undertaken by Sapere found that both proposed methodologies provide an improvement over the current methodology in that they focus on output during the peak periods, but that an improved modified methodology could be developed.

In examining the IMO and Griffin proposals and analysing potential alternatives, Sapere used as a framework the following generic formula — appropriate for power systems where output from Intermittent Generator assets is reasonably low relative to peak load[9].

Capacity credits =	*1. Average facility output during peak periods*	***Less***	*2. An adjustment for the variability in output*

Sapere found that in calculating the average sent out generation for an Intermittent Generator, both the IMO and Griffin proposals suffer from a 'clustering' problem because they select Trading Intervals regardless of day. As load is highly correlated between Trading Intervals during a day, the Trading Intervals selected tend to occur on similar days. For example, in all years examined, the top 12 Trading Intervals are clustered in 2 or 3 days. This results in excess volatility (i.e. defeats the purpose of averaging over 12 Trading Intervals) and results in Trading Intervals being selected outside of very peak times (i.e. 3:30pm-5pm, see Box 1 in section 6.2.2) — the later problem is particularly significant for the top 250 and 750 Trading Intervals.

The Sapere report recommended that that the clustering issue be addressed by selecting Trading Intervals from separate days. By doing so an average value based on a small number of Trading Intervals per facility can be estimated without introducing excessive risk of volatility in results. To further minimise the risk of excess volatility the report also recommended selecting Trading Intervals over 5 years when determining the average facility output.

The Sapere report also considered the extent of the adjustment for variability in facility output. The report noted that there are theoretical and practical reasons for an adjustment based on an amount proportional to the variance in facility output (in preference to an adjustment based on the standard deviation as in the original IMO proposal). More specifically, it noted that an internationally recognised method, known as the 'z-method', determines Capacity Credits as follows.

Capacity credits =	*1. Average facility output during peak trading intervals*	***Less***	*2. K x variance of facility output during peaks*

Where *K* is a parameter to be determined

Variance of facility output during the same peak Trading Intervals

Unlike the original IMO proposal, this method does not include a fleet adjustment — it is primarily based on the facility output during peak periods. However the Sapere report notes that by using LSG to select Trading Intervals an individual facility's output will depend partly on the fleet output. The report also notes that there is a theoretical justification for some fleet considerations. In particular it is desirable that the capacity value of new facilities is relatively more if their output is not correlated with existing facilities because they reduce the risk of the fleet output being low during peak times.

[9] The IMO notes that the original IMO proposal incorporated an adjustment factor to account for variability while the Griffin proposal did not. As such the original Methodology 1 was better aligned with the generic formula.

The results of this method depend critically on the size of the parameter *K*. The appropriate value of K parameter depends on characteristics of the base system — in particular the distribution of peak demand and the availability of output from other supply sources. The parameter can be estimated using statistical modelling or from simplified estimation techniques. In some circumstances it can be estimated directly based on the average and variance of the system surplus (i.e. available capacity less demand) during peak periods. Sapere noted that a large adjustment is not necessarily warranted as, although the output of intermittent facilities is variable, so is demand and (because of outages) conventional generation. The Sapere report proposed a value of K based on international benchmarks that suggested a value in the range of 0.002 to 0.005 MW^{-1}.

However, the Sapere report highlighted another significant reason for an adjustment. A key concern is that historical information held does not capture the peak demand scenario and that performance of Intermittent Generators at the very peaks may be different from the Trading Intervals selected. The report provides analysis that is consistent with there being a negative relationship between very high temperatures (when peak demand is most likely to occur) and Intermittent Generator output.

The Sapere report notes that there is no precise way of addressing the issue that Intermittent Generator output may differ during the very peak scenarios. While ideally an adjustment to each facility's average output should be made there are very few data points at the extreme peaks. Sapere recommends an adjustment proportional to the variance in output of the facility to allow for this uncertainty to be captured when assigning Capacity Credits. This adjustment was scaled downward based on the average output to avoid a bias against large facilities.

The report also recommended a number of refinements to the method be examined if the method is reviewed in the future. In particular, the Sapere report recommends consideration be given to:

- addressing the issue of correlation between the output of separate Intermittent Generator facilities.
- altering how Trading Intervals are selected for analysis. For example, accuracy may be improved by using a different number of Trading Intervals and/or weighting the Trading Intervals used.
- using more sophisticated techniques such as regression analysis to forecast Intermittent Generator output at extremes. As more data is obtained, this would potentially enable a more accurate measure to be developed.

For further details refer to the Sapere report available on the following webpage's: http://www.imowa.com/RC_2010_25 and http://www.imowa.com/RC_2010_37.

5.3 Conclusions from the analysis

Given the analysis presented in the Sapere report, the IMO Board considers that the proposed Methodology 1 (the IMO's proposal) should be amended in line with the Sapere report recommendations.

Modified Methodology 1 is to be calculated in accordance with the following formula:

Capacity credits =	*1. Average facility output during Top 12 Trading Intervals drawn from separate days from a number 5 years*	***Less***	*2. G x variance of facility output during peaks*

Where $G = K + U$ reflects both known variability (reflected in *K)* and *uncertainty* of the distribution *of output* (reflected in U).

K is initially set at *K = 0.003*.

U is initially set at U=0.635/(average facility output during peaks*)*

K and *U* are measured in units of MW^{-1}.

All averages and variances are determined over the same peak Trading Intervals from facility output measured in MWs.

The initial values of *K* of and *U* are set according to recommendations of the Sapere report. The value of *K* was selected to align with similar size international systems. The initial value of the parameter for *U* is set to ensure that the fleet Capacity Credits are consistent with the fleet contribution to reducing the peak on peak demand days with the highest peak temperature. The IMO notes that some judgement was used by Sapere in determining the specific parameter values.

The IMO Board notes that the basis for modifying Methodology 1 (as opposed to Methodology 2) is its greater conceptual alignment with the z-method through the inclusion of an adjustment factor for the variability of output. Methodology 2 does not propose such an adjustment. However to better align the IMO proposal with theory and practice, amendments to how the methodology accounts for variability have been incorporated. In particular, the proposal's original adjustment based on the standard deviation of the fleet annual average peak output through the use of the 95% POE calculation has been modified to be based on a parameter to account for uncertainty and variability (G) and the variance of the individual facility output (for further details refer section 5.2 of this report for details around the rationale for this change). As noted in the Sapere report, an adjustment based on facility variance is more accurate and more practical that one based on standard deviation. The modified methodology also incorporates an amendment to how the average is calculated to:

- be based on Trading Intervals occurring on separate Trading Days to remove the identified clustering issue; and
- the number of years of data used.

5.3.1 Future review

The IMO Board also considers that review of the methodology and parameter values in a three year period would be appropriate. It is expected that the review would also give consideration to other matters raised in the Sapere report and the Office of Energy's public submission.

The IMO's first three yearly review of the methodology will be completed by 1 January 2015.

5.3.2 Transition arrangements

The IMO Board commissioned Sapere to consider transitional arrangements for new and existing facilities. Given the potential impact of the proposed changes on existing Intermittent Generation investments, the IMO Board considers that on this occasion a set of transitional arrangements are appropriate.

The Sapere report considered two alternative transition arrangements.

1. Using a simple average between the current and future methodology.

2. Modifying the size of the adjustment to the average over time

The IMO Board considers that a glide path based on the second option would be most appropriate as it would:

- Provide transitional relief based on the major change in approach (i.e. the use of an adjustment to the average) — it gives no transition relief due to a shift from measuring output over all Trading Intervals to measuring output just at peak times; and
- It is simpler as it applies just one set of rules.

The transition would apply over a three year period (for the 2012 – 2014 Reserve Capacity Cycles) using a straight line basis.

5.4 Additional Amendments to the Amending Rules

As a result of the IMO Board's conclusions in light of the Sapere report (refer to section 5.2.1 for further details) and following the closure of the first consultation period, the IMO made additional changes to the proposed Amending Rules for Methodology 1 to:

- Modify the methodology in accordance with the recommendations presented in the Sapere report;
- Outline the requirements for a periodic review of the methodology to be conducted by the IMO prior to the start 2017/18 Capacity Year;
- Incorporate details of the glide path for implementation to apply to new and existing facilities during the 2014/15 – 2016/17 Capacity Years;
- Reflect the suggestions received in submissions during the first consultation period, where appropriate; and
- Improve the integrity and clarity of the proposed Amending Rules.

The IMO also notes it has reflected in the proposed Amending Rules the approved amendments presented in the Final Rule Change Reports for:

- Adjustment of Relevant Level for Intermittent Generation (RC_2010_24)[10];
- Curtailable Loads and Demand Side Programmes (RC_2010_29)[11]; and
- Demand Side Programmes – Operational Issues (RC_2008_20)[12]

These additional amendments are presented in Appendix 5 of this report.

6 THE IMO'S ASSESSMENT

6.1 Introduction

This section conducts an assessment of the modified IMO (modified Methodology 1) and Griffin (Methodology 2) proposals,

[10] For further details refer to the following Web Page: http://www.imowa.com.au/RC_2010_24
[11] For further details refer to the following Web Page: http://www.imowa.com.au/RC_2010_29
[12] For further details refer to the following Web Page: http://www.imowa.com.au/RC_2008_20

This is an unusual situation for the IMO. The IMO has not previously had to contemplate two Rule Change Proposals that seek to change the same provisions of the Market Rules at the same time.

In deciding whether or not to make Amending Rules, the IMO is required by clause 2.4.2 to take into account the Market Objectives, and also to have regard to the matters listed in clause 2.4.3. Given the mutually exclusive nature of these two Rule Change Proposals, the IMO considers it must take into account the relative merits of each proposal when deciding which (if any) of the Rule Change Proposals to accept and whether in the forms proposed or in a modified form.

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 on the proposals 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.

The two methodologies (modified Methodology 1 and Methodology 2) before the IMO for consideration are similar in that they both seek to determine a value of Capacity Credits for Intermittent Generators in a practical way. As a result the primary difference in the extent to which the methodologies meet the Wholesale Market Objectives is in how they perform in accurately meeting the objective of valuing Capacity Credits.

Given the similarity of the two proposals, the IMO has chosen to prepare a joint rule change report in respect of the proposals. The main benefit of this approach is that it enables a comparison of the relative merits of the proposals and avoids duplication of work where issues are common to both proposals. The IMO's detailed assessment is outlined in the following sections.

To simplify the IMO's assessment, the following approach is taken:

- Section 6.2 assesses the two methodologies in terms of their relative accuracy in valuing Capacity Credits and subsequently in meeting the reliability criteria.
- Section 6.3 compares the two methodologies directly against the Wholesale Market Objectives.
- Section 6.4 covers further feedback and discussion of key issues including submissions.
- Section 6.5 examines the practicality and cost of implementing the proposed changes.

A number of submissions received during the first submission period commented on the relative merits of the 2 methodologies including the extent to which the 2 proposals aligned with the Wholesale Market Objectives. These comments have been considered

by the IMO in conducting its assessment. The IMO's responses to specific comments can be found in Appendix 4.

The IMO notes that it has taken into account the technical study completed by Sapere in conducting its assessment as to whether to make the Amending Rules. In particular, the IMO has chosen to modify Methodology 1 based on the Sapere report's recommendations. The assessment presented in this section is therefore of the modified Methodology 1(as opposed to that originally proposed by the IMO) and Methodology 2.

6.2 Reliability Criteria

The core objective of both of the proposals is to provide an improved method for valuing the Capacity Credits of Intermittent Generators. The focus of this section is on the relative merits of each of methodologies in meeting the peak demand criterion of the energy reliability criteria.

The second element of the reliability criteria, the requirement to maintain less than 0.002 percent expected unserved energy, should also be taken into account. This manifests itself in the requirement for Scheduled Generators to maintain fuel stocks and to be available at all times. All energy-producing plant will contribute to this element of the Planning Criterion. While the peak demand continues to grow at a fast rate than average demand, this element of the Planning Criterion is unlikely to be the dominant factor in determining requirements for the SWIS. In the future increased solar PC penetration, (small-scale) storage technology and changes to consumer behaviour at peak times could alter the selection of the Planning Criterion used to set the Reserve Capacity Requirements.

6.2.1 Comparison of the Methodologies

To assess which methodology more closely reflects the reliability criteria it is useful to more closely examine the differences between the 2 methodologies. A useful framework in which to consider the alternative methodologies is to consider that both proposals can be expressed as:

Capacity credits =	*1. Average facility output during peak periods*	***Less***	*2. An adjustment for the variability in output*

A summary of the proposals against this structure is provided in Table 3 below.

Table 3: Summary comparison of proposals

	1. Average facility output	2. Adjustment for variability in output
Methodology 1 (Original IMO proposal)	Based on fleet average from top 12 Trading Intervals (over 8 years) allocated to facilities based on relative output in top 250 Trading Intervals (over 3 years)	Adjustment based on the 95% PoE of the fleet annual averages allocated to facilities based on relative output in top 250 Trading Intervals (over 3 years)
Modified Methodology 1 (Modified IMO proposal)	Average of facility output from top 12 Trading Intervals (over 5 years) chosen from separate days	Based on a multiple of facility variance during same Trading Intervals

Methodology 2 (Griffin proposal)	Average of facility output over top 750 Trading Intervals (over 3 years)	No adjustment

Notes: All proposals identify the top Trading Intervals using LSG.

Table 4 provides an estimate of the Capacity Credits for the Intermittent Generator fleet for each of the proposals. The total Capacity Credits allocated under the modified Methodology 1 is in between that determined by Methodology 2 and the original IMO proposal. As summarised in the table, while there are some differences in the calculation of the 'average' component, the core differences in the results stem from the adjustment for variability in output.

Table 4: Estimate of Capacity Credits assigned to fleet by proposal (MW output)

	1. Average facility output	2. Adjustment for variability in output	Capacity credits (equal to 1. – 2.)
Methodology 1	74.8	38.5	36.3
Modified Methodology 1	80.2	17.2	63.0
Methodology 2	82.2	*Nil*	82.2

Source: Adapted from Sapere Report.

Note: Amounts reflect estimates of the output of the fleet of intermittent generators. Amounts are not finalised and should be considered draft.

6.2.2 Assessment of the average

As shown in Table 4 there is a small but material difference between the average facility values that are generated by modified Methodology 1 and Methodology 2. A core difference between the modified Methodology 1 and Methodology 2 (and original Methodology 1) in determining the average is that modified Methodology 1 uses top Trading Intervals selected from separate days.

This modification was introduced to address a 'clustering' problem with Methodology 2 (and the original Methodology 1) whereby Trading Intervals may be selected from periods that are unlikely ever to be the peak periods.

As the primary reliability criterion of interest is concerned with meeting the required load at the peak it is important that the Trading Intervals selected are those that may be the peak Trading Intervals. Because in any one year there is only one peak, an average of top Trading Intervals is selected so as to attempt to reduce the volatility of results. However the top Trading Intervals tend to be 'clustered' on a small number of days — in most years the top 12 Trading Intervals came from only two Trading Days. This results in Trading Intervals being selected outside of the very peak time (most likely to be between 15:30 and 17:00). The clustering problem is described in Box 1 below.

In the IMO's view by selecting only the top 12 Trading Intervals, the average facility output captured in modified Methodology 1 more accurately reflects the output at the periods that are likely to be peak times.

Box 1: The clustering problem

The highest demand periods tend to be clustered into a small number of days, thus selecting the top trading intervals in a year will result in multiple Trading Intervals from particular days.

Clustering has two unwanted effects.

- It means that the benefits of using a broader range of Trading Intervals are not being achieved. It is similar to conducting a phone survey and repeatedly calling the same household.
- It results in Trading Intervals being used that are unlikely ever to be the peaks.

The second point is demonstrated in Figure 1 below, which shows the times in the day when the top Trading Intervals occur over the years 2006 to 2011. The blue bars show the frequency of when the peak LSG occurs during each day based on the top 12 days with the highest peaks. As highlighted in the figure, the most likely period for the peak is in 15:30 Trading Intervals. Over 60% of the peaks occurred between 15:30 and 17:00.

The red, orange and green bars show when the top 12, top 50 and top 750 Trading Intervals occurred. Due to the clustering on specific days, many of these intervals are outside the period when the peak is most likely to occur. For example, in the top 12 days from each of the years in the 2006 to 2011 period, none of peaks occurred at 5pm.

The use of the top 12 (or top 750 etc) Trading Intervals (without the requirement of separate days) induces a bias in the results because, as shown in the figure, the output of Intermittent Generators is also strongly correlated with the time of day. The purple line shows the average output of Intermittent Generators (based on top 750 Trading Intervals). The chart highlights that the bias increases through use of top 50 Trading Intervals (and would be even worse if the top 750 Trading Intervals were used).

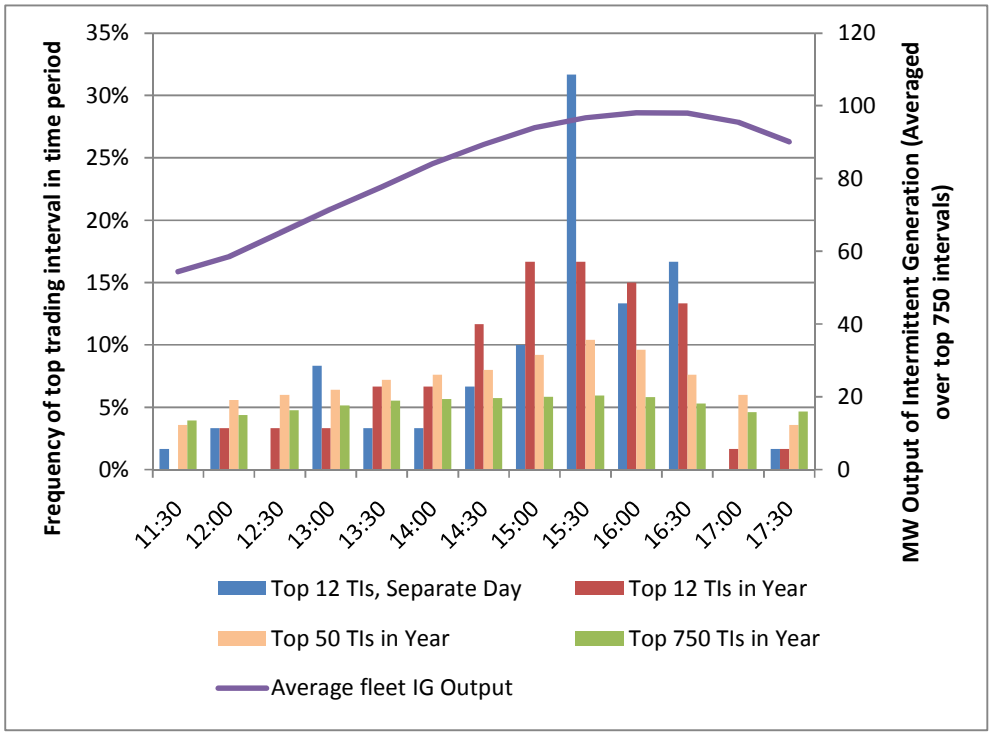

Figure 1: Timing of top trading intervals

Source: Adapted from Sapere Report: Appendix C

6.2.3 Adjustment from the average

A major difference in the methodologies being considered is that modified Methodology 1 (and the original IMO proposed methodology) makes an adjustment from the average facility output whereas Methodology 2 does not.

There are two justifications for an adjustment to the average facility output. First, the Intermittent Generators output will typically add to the variability in the peak load that needs to be met from Scheduled Generators. That is, typically, at peak times:

Variability in total sent out generation	***Less than***	Variability in LSG (i.e. total sent out generation less Intermittent Generation)

This is important as, the greater the variability in the load to be met by Scheduled Generators, the greater the risk that the peak demand target will not be met. To meet this additional risk, additional capacity is required, thus in part reducing the benefit of the Intermittent Generators.

To account for this factor, modified Methodology 1 makes an adjustment proportional to the variance of the facility output during peak periods. As noted in the Sapere report, this approach is consistent with theory and follows an internationally recognised and used method for Capacity Credit valuation appropriate when penetration of Intermittent Generation is (as is the case) relatively small.

The size of the adjustment depends on a number of factors, including — as noted in the report — the extent of correlation of output between facilities and the effect of using LSG to select peak trading intervals. The Sapere report indicates that the appropriate adjustment factor is likely to be in the order of 0.002 to 0.005 per MW^{-1}.

The second justification is more significant. A key concern is that future extreme peaks in demand will coincide with low Intermittent Generation output. The Sapere report provides evidence that justifies this concern. The report found that on very hot days, Intermittent Generator output has tended to be lower (see Box 2 below). The report examined the contribution of Intermittent Generators in reducing the peak load to be met by Scheduled Generation on very hot days and found this to be less than the average Intermittent Generator output during the top 12 Trading Intervals. For example, the report (page 18) notes that this average contribution of the fleet was '67 MW for days with temperature ≥40' and lower still for higher temperatures, compared with the fleet average in the top 12 Trading Intervals (as measured by LSG on separate days) of 80 MW.

The Sapere report notes that these results are based on a small number of Trading Intervals and should not be considered as strong evidence of Intermittent Generator output during extreme demand/temperature scenarios. However, the Sapere report argues that it provides enough evidence to warrant a further adjustment based on the uncertainty in Intermittent Generator output.

Modified Methodology 1 also makes a further adjustment for this uncertainty. The adjustment is made in proportion to the variance of output during peak periods, thus ensuring that facilities whose output does not vary during the peaks are not impacted. Methodology 2 makes no adjustment for this uncertainty.

By making these adjustments, in the IMO's view, modified Methodology 1 more accurately reflects the capacity value of Intermittent Generators.

Box 2: Intermittent Generator output during extreme temperatures

Figure 2 examines the relationship between Intermittent Generator output at the peak period on each of the 12 peak days in each Capacity Year against a measure of the temperature on the relevant day. This graph highlights the concern that circumstances (i.e. higher temperatures) that drive higher demand may coincide with lower Intermittent Generator output.

The total Intermittent Generator output appears to materially lower for days when the temperature (recorded at 3pm on the day) was very high. Regression analysis (see Sapere report) undertaken on this data set, showed a statistically significant negative relationship between Intermittent Generator output and temperature recorded.

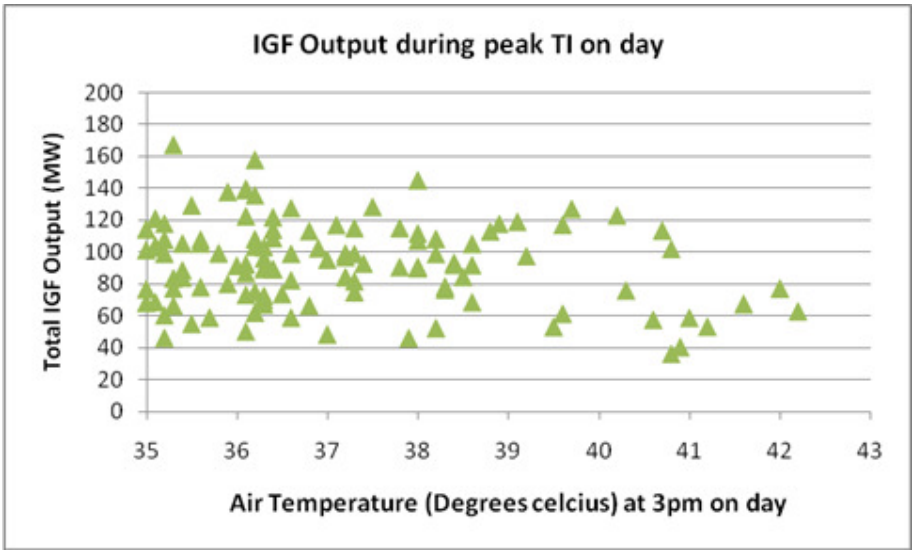

Figure 2: IGF output at peak demand during day (temperature at 3pm >35 degrees)

Note: Each data point represents a separate day over the years 2007 to 2011. The measure of temperature used is the temperature at 3pm, which of the times available, was the closest to when peaks generally occur (see Box 1 in section 6.2.2). Similar results are produced if temperature of different times is produced.

Source: Adapted from Sapere Report

6.3 Wholesale Market Objectives

In considering the two proposals the IMO has:

- undertaken an assessment of each of the proposals against the Wholesale Market Objectives; and
- directly compared the two proposals to assess which would better achieve the Wholesale Market Objectives.

The IMO notes that the now modified Methodology 1 (RC_2010_25) and Methodology 2 (RC_2010_37) are similar in that they each put forward a new method for valuing the capacity of Intermittent Generators based on historical performance data. As such, the impact of each depends on the extent to which they accurately represent the capacity value of Intermittent Generators.

The IMO's assessment is presented below:

Market Objective (a): promote economically efficient, safe and reliable production and supply

Assessment of each methodology against the Wholesale Market Objectives: Both methodologies would improve the reliability of the SWIS by more accurately valuing the capacity of Intermittent Generators than under the current valuation methodology. This is achieved by more closely aligning the Capacity Credits of Intermittent Generators with the peak system demands, thereby better reflecting their capacity contribution during these times. System Management will therefore have greater certainty that the capacity available in the market can meet peak demand requirements.

Under both methodologies greater security and reliability will be achieved than under the current valuation methodology through the RCM providing incentives for generators to meet reliability requirements at lowest cost.

Both methodologies appear to improve efficiency in that they correct for a current distortion, though to differing extents, in the valuation of Capacity Credits for Intermittent Generators. Through the workings of the RCM, this distortion also affects the value of Capacity Credits for Scheduled Generation. An overvaluation of Capacity Credits (all else being equal) for Intermittent Generators will result in greater levels of Intermittent Generators entering the market and consequently reduced levels of capacity being provided by Scheduled Generators. By correcting for this distortion, the proposals would improve the economic incentives for efficient investment in both Intermittent and Scheduled Generators relative to the current valuation methodology.

Comparison of the methodologies: Based on the information available to date, the IMO considers that Methodology 2 would over allocate Capacity Credits to Intermittent Generators. This would mean that Capacity Credits allocated to these facilities would not be reflective of their actual deliverable capacity to System Management during peak periods, thereby creating a potential system security risk when compared to the outcomes of modified Methodology 1. This security risk would however be reduced in comparison to the current valuation methodology. Further, as Intermittent Generators would continue to be paid for an amount of capacity that is not actually available during peak periods, a current market distortion (though to a reduced extent) would continue.

Modified Methodology 1 would more accurately align Capacity Credits with the actual performance of Intermittent Generators during peak periods (refer to Sections 5 and 6.2). It would encourage the entry of Intermittent Generators that have the greatest contribution to the peak demands on Scheduled Generation more so than Methodology 2. This encourages diversification to the benefit of system security. Further, modified Methodology 1 would remove the current distortion in Capacity Credits assigned to Intermittent Generators. This would improve economic incentives for efficient investment in all generation types.

The relative extent to which the two methodologies meet the reliability criteria is a **key issue** that is considered in section 6.2.

The IMO considers that modified Methodology 1 would improve economic efficiency, safety and reliability in the WEM to a greater extent than the application of Methodology 2. For further details of the IMO's assessment of the two methodologies against the reliability criteria refer to section 6.2.

Market Objective (b): encourage competition among generators and retailers, including by facilitating efficient entry of new competitors

Assessment of each methodology against the Wholesale Market Objectives: The IMO is of the view that both methodologies would have no material impact on the level of competition among existing generators and retailers.

Both methodologies are expected to have a net positive impact on facilitating efficient entry of new competitors when compared to the current valuation methodology, specifically:

- Under the current rules there is a distortion in the valuation of Capacity Credits for Intermittent Generators. By correcting for this distortion in the valuation of Capacity Credits, though to varying extents, both methodologies would have a positive impact on facilitating *efficient* entry;
- Furthermore, by addressing a long-standing issue (i.e. how to value the capacity of Intermittent Generators) both proposals would remove an existing area of uncertainty that is a potential deterrent for new entrants of both Intermittent and Scheduled Generation capacity; and
- The methodologies are similar in concept to the existing capacity valuation methodology and are not overly complex. As such, neither methodology would materially increase the costs of investigating investment opportunities in the WEM for potential new entrants.

Comparison of the methodologies: The IMO considers that through its better alignment with actual Intermittent Generator performance during peak periods, modified Methodology 1 will provide a better signal for entry of new Intermittent Generator types (i.e. Solar PV) than under Methodology 2. This is because modified Methodology 1 will provide more accurate signalling of the true benefits to the market of the different types of Intermittent Generators in comparison with each other and in comparison with Scheduled Generators.

Market Objective (c): to avoid discrimination against particular energy options and technologies

Assessment of each methodology against the Wholesale Market Objectives: Under current arrangements, compared with Scheduled Generators who are allocated Capacity Credits to reflect the actual value of peak generation of these facilities, Capacity Credits for Intermittent Generators are allocated based on long-term averages and do not reflect the value of actual generation during peak demand. These arrangements may distort the value of investment in Intermittent Generators. Both methodologies seek to correct this potential distortion.

Both methodologies would also lessen the discrimination between alternative Intermittent Generator technologies. In particular, the methodologies are expected to provide greater value to solar power generation which provides a greater contribution to peak demand times than is reflected in current Market Rules.

Comparison of the methodologies: The IMO considers that Methodology 2 will tend to over allocate Capacity Credits to Intermittent Generators. Further by not making an adjustment based on variability of output, Methodology 2 will be relatively favourable (relative to their actual value) to facilities which are larger and have greater variability in

output. Due to the clustering problem Methodology 2 may also discriminate against options that produce energy very closely correlated with peak times during the day.

The IMO considers that modified Methodology 1 will more accurately allocate Capacity Credits to Intermittent Generators based on their contribution to reliability and thus will better avoid discriminating against particular energy options and technologies than Methodology 2.

Market Objective (d): to minimise the long-term cost of electricity supplied to customers from the South West interconnected system

Assessment of each methodology against the Wholesale Market Objectives: By more accurately valuing the capacity of Intermittent Generators a capacity valuation methodology for Intermittent Generators will be consistent with the objective of reducing the long term cost of electricity. The IMO considers that both methodologies provide incentives to meet the reliability requirements in a lower cost manner than currently through incentivising a more appropriate allocation of resources, though to differing extents. The IMO considers that both modified Methodology 1 and Methodology 2 are an improvement over the current valuation methodology in terms of minimising the long term cost of electricity.

The application of either methodology will result in increased costs being incurred by the market in the short term as a result of a reduction in the number of Capacity Credits being assigned to existing Intermittent Generators. This will increase the need for the IMO to secure the shortfall in available capacity from other generators. However, if neither methodology was implemented, in the long-term either reliability may be compromised or a more expensive method of generation (i.e. Demand Side Management or liquid fuelled generation) may be required to meet the reliability requirements.

Comparison of the methodologies: The IMO considers that the application of modified Methodology 1 will result in a more accurate reflection of the actual costs to the market associated with the provision of Intermittent Generator capacity than Methodology 2. This is because the IMO considers that modified Methodology 1 will more accurately allocate Capacity Credits to Intermittent Generators based on their contribution to reliability than Methodology 2.

Market Objective (e): to encourage the taking of measures to manage the amount of electricity used and when it is used

Assessment of each methodology against the Wholesale Market Objectives: The proposed changes do not directly impact on the amount of electricity used and/or when it is used. However, both proposals may have a long-term indirect impact. By aligning Capacity Credits more closely to the output at peak times, the proposals may increase the financial incentives for firms to investigate and invest in storage technologies as they become economically viable.[13]

The IMO's overall assessment:

The IMO considers that the Market Rules as a whole, if amended by either RC_2010_25 (as modified based on the advice of the technical study conducted by Sapere) or

[13] This point is noted in Griffin Energy's submission.

RC_2010_37 would be consistent with the Wholesale Market Objectives and would better achieve Wholesale Market Objectives (a), (b), (c) and (d).

Further, the IMO considers that modified Methodology 1 will better achieve the Market Objectives to a greater extent that Methodology 2. This is due to the methodology's greater accuracy in measuring Intermittent Generators' contribution to reliability.

6.4 Discussion and Issues

6.4.1 Market Advisory Committee

The MAC discussed the proposals at the 10 November 2010 (RC_2010_25) and 15 December 2010 (RC_2010_25 and RC_2010_37) MAC meetings. An overview of the MAC discussions is presented in Appendix 6. Further details are available in the MAC meeting minutes available on the IMO website: http://www.imowa.com.au/market-advisory-committee

In summary, the views expressed at the MAC were polarised on the two proposals and it was acknowledged that a number of issues would likely be raised during the consultation process. No consensus on the two proposals was reached by the MAC and as such no specific advice on RC_2010_25 and RC_2010_37 was provided to the IMO.

The IMO notes that the views of the MAC have not been sought on modified Methodology 1.

6.4.2 Views Expressed in Submissions

The IMO received 15 submissions on RC_2010_25 and 11 submissions on RC_2010_37 during the first submission period. In summary, the views of submitting parties on the proposed changes under both proposals were polarised. A summary of the common issues raised in submissions is provided in the following sub-section, with further detail available in section 4.2 of this report:

- Investment impacts
- The REGWG process
- Regulatory risk
- Wholesale Market Objectives
- Security and reliability impacts
- Methodology issues
- General comments

A summary of the IMO's response to each of the issues raised in submissions is presented in Appendix 4 of this report and is supported by the analysis presented in Sections 6.2 and 6.3.

6.4.3 Discussion of key issues raised

A number of issues were raised in submissions received during the first consultation period with regard to the choice of methodology that warrant further comment. These are discussed below.

The IMO's recommendation with regard to the approach to addressing each of these issues is presented in section 7.1 of this report.

Overvaluation versus undervaluation of capacity

One issue that the IMO has carefully considered is the impact of undervaluing or overvaluing Capacity Credit allocations. Overvaluation of the level of CRC assigned to any Facility will potentially lead to a lower level of reliability being delivered to customers than is contemplated under the Market Rules. There are 2 possible outcomes of this scenario:

- No action is taken and reliability is compromised in the longer term;
- As per suggestions, the reliability criterion could be adjusted (increased) to allow for the lower level of confidence in the capacity delivered by those facilities which have been over-valued.

In the latter case, additional capacity would need to be purchased to maintain the same level of reliability. This is inefficient and creates an additional cost burden to procure this capacity (to remove the cross-subsidy that would exist).

Undervaluation of capacity will mean loss of income to Capacity Credit providers. This will reduce the competitiveness of these entities.

Regulatory risk and transitional arrangements

Regulatory risk is a real issue as inappropriately changing the investment signals has and will continue to cause concern for investors. For the RCM to be successful in the longer term, the technical provisions must be as correct as possible while maintaining a stable investment environment.

In preparing this draft report, the IMO has undertaken a number of steps to address regulatory risk concerns. First it has sought to adopt a methodology that most closely reflects the reliability value of Intermittent Generators both in terms of structure and overall level. The additional component in modified Methodology 1 makes it more flexible and thus reduces the risk that a future change in structure is required. This reduces the risk for investors of a significant future revision to the determination of Capacity Credits.

Second, the IMO has established a more comprehensive three year review period of the methodology than was originally proposed under either RC_2010_25 or RC_2010_37. Based on the recommendations of the Sapere report and as suggested by the Office of Energy in its submission on both proposals, the review will include, but is not limited to, the consideration of:

- the operational impacts of any amendments to the Market Rules on modified Methodology 1;
- the correlation between Intermittent Generator output and the periods of high system risk (given the availability of a larger data set at such time);
- how the peak Trading Intervals are selected for the analysis;
- the penetration of Intermittent Generators in the SWIS and whether there is a need to investigate alternative valuation methodologies;
- the use of more sophisticated techniques such as regression analysis to forecast the output of Intermittent Generators during peak periods; and

- the effectiveness of modified Methodology 1 in meeting the Wholesale Market Objectives.

The three year review will determine the value of the parameters K and U used in the methodology to be applied during each of the three Reserve Capacity Cycles commencing during the three year period.

Third, the IMO has put forward a three year glide path from the current methodology. The details of this are provided in Section 5.3.2. This transition path reflects the major change in the methodology selected.

The view of the consultant engaged by the REGWG

MMA, the consultant engaged by the REGWG, assessed a number of methodologies (five are presented in MMA's August 2010 report). MMA recommended against using Methodology 1 — in preference for a methodology based on average output of each facility in the 750 peak intervals — mainly on the basis that Methodology 1 was too conservative. [14]

However, the IMO's view is that MMA's assessment does not sufficiently reflect the risk to reliability. The MMA assessment was primarily based on Loss of Load Probability (LOLP) analysis conducted by MMA as part of Work Package 2. This analysis — based on historical data — provided results (LOLP Capacity) similar in amount to the average of the results from the top 750 Trading Intervals.

The IMO has two main concerns. First, there was significant uncertainty in the LOLP capacity values. For example, for wind farms, the 80 percent confidence interval of the LOLP capacity values ranged from a 30 to 50 percent capacity valuation. The results of Methodology 1 were consistent with this uncertainty. As noted by MMA [emphasis added]:

> *"The overall assessed capacity [under Methodology 1] for wind is much less than what was obtained from the LOLP and reliability equalisation analysis previously reported,* ***although comparable*** *to the lower end of the range given the uncertainty in that assessment ..."* [15]

These conclusions are similar to the analysis provided in Section 6.2. While there are some differences in the average Intermittent Generator output from the top 12 and top 750 Trading Intervals, this is not the main difference between the methodologies.

Second — and more significantly — is the concern that historical data used in the MMA analysis does not reflect the additional risk that historical outcomes do not adequately reflect the distribution of outcomes in the future. The IMO notes that there is little evidence of the performance of large-scale Intermittent Generators during peak conditions. As discussed in Section 6.2.3, the little evidence that exists indicates that intermittent generator output may be lower during extreme peak periods.

The Office of Energy and System Management both strongly recommended taking a conservative approach to this aspect of the RCM, given their concerns for reliability and speculation about the variability of outcomes of predominantly wind farms. System

[14] See 'Analysis of Procedures for Assessing the Capacity Value of Intermittent Generation in the Wholesale Electricity Market', Draft report to the Independent Market Operator, MMA, August 2010.
[15] Ibid, page 13.

Management considers that the averaging methodology (Griffin Energy's proposal) introduces additional and unacceptable risk to Power System Security and reliability (as reflected in its submissions on both proposals).

The use of the Load for Scheduled Generation methodology

The use of LSG as the basis for determining the Trading Intervals attracted some attention from interested stakeholders during both the deliberations of the REGWG and the first submission period for both proposals.

The use of LSG may appear to be biased against Intermittent Generators, as, for a given level of total demand, LSG is lowest when Intermittent Generator output is highest. However, selecting the average Intermittent Generator output from peak Trading Intervals as measured by total sent out generation would tend to overestimate the benefit of Intermittent Generators in reducing the peak demands on Scheduled Generation (see Box 2 below).

Box 2: The effect of Load for Scheduled Generation (LSG)

The value of Intermittent Generators and the impact of using LSG can be shown in the following simple two-period example. The example shows how Intermittent Generators contribute to reducing the peak load to be met by Scheduled Generators.

Period	a. Peak total sent out generation	*b.* Intermittent Generation	LSG (=a – b)	
1	**2,100**	***100***	2,000	Old peak period
2	2,080	***50***	**2,030**	New peak period
Reduction in peak = 2,100 – 2,030 = **70.**				

In the absence of intermittent generation the peak load to be met by Scheduled Generators would be 2,100 units (in period 1). With intermittent generation, the peak load to be met by Scheduled Generators is determined by the peak LSG which 2,030 units (in period 2). Thus the value in peak reduction from the Intermittent Generator (IG) fleet is 70 units. However, the fleet output at the peak LSG is only 50 units and fleet output at peak total sent out generation (TG) is 100 units.

More generally it is clear that:

IG output at peak LSG	≤	Reduction in peak to be met by scheduled generation (i.e. Peak TG minus Peak LSG)	≤	IG output at peak TG

If Intermittent Generator output was constant then all three values would be identical.

Source: Adapted from the Sapere Report

Further, there is a strong rationale for using LSG to identify the Trading Intervals to be analysed as LSG is highest in Trading Intervals when additional capacity has the highest value to the market.

By their nature, Intermittent Generators cannot be scheduled. Given this, short term increases in capacity must be drawn from Scheduled Generator facilities. When LSG is high, the availability of additional Scheduled Generator capacity is lowest and the value of additional capacity is highest. Conversely, when LSG is low, additional capacity can be drawn from existing Scheduled Generators. In contrast, the use of total demand to identify Trading Intervals would not necessarily lead to selecting the Trading Intervals when the value of additional capacity is highest.

A related concern raised by stakeholders is that an increase in Intermittent Generator output at peak LSG times will result in a reduction of LSG in these times and change when peaks Trading Intervals are determined. While this is a possibility, it is consistent with the operation of an effective market. That is, the value of capacity reacts to changes in supply.

The use of LSG is not expected to materially impact the total value of Capacity Credits allocated to Intermittent Generators as the use of LSG was a consideration in determining the parameters used in modified Methodology 1. Further it is expected that LSG will be a consideration in future reviews of the methodology.

Fleet impacts

The original IMO proposal had a fleet adjustment factor that modified individual capacity. This raised some concerns by participants (refer to items 136 and 137 in Appendix 4). The modified Methodology 1 does not have such an adjustment.

However it should also be noted that:

- The true capacity value of an Intermittent Generator depends in part on its performance relative to the rest of the fleet. For example, there is value in diversity of Intermittent Generator resources as this reduces the risk of low fleet output during peak times; and
- Under both modified Methodology 1 and Methodology 2 a facility's Capacity Credit valuation is potentially impacted by other Intermittent Generators through the use of LSG for selecting top Trading Intervals.

These issues are not currently significant. However these matters be considered in future reviews of the methodology.

Avoidance of discrimination

While the IMO agrees that there is a need to ensure that the right amount of investment in generation in the SWIS is encouraged, the Market Rules must avoid discrimination in the market against particular energy options and technologies (Market Objective (c)). The IMO considers that correctly reflecting the contribution all Intermittent Generators technologies make to system reliability during peak events will ensure that they are allocated Capacity Credits on a similar basis to other technology types.

6.5 Practicality and Cost of Implementation

Cost

Identified IT change costs

The proposed amendments will require changes to the Wholesale Electricity Market Systems operated by the IMO. The costs of these changes are estimated to be:

- RC_2010_25: between $113,000- $122,000

- RC_2010_37: between $85,000 - $113,900

Both of the proposed changes would require updates to System Management's IT systems. These costs have not been evaluated by System Management as there is no IMO Interface Specification on which to base these costs. It is expected that IT interface modifications to reflect changes resulting from either methodology may be significant.

The IMO notes that no other submitting parties identified any IT costs associated with the proposed changes.

Updates to Market Procedures:

The IMO also notes that there will be updates required to the following IMO and System Management Market Procedures as a result of either RC_2010_25 or RC_2010_37:

- Certification of Reserve Capacity (IMO);
- Information Confidentiality (IMO);
- Data Cleansing (System Management);and
- Operational Data Points for Generating Plant (System Management)

The IMO considers that these costs fall within the day to day operation of the IMO and System Management and therefore will not incur additional personnel costs.

Practicality

The IMO notes that a number of Market Participants identified costs to their current asset values for Intermittent Generator assets. To reduce the impacts the IMO Board has considered the implementation of a 3 year glide path (for the 2012 – 2014 Reserve Capacity Cycles). For further details refer to section 7.1 of this report.

The IMO has not identified any other issues with the practicality of implementing either of the proposed changes.

7 THE IMO BOARD'S PROPOSED DECISION

In accordance with clause 2.7.7 (f), the IMO Board's proposed decision on:

- RC_2010_25 is to accept the proposed amendments presented in RC_2010_25, as modified by the amendments outlined in section 5.4 and specified in Appendix 5 of this report (modified Methodology 1); and

- RC_2010_37 is to reject the proposed amendments in RC_2010_37 (Methodology 2).

7.1 Reasons for the IMO Board's proposed decision

Given the lack of evidence surrounding the performance of large scale Intermittent Generator facilities in the SWIS during extreme peak demand events, it is difficult to accurately assess the real contribution that these facilities make to the RCM. This will remain an issue for some time and the IMO Board must choose an appropriate course of action based on the balance of information and submissions it has before it.

The IMO's detailed assessment set out at Section 6.3 above indicates that both methodologies could be expected to result in the Market Rules better achieving Wholesale Market Objectives (a), (b), (c) and (d). Both proposals would also more fairly reflect the contribution of solar generation facilities to power system reliability at times of peak output than the current Capacity Credit valuation methodology for Intermittent Generators which undervalues their contribution.

However the 2 methodologies are mutually exclusive. In making its proposed decisions on each of the proposals, the IMO Board has given substantial weight to the area where the 2 methodologies are clearly distinguishable, that is, in the area of alignment with the reliability criterion. On the weight of current information and analysis, the IMO Board considers it most appropriate to select modified Methodology 1.

After taking into account all of the submissions made on the proposals (as summarised in Appendix 3) and the advice and recommendations presented in the Sapere report, the IMO Board proposes to accept Methodology 1 in a modified form and reject Methodology 2 on the basis that:

- Modified Methodology 1 is more accurate at reflecting the actual performance of Intermittent Generators during peak periods and thereby better achieves the Market Objectives than Methodology 2.
- Given the lack of available data on the performance of Intermittent Generators during peak periods and the complexity of the matter at hand, a more conservative approach is required.
- Notwithstanding the conclusions reached by MMA in its review, lack of performance data during extreme peak conditions is a significant concern for the IMO and a reassessment should be conducted following any extreme peak event (as per the IMO's Rule Change Proposal).
- The adoption of a lesser number of intervals on which the performance of an Intermittent Generator is assessed appears to be better aligned with the intent of the Planning Criterion, in conditions where there is sufficient energy-producing plant available on the SWIS.

The IMO Board also proposes to implement a 3 year glide path (to apply for the 2012 – 2014 Reserve Capacity Cycles) during the initial implementation of modified Methodology 1 and to require a 3 year review of the methodology to be undertaken by the IMO prior to 1 January 2015. The IMO Board considers a 3 year review period is appropriate as over this period further performance information will be available to the IMO which will enable analysis to be undertaken on the performance of facilities during extreme peaks. The IMO Board also notes that any changes in international practice in this field during the 3 year period will be considered during such a review. Further, a 3 year review is appropriate given the likely increase in the penetration of Intermittent Generation over the next few years.

In making these proposed decisions, the IMO Board has relied on a number of findings and conclusions it has reached with regard to the relevance and weight of the material before it, as set out in detail in Section 6 and as summarised below.

7.1.1 Overvaluation versus undervaluation of capacity

The IMO Board considers that the lack of evidence surrounding the performance of large-scale Intermittent Generators in the SWIS during extreme peak demand events is expected to remain an issue for some time. The IMO Board does not consider it appropriate to continue to apply a current distortion in the valuation of Capacity Credits

for Intermittent Generators. The IMO notes that it must choose an appropriate course of action based on the balance of information and submissions it has before it.

7.1.2 Regulatory risk and transitional arrangements

The IMO Board acknowledges that there may be negative impacts on the asset values of some Intermittent Generators associated with either of the proposed rule changes.

However, with regard to regulatory risk and the need for transitional arrangements, the IMO Board notes the following:

- Most existing Intermittent Generators were in development prior to the start of the market;
- The WEM has a rule development process which implicitly allows the market to evolve over time consistent with the Market Objectives;
- Concerns over the capacity valuations of Intermittent Generators have been raised by participants for some time. More formally, a review of, and potential changes to the level of CRC and Capacity Credits for Intermittent Generators, were identified in the 2008 - 2011 Statement of Opportunities Reports, with the intention of notifying existing and potential investors of possible changes;
- The market is designed on the premise that capacity will be largely bilaterally contracted and the capital cost recovery will be a matter between bilateral counterparties; and
- Capacity prices in the market have risen significantly over the past 5 years so, to the extent that owners of Intermittent Generators are not bilaterally covered, their financial exposure is likely to have been less than if capacity prices had not grown as they have over previous years.

Further, the IMO Board is of the view that the overvaluation of Capacity Credits of Intermittent Generator facilities potentially propagates inefficient signals to other sectors of the market in the long term.

Overall the IMO Board however considers that the implementation of a 3 year glide path (to apply for the 2012 – 2014 Reserve Capacity Cycles) to the new modified Methodology 1 will strike an appropriate balance between reducing the financial impact on Market Participants and not continuing to generate market inefficiencies.

7.1.3 The view of the consultant engaged by the REGWG

Given the factors outlined in section 6.2 of this report, the IMO Board has determined that MMA's assessment does not sufficiently reflect the risks to reliability and, for this reason, the IMO Board has decided not to accept MMA's recommendation. As noted previously, the IMO considers that modified Methodology 1 better reflects the risks to reliability in the SWIS than Methodology 2.

7.1.4 The use of the LSG methodology

The IMO Board has determined that there is strong rationale for using LSG to identify the Trading Intervals to be analysed in determining the capacity valuation for Intermittent Generators. This is because a LSG-based methodology is reflective of the Trading Intervals when additional capacity has highest value.

7.1.5 The use of a fleet adjustment

The original Methodology 1 included a fleet adjustment to the average facility output and an adjustment for the variability in the fleet output based on the standard deviation of annual average fleet peak output. The fleet adjustment for the average facility output has been removed under the modified Methodology 1 because as set out in the Sapere report it was no longer necessary. The IMO Board considers it is more appropriate to assign Capacity Credits based on an individual facilities performance than the fleet performance, thereby ensuring consistency with the approach adopted for Scheduled Generators.

The IMO Board notes that a key justification for the original fleet adjustment was to allow for averaging over a small number of peak Trading Intervals without introducing significant volatility. By selecting Trading Intervals from separate days this can be achieved at a facility level without introducing excessive volatility.

The adjustment for standard deviation in the annual average fleet peak output has been replaced with an adjustment for variance in individual facility performance during the peaks. This adjustment was changed to better reflect theory and international practice and the nature of causes of the adjustments. The modified approach also ensures that facilities with stable output during peaks are not penalised by variable output of other facilities.

However the IMO Board notes that fleet considerations will still be relevant:

- The capacity value of an Intermittent Generator in part depends on how it performs relative to the Intermittent Generator fleet due to the value of diversity.
- Under the modified Methodology 1 (and Methodology 2) a facility's Capacity Credit valuation is potentially impacted by other Intermittent Generators through the use of LSG for selecting the top Trading Intervals.

7.1.6 Avoidance of discrimination

While the IMO Board agrees that there is a need to ensure that the right amount of investment in generation in the SWIS is encouraged, the Market Rules must avoid discrimination against particular energy options and technologies. The IMO Board considers that adoption of modified Methodology 1 will ensure that correct signals for investment decisions in the SWIS are provided and thereby remove a potential discrimination in favour of Intermittent Generators.

The IMO Board notes the modified Methodology 1 benefits those facilities with output that is greatest and most stable during the very peak times.

7.1.7 The views of the MAC

The IMO Board notes that, due to the fact that the MAC did not reach a view on the preferred proposal, the MAC's advice was not determinative in the IMO Board's proposed decisions on each of the proposals (refer to section 6.5 and Appendix 6).

8 PROPOSED AMENDING RULES

The IMO Board proposes to implement the following Amending Rules (added text, ~~deleted text~~)[16]:

4.11.3A. In order to determine the Relevant Level for a Facility under clause 4.11.2(b), the IMO must apply the methodology described in Appendix 9.

~~The Relevant Level in respect of a Facility at a point in time is determined by the IMO following these steps:~~

~~(a) take all the Trading Intervals that fell within the last three years up to, and including, the last Hot Season, excluding any Trading Intervals where the Facility either:~~

~~i. was owned, controlled or operated by a Market Participant other than the Electricity Generation Corporation and:~~

~~1. was affected by a Planned Outage or Consequential Outage as notified under clause 7.13.1A; or~~

~~2. was issued a Dispatch Instruction from System Management as notified under clause 7.13.1(c); or~~

~~ii. was owned, controlled or operated by the Electricity Generation Corporation and:~~

~~1. was affected by a Planned Outage or Consequential Outage as notified under clause 7.13.1A; or~~

~~2. was issued an instruction from System Management to deviate from the Dispatch Plan or change its commitment or output as notified under clause 7.13.1C;~~

~~(b) determine the amount of electricity (in MWh) sent out by the Facility in accordance with Meter Data Submissions received by the IMO in accordance with clause 8.4 for all Trading Intervals occurring during the period referred to in step (a);~~

~~(c) if the Facility has not entered service, or if it entered service during or after the period referred to in step (a), estimate in accordance with the Reserve Capacity Procedure the amount of electricity (in MWh) that would have been sent out by the Facility, had it been in service, for all Trading Intervals occurring during the period referred to in step (a) which are prior to it entering service;~~

[16] The IMO notes that the proposed amendments to clauses 4.11.3A, 7.7.5E and 7.13.1C reflect the Amending Rules resulting from RC_2010_24 which are due to commence on 1 July 2011. Likewise, clause 7.13.1 reflects the Amending Rules resulting from the Rule Change Proposal: Curtailable Loads and Demand Side Programmes (RC_2010_29) which will commence at 8:00AM on 1 October 2011.

(cA) if, during the period described in step (a), the Facility's output was reduced in order to comply with a Dispatch Instruction from System Management, issued in accordance with clause 7.7, use:

(a) the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of System Management Dispatch Instructions, provided by System Management in accordance with clause 7.13.1(eB); and

(b) the amount of electricity (in MWh) sent out for the Facility determined from Metered Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were excluded under step (a)(i)(2),

to estimate the amount of electricity (in MWh) that would have been sent out by the Facility, had it not complied with the Dispatch Instruction for all the Trading Intervals that were excluded under step (a)(i.)(2);

(cB) if, during the period described in step (a), the Facility's output was reduced in order to comply with an instruction from System Management under clause 7.6A.3(a) to deviate from the Dispatch Plan or change its commitment or output, use:

i. the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of an instruction from System Management in accordance with clause 7.6A.3(a), where this information has been either:

1. provided by System Management in accordance with clause 7.13.1C(b) for the Trading Intervals that were excluded under step (a)(ii)(2), where actual data for the site of the Facility has been provided to System Management under clause 7.7.5B; or

2. determined by the IMO in accordance with the Reserve Capacity Procedure for all the Trading Intervals that were excluded under step (a)(ii)(2), where actual data for the site of the Facility has not been made available to System Management under clause 7.7.5B; and

ii. the amount of electricity (in MWh) sent out for the Facility determined from Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were excluded under step (a)(ii)(2),

to estimate the amount of electricity (in MWh) that would have been sent out by the Facility had it not complied with System Management's instruction for all the Trading Intervals that were excluded under step (a)(ii)(2); and

~~(d) set the Relevant Level as double the sum of the quantities determined in steps (b), (c), (cA) and (cB) divided by the total number of Trading Intervals identified in steps (a), (cA) and (cB).~~

4.11.3B. For each three year period, beginning with the period commencing on 1 January 2015, the IMO must, by 1 April of the first year of that period, conduct a review of the methodology described in Appendix 9. In conducting the review, the IMO must:

(a) examine the effectiveness of the methodology in meeting the Wholesale Market Objectives; and

(b) determine the values of the parameters K and U used in the methodology to be applied for each of the three Reserve Capacity Cycles commencing in the period,

and the IMO may examine any other matters that the IMO considers to be relevant.

4.11.3C. In conducting a review under clause 4.11.3B, the IMO must publish a draft report and invite submissions from Rule Participants and any other stakeholders the IMO considers should be consulted.

4.11.3D. At the conclusion of a review under clause 4.11.3B, the IMO must publish a final report containing:

(a) details of the IMO's examination of the methodology;

(b) a summary of the submissions received during the consultation period;

(c) the IMO's response to any issues raised in those submissions;

(d) the values of the parameters K and U to be applied for each of the Reserve Capacity Cycles commencing during the relevant period; and

(e) any recommended amendments to the methodology described in Appendix 9.

6.17.6 The Dispatch Instruction Payment, DIP(p,d,t), for Market Participant p and Trading Interval t of Trading Day d equals either:

(a) zero, if Market Participant p:

i is the Electricity Generation Corporation; or

ii was issued no Dispatch Instructions for Trading Interval t;

or the sum of:

...

(c) the sum over all Non-Scheduled Generators registered by the Market Participant of the amount that is the product of:

i. the quantity, defined as a negative value, by which the Non-Scheduled Generator was instructed by System Management to reduce its output, as provided to the IMO by System Management under clause 7.13.1(eB) (where for the purpose of

this calculation a Loss Factor adjustment is to be applied to the quantity specified by System Management so that the result is measured at the Reference Node); and

ii. the Standing Data price defined in Appendix 1(e)(v) that was current at the time of the Trading Interval for the Non-Scheduled Generator for a decrease in generation, (accounting for whether the Trading Interval is a Peak Trading Interval or an Off-Peak Trading Interval) less MCAP for the Trading Interval; and

…

7.7.5A. ~~For the purpose of determining the quantity described in clause 6.17.6(c)(i) for each Trading Interval, the quantity is:~~

~~(a) where System Management has been provided with information in accordance with clause 7.7.5B, System Management's estimate of the MWh reduction in output, by Trading Interval, of the Non-Scheduled Generator as a result of System Management's Dispatch Instruction; or~~

~~(b) in the case of a Non-Scheduled Generator included in a Resource Plan, for which System Management has not been provided with information in accordance with clause 7.7.5B, the greater of zero and the MWh difference between the Resource Plan MWh quantity of the Non-Scheduled Generator less the MWh output of the Non-Scheduled generator over the Trading Interval implied by its Dispatch Instruction~~.

System Management must document in a Power System Operation Procedure the information required to be provided by a Market Participant to System Management for each of its Non-Scheduled Generators for each Trading Interval to allow estimation of the output of each Facility (in MWh) by:

(a) System Management, as required under clause 7.7.5B(a); and

(b) the IMO, as required under Appendix 9,

and System Management and Market Participants must follow that documented Market Procedure.

7.7.5B. ~~A Market Participant may provide System Management with information specified in the Power System Operation Procedure to support the calculation of the quantity described in clause 7.7.5A(a).~~

The quantity reduction in the output of a Non-Scheduled Generator as a result of a Dispatch Instruction from System Management (in MWh) for each Trading Interval to be used in clause 6.17.6(c)(i) is:

(a) where information has been made available to System Management under the Power System Operation Procedure referred to in clause 7.7.5A, System Management's estimate of the decrease in output of the Non-Scheduled Generator (in MWh) during the Trading Interval; or

(b) in the case of a Non-Scheduled Generator included in a Resource Plan, for which System Management has not been provided with information under the Power System Operation Procedure referred to in clause 7.7.5A, the greater of zero and the difference between the Resource Plan quantity of the Non-Scheduled Generator (in MWh) less the output of the Non-Scheduled Generator (in MWh) over the Trading Interval implied by its Dispatch Instruction.

~~7.7.5C. The Power System Operation Procedure must specify that actual wind data for the site of a wind farm and the number of turbines operating, if made available by a Market Participant to System Management, are sufficient to allow System Management to determine what the output of a wind farm would have been had no Dispatch Instruction been issued.~~

~~7.7.5D [Blank]~~

~~7.7.5E Where the Electricity Generation Corporation has made information available to System Management in accordance with clause 7.7.5B and the Power System Operation Procedure, System Management must estimate for each Trading Interval the decrease, in MWh, in the output of each Electricity Generation Corporation Non-Scheduled Generator as a result of an instruction from System Management to deviate from the Dispatch Plan or change its commitment or output in accordance with clause 7.6.A.3(a).~~

7.13.1. System Management must provide the IMO with the following data for a Trading Day by noon on the first Business Day following the day on which the Trading Day ends:

…

(eB) the estimated decrease, in MWh, in the output of each Non-Scheduled Generator, by Trading Interval, as a result of System Management Dispatch Instructions, as determined in accordance with clause 7.7.5AB;~~, where this is to be used in settlement as the quantity described in clause 6.17.6(c)(i).~~

…

(g) details of the instructions provided to:

i. Curtailable Loads that have Reserve Capacity Obligations; and

ii. providers of Supplementary Capacity;

on the Trading Day; and

(h) the identity of the Facilities ~~which~~ that were subject to either a Commissioning Test or a test of Reserve Capacity for each Trading Interval of the Trading Day.

7.13.1C The IMO may request, and System Management must provide, within 10 Business Days of receipt of a request from the IMO, ~~provide the IMO with the following information:~~ all information made available to System Management

under the Power System Operation Procedure referred to in clause 7.7.5A for each Facility and each Trading Interval during the time period specified by the IMO in its request.

~~(a) a schedule of all instructions provided to the Electricity Generation Corporation's Non-Scheduled Generators to deviate from the Dispatch Plan or change their commitment or output in accordance with clause 7.6A.3(a) for each Trading Interval during the time period specified by the IMO in its request; and~~

~~(b) where the Electricity Generation Corporation has made actual wind data available in accordance with clause 7.7.5B, the estimated decrease, in MWh, in the output of each Electricity Generation Corporation Non-Scheduled Generator as a result of an instruction from System Management to deviate from the Dispatch Plan or change their commitment or output in accordance with clause 7.6A.3(a), as determined in accordance with clause 7.7.5E, for each Trading Interval during the time period specified by the IMO in its request, where this is to be used in the calculation of the Relevant Level described in clause 4.11.3A.~~

10.5.1. The IMO must set the class of confidentiality status for the following information under clause 10.2.1, as Public and the IMO must make each item of information available from the Market Web-Site after that item of information becomes available to the IMO:

(a) the following Market Rule and Market Procedure information and documents:

…

(f) the following Reserve Capacity information (if applicable):

i. Requests for Expressions of Interest described in clause 4.2.3 for the previous five Reserve Capacity Cycles;

…

ix. The following annually calculated and monthly adjusted ratios:

1. NTDL_Ratio as calculated in accordance with Appendix 5, STEP 8;

2. TDL_Ratio as calculated in accordance with Appendix 5, STEP 8; and

3. Total_Ratio as calculated in accordance with Appendix 5, STEP 10~~.~~; and

x. Load for Scheduled Generation and the relevant Load for Scheduled Generation Trading Intervals as determined under Appendix 9.

Glossary

Load for Scheduled Generation: The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of all Facilities that have applied to be assigned Certified Reserve Capacity under clause 4.11.2(b) adjusted for the impact of Consequential Outages on those Facilities, as determined in accordance with Appendix 9, step 6.

Appendix 9: Relevant Level Determination

This Appendix presents the methodology for determining the Relevant Levels for Facilities that have applied for certification of Reserve Capacity under clause 4.11.2(b) for a given Reserve Capacity Cycle ("candidate Facilities").

The IMO must perform the following steps to determine the Relevant Level for each candidate Facility:

Determining the Facility Average Performance Level

Step 1: Identify the five year period ending at 8:00 AM on 1 April of Year 1 of the relevant Reserve Capacity Cycle.

Step 2: Determine the quantity of electricity (in MWh) sent out by each candidate Facility using Meter Data Submissions for each of the Trading Intervals in the period identified in step 1.

Step 3: For each candidate Facility, identify any Trading Intervals in the period identified in step 1 where the Facility was affected by a Consequential Outage as notified to the IMO under clause 7.13.1A.

Step 4: For each candidate Facility and Trading Interval identified in step 3 use:

(a) the schedule of Consequential Outages provided by System Management under clause 7.13.1A;

(b) the quantity determined for the candidate Facility and Trading Intervals identified in step 2; and

(c) the information provided by System Management under clause 7.13.1C

to estimate the quantity of electricity (in MWh) that would have been sent out by the Facility had it not experienced a Consequential Outage during the Trading Interval.

Step 5: If a candidate Facility was not in service for one or more of the Trading Intervals in the period identified in step 1, then determine, for each Trading Interval in the period during which the Facility was not in service, an estimate of the quantity of electricity (in MWh) that would have been sent out by the Facility had it been in service. The estimates must reflect the estimates in the expert report provided for the Facility under clause 4.10.3, unless the IMO reasonably does not consider the expert report to be accurate.

Step 6: For each Trading Interval in the period identified in step 1, determine the Load for Scheduled Generation (in MWh) as:

(a) the total sent out generation of all Facilities, as determined from Meter Data Submissions; minus

(b) the total sent out generation of all the candidate Facilities, as determined in step 2 or as estimated under steps 4 or 5 as applicable.

Step 7: Identify for each year during the period identified in step 1, the 12 Trading Intervals occurring on separate Trading Days with the highest Load for Scheduled Generation as determined under step 6.

Step 8: For each candidate Facility and each of the 60 Trading Intervals identified in step 7, multiply the sent out generation (in MWh) of the Facility in the Trading Interval, as determined in step 2 or as estimated under steps 4 or 5 (as applicable) by 2 to convert to units of MW.

Step 9: Determine the **Facility Average Performance Level** for each candidate Facility. The Facility Average Performance Level for Facility f (in MW) is the mean of the MW quantities determined for the Facility in step 8 for the 60 Trading Intervals identified under step 7.

Determining the Facility Adjustment Factor

Step 10: Determine the **Facility Variance** for each candidate Facility. The Facility Variance for Facility f (in MW) is the variance of the MW quantities determined for the Facility in step 8 for the 60 Trading Intervals identified in step 7.

Step 11: Determine the **Facility Adjustment Factor** for each Facility f (in MW) in accordance with the following formula:

Facility Adjustment Factor = G x Facility Variance (f)

Where

G = K + U/Facility Average Performance Level (f)

K is determined in accordance with the following table:

Reserve Capacity Cycle	**Capacity Year**	**K value**
2012	2014/15	0.001
2013	2015/16	0.002
2014	2016/17	0.003
2015 onwards	From 2017/18	To be determined by the IMO

	onwards	as part of the review required under clause 4.11.3B.

U is determined in accordance with the following table:

Reserve Capacity Cycle	Capacity Year	U
2012	2014/15	0.211
2013	2015/16	0.422
2014	2016/17	0.635
2015 onwards	From 2017/18 onwards	To be determined by the IMO as part of the review required under clause 4.11.3B.

Determining the Relevant Level for a Facility

Step 12: Determine the Relevant Level for each candidate Facility f (in MW) in accordance with the following formula:

Relevant Level (f) = max(0, Facility Average Performance Level (f) - Facility Adjustment Factor (f))

Publication of information

Step 13: Publish the Trading Intervals identified in step 7 and the Load for Scheduled Generation calculated in step 6 on the Market Web Site by 1 August of the relevant Reserve Capacity Cycle.

APPENDIX 1: IMO'S ORIGINAL RULE CHANGE PROPOSAL (RC_2010_25)

Background

The IMO noted in its Rule Change Proposal that a key objective for the WEM is to ensure that electricity and related services are provided reliably and economically. This is a significant challenge in Western Australia because the electricity system is isolated and supplies cannot be drawn from neighbouring systems during times of system peak demand.

The provision of capacity in Western Australia is achieved through the RCM. This is a set of processes through which the IMO determines the amount of generation and Demand Side Management capacity required to meet future peak system demand and reliability requirements.

The current incentives for investment in the WEM, as provided by the RCM, distinguish broadly between Scheduled Generation and Intermittent Generation. They are as follows:

- Scheduled Generation – assigned Capacity Credits at a level equivalent to the level of electrical output produced on a sent-out basis at 41 degrees Celsius (in accordance with clause 4.11.1(a)); and
- Intermittent Generation – assigned Capacity Credits based on their average capacity factor over a three year period (in accordance with clause 4.11.2(b)[17]). This has historically equated to valuing wind farms at 38 to 42 percent of their nameplate capacity. Modelling suggests that a solar generation plant would be valued between 20 percent and 30 percent of its nameplate capacity with this method.

The IMO noted that for comparison, a wind farm investing in the National Electricity Market (NEM) is assumed to receive in the order of 5 percent of nameplate capacity for reliability planning purposes. It should be noted that the NEM does not have a capacity market and the lower valuation does not affect the income of the individual wind farms.

Given the expanded MRET scheme to achieve a national target of 20 percent of renewable generation in 2020, there is a possibility of greater momentum in renewable energy generation growth, particularly wind generation, in the SWIS. Greater renewable energy penetration in the SWIS would impact significantly on the composition of the available capacity.

Issues

The IMO noted that the intent of the RCM is to ensure that there is sufficient capacity at peak demand times. This intent is reflected in the valuation methodology for Scheduled Generators that focuses on peak demand times by assessing the sent out capacity likely to be available at an ambient temperature of 41°C. By contrast, the current methodology for Intermittent Generators (IGs), based on the three-year average output, does not

[17] The IMO noted that there is no restriction on the ability of each type of technology to apply for certification in accordance with either of the Capacity Credit allocation methodologies. However, predominantly since market start Intermittent Generators have applied for certification in accordance with clause 4.11.2(b). Note that during the October 2010 MAC meeting, the MAC endorsed that the methodology for certification under clause 4.11.1(a) be limited to Scheduled Generators.

focus on peak demand times and is thus not obviously aligned with the intent of the RCM. The capacity of an IG is subject to technology-specific constraints and risks such as weather conditions which impact on its ability to provide the required capacity during peak periods.

Given the momentum driving the growth in renewable energy providers on the SWIS, concerns have been raised regarding the current Capacity Credit valuation methodology for IGs. Specifically:

- Doubts have been expressed as to whether the three-year average accurately represents the capacity that can be reliably delivered by wind generators. System Management, in particular, has expressed concern that excessively high valuations for wind farms could reduce the capacity available during a peak demand event and jeopardise the security of the power system.
- It has been widely acknowledged that the current valuation methodology is unsuitable for solar generation and undervalues this capacity. The current method includes overnight and winter periods that are outside peak demand times and during which solar output is low.

These concerns highlight the importance of ensuring that the investment signals provided by the RCM strike a balance between providing appropriate remuneration for Intermittent Generation and ensuring system security and reliability can be maintained.

Renewable Energy Generation Working Group

In light of the expected increase in Intermittent Generation capacity in the SWIS, the appropriateness of the current capacity valuation methodology for Intermittent Generation capacity has been reviewed by the REGWG. The REGWG was convened by the MAC at its meeting on 12 March 2008 to consider and assess system and market issues arising from increasing penetration of Intermittent Generation[18]. A work program which broadly comprised four Work Packages was established to address these issues.

Work Package 2 sought to address these issues through the development of a capacity valuation methodology that would accurately value the contribution of Intermittent Generators at times of peak demand.

A key concept that was considered and recommended was the use of LSG when identifying the critical peak demand intervals. LSG is calculated using the load that remains after removing the level of intermittent generation in the market. The use of LSG can change the timing of critical system reliability conditions towards those times where the demand on Scheduled Generators is highest. This technique accounts for increasing penetration of Intermittent Generation and promotes diversity of technology types and location.

While failing to reach a consensus position on the matter of valuing Capacity Credits for Intermittent Generation, the REGWG supported the proposal that the IMO would nominate the valuation methodology that it felt best served the Market Objectives and would submit a Rule Change Proposal to the MAC.

Proposal

[18] Additional detail on the REGWG can be found on the IMO website: www.imowa.com.au/REGWG

The IMO recommended the implementation of the following methodology:

1. Identify in each of the eight previous years the 12 Trading Intervals which experienced the highest LSG. For this purpose, the LSG is calculated for each Trading Interval by subtracting the output from Intermittent Generation facilities (measured output from existing facilities and modelled output where the facility had not yet entered service) from the total sent out generation during that Trading Interval.
2. For each of the eight years, determine the average output of the Intermittent Generation fleet during the 12 Trading Intervals with the highest LSG.
3. Determine the 95 percent PoE level of the eight annual averages. This is the fleet capacity value.
4. Identify in each of the three previous years the 250 Trading Intervals which experienced the highest LSG.
5. Determine the average output of each individual Intermittent Generation facility for the 750 intervals determined in step 4. This is denoted below as the facility performance level.
6. Determine the sum of the facility performance levels determined in step 5. This is denoted below as the fleet performance level.
7. Apportion the fleet capacity value to each Intermittent Generation facility according to its performance over the 750 intervals.

   Relevant Level = (Facility Performance Level) / (Fleet Performance Level) × Fleet Capacity Value

The IMO noted that it has also considered the proposed amendments presented in the Draft Rule Change Report: Adjustment of the Relevant Level for Intermittent Generation (RC_2010_24). As agreed at the October 2010 MAC meeting the IMO has incorporated Alinta's proposed amendments to adjust for Trading Intervals where a Planned or Consequential Outage occurred or where output was curtailed following a request from System Management in the calculation of the highest 12 Trading Intervals for the Fleet each year. Additionally the IMO has adjusted for the incidence of Forced Outages in these intervals to avoid penalising all Non-Scheduled Generators due to Forced Outage at a single Facility.

The IMO noted that it has however excluded only periods where a Facility experiences a Consequential Outage from the determination of the 750 intervals for each individual Intermittent Generation facility. This is because instances of a Consequential Outage occurring are outside the control of a Facility. The IMO considered that it is reasonable to include all other instances of outages or curtailment following an instruction by System Management during the 750 Trading Intervals, as this will more appropriately reflect the availability of a facility during peak demand times. Network-related failures that result in a Dispatch Instruction being issued to a Facility should be reported as a Consequential Outage, and would be excluded accordingly.

The IMO considered that the proposed solution provides the following advantages:

- gives consideration to the reliability impacts of the capacity valuation methodology by valuing the intermittent generation fleet at the 95 percent PoE level;
- focuses on critical intervals of high system demand; and

- more fairly reflects the contribution of solar generation facilities to power system reliability at times of peak demand.

Proposed Amending Rules

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

The proposed amendment will specify that the IMO must determine the Relevant Level for a Facility in accordance with the methodology specified in Appendix 9.

4.11.3A. Where the IMO accepts a nomination to use the methodology prescribed in clause 4.11.2(b) to assign Certified Reserve Capacity, the IMO must determine the Relevant Level for that Facility using the methodology described in Appendix 9.

~~The Relevant Level in respect of a Facility at a point in time is determined by the IMO following these steps:~~

~~(a) take all the Trading Intervals that fell within the last three years up to, and including, the last Hot Season;~~

~~(b) determine the amount of electricity (in MWh) sent out by the Facility in accordance with metered data submissions received by the IMO in accordance with clause 8.4 during these Trading Intervals;~~

~~(c) If the Generator has not entered service, or if it entered service during the period referred to in step (a), estimate the amount of electricity (in MWh) that would have been sent out by the facility, had it been in service, for all Trading Intervals occurring during the period referred to in (a) which are prior to it entering service;~~

~~(d) set the Relevant Level as double the sum of the quantities determined in (b) and (c) divided by 52,560~~

The proposed new clause will require the IMO to conduct a five year review of the methodology for determining the Relevant Level for a Facility to ensure it is effective in its application.

4.11.3B At least once in every five year period, commencing from 1 October 2011, the IMO must conduct a review of the methodology for determining the Relevant Level for a Facility specified in clause 4.11.3A.

The proposed amendments are consistent with the amended requirement for all renewable energy generators to provide details of their fuel data for the Facility to System Management (i.e. wind data and number of turbines operating for a wind farm). The provision of wind farm data has previously been optional for Market Participants.

7.7.5A. For the purpose of determining the quantity described in clause 6.17.6(c)(i) for each Trading Interval, the quantity is~~:~~

~~(a) where System Management has been provided with information in accordance with clause 7.7.5B,~~ System Management's estimate of the MWh reduction in output, by Trading Interval, of the Non-Scheduled Generator as a result of System Management's Dispatch Instruction~~; or~~

~~(b) in the case of a Non-Scheduled Generator included in a Resource Plan, for which System Management has not been provided with information in accordance with clause 7.7.5B, the greater of zero and the MWh difference between the Resource Plan MWh quantity of the Non-Scheduled Generator less the MWh output of the Non-Scheduled generator over the Trading Interval implied by its Dispatch Instruction~~.

7.7.5B. A ~~Market Participant~~ Non-Scheduled Generator ~~may~~ must provide System Management with the information specified in the Power System Operation Procedure to support System Management's ~~the~~ calculation of the quantity described in clause 7.7.5A~~(a)~~ and the IMO's estimation in Appendix 9 of the impact of Planned Outages, Consequential Outages and Forced Outages on the output, by Trading Interval, of a Facility assigned Certified Reserve Capacity in accordance with the methodology specified in clause 4.11.2(b).

7.7.5C. The Power System Operation Procedure must specify the data required to be provided by a Non-Scheduled Generator to System Management for each Facility during each Trading Interval, where this information must be ~~that actual wind data for the site of a wind farm and the number of turbines operating, if made available by a Market Participant to System Management, are~~ sufficient to allow:

a) System Management to determine, in accordance with clause 7.7.5A, what the output of ~~the~~ each Facility ~~a wind farm~~ would have been had no Dispatch Instruction or request to deviate from its Dispatch Plan or change its commitment or output been issued; and

b) the IMO to determine, in accordance with Appendix 9, what the output of the Facility would have been had a Planned Outage, Consequential Outage or Forced Outage not occurred.

7.13.1. System Management must provide the IMO with the following data for a Trading Day by noon on the first Business Day following the day on which the Trading Day ends:

…

(g) details of the instructions provided to:

i. Curtailable Loads that have Reserve Capacity Obligations; and

ii. providers of Supplementary Capacity;

on the Trading Day; ~~and~~

(i) the identity of the Facilities which were subject to either a Commissioning Test or a test of Reserve Capacity for each Trading Interval of the Trading Day~~.~~; and

(j) the data provided by a Market Participant in accordance with clause 7.7.5B.

The proposed amendment will allow the IMO to publish the relevant information required by Market Participants to determine their certification value. This information will be published as public information by 1 May of each year. Further details of the level of information to be published will be specified in the Market Procedure for Certification of Reserve Capacity.

Note that the REGWG at its 12 August 2010 meeting agreed to progress a Rule Change Proposal to publish details of aggregate Intermittent Generator data.

10.5.1. The IMO must set the class of confidentiality status for the following information under clause 10.2.1, as Public and the IMO must make each item of information available from the Market Web-Site after that item of information becomes available to the IMO:

(a) the following Market Rule and Market Procedure information and documents:

…

(f) the following Reserve Capacity information (if applicable):

i. Requests for Expressions of Interest described in clause 4.2.3 for the previous five Reserve Capacity Cycles;

…

ix. The following annually calculated and monthly adjusted ratios:

1. NTDL_Ratio as calculated in accordance with Appendix 5, STEP 8;

2. TDL_Ratio as calculated in accordance with Appendix 5, STEP 8; and

3. Total_Ratio as calculated in accordance with Appendix 5, STEP 10~~.~~; and

x. Fleet-Assessment Load for Scheduled Generation, Facility-Assessment Load for Scheduled Generation and the relevant Trading Intervals as determined under Appendix 9.

Glossary

Facility-Assessment Load for Scheduled Generation: The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of Facilities which applied to be assigned Certified Reserve Capacity in accordance with clause 4.11.2(b) adjusted for the impact of Consequential Outages on those Facilities.

Fleet-Assessment Load for Scheduled Generation: The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of Facilities which applied to be assigned Certified Reserve Capacity in accordance with clause 4.11.2(b) adjusted for the impact on the output of those Facilities due to Consequential Outages, Planned Outages, Forced Outages, Dispatch Instructions and deviations from Dispatch Plans due to instructions from System Management.

The proposed new Appendix 9 will specify the methodology followed by the IMO in determining each Facility's Relevant Level. Alternatively, this could be presented in a Market Procedure.

Appendix 9: Relevant Level Determination

This Appendix presents the methodology for determining the Relevant Level for a Facility which has applied for certification of Reserve Capacity in accordance with the methodology prescribed in clause 4.11.2(b).

The IMO must perform the following steps in determining the Relevant Level for Facility in accordance with clause 4.11.3A:

Determining the Fleet Capacity Value

Step 1: Take all the Trading Intervals that occurred with the eight year period ending on the Trading Day ending on 1 April of Year 1 of the relevant Reserve Capacity Cycle.

Step 2: Determine the amount of electricity (in MWh) sent out by all Facilities applying for Certified Reserve Capacity under clause 4.11.2(b) using the Meter Data Submissions received by the IMO in accordance with clause 8.4 during the Trading Intervals identified in step 1.

Step 3: Identify any Trading Intervals in step 1 where a Facility, as identified in step 2, either:

a) was owned, controlled or operated by a Market Participant other than the Electricity Generation Corporation and was issued a Dispatch Instruction from System Management as notified under clause 7.13.1(c); or

b) was owned, controlled or operated by the Electricity Generation Corporation and was issued an instruction from System Management to deviate from its Dispatch Plan or change its commitment or output as notified under clause 7.13.1(cC); or

c) was affected by a Forced Outage, Planned Outage or Consequential Outage as notified under clause 7.13.1A; or

Step 4: If, as identified in step 3 (a), a Facility's output was reduced in order to comply with a Dispatch Instruction from System Management, issued in accordance with clause 7.7, use:

(a) the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of System Management Dispatch Instructions, provided by System Management in accordance with clause 7.13.1(eB); and

(b) the amount of electricity (in MWh) sent out for the Facility in accordance with the Metered Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3 (a)(ii.),

to estimate the amount of electricity (in MWh) that would have been sent out by the Facility, had it not complied with the Dispatch Instruction for all the Trading Intervals identified under step 3(a)(ii.). Use these estimated values to replace the amount of electricity identified in step 2 for the relevant Trading Intervals.

Step 5: If, as identified in step 3 (b), a Facility's output was reduced in order to comply with an instruction from System Management under clause 7.6A.3(a) to deviate from its Dispatch Plan or change its commitment or output, use:

(a) the estimated decrease (in MWh) in the output of that Facility, by Trading Interval, as a result of an instruction from System Management in accordance with clause 7.6A.3(a), provided by System Management in accordance with clause 7.13.1(eD); and

(b) the amount of electricity (in MWh) sent out for that Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3 (b)(ii.),

to estimate the amount of electricity (in MWh) that would have been sent out by that Facility had it not complied with System Management's instruction for all the relevant Trading Intervals that were excluded under step 3 (b)(ii). Use these estimated values to replace of the amount of electricity identified in step 2 for all the relevant Trading Intervals identified in step 3.

Step 6: If, as identified in step 3 (c), a Facility's output was reduced due to a Forced Outage, Planned Outage or Consequential Outage, as notified under clause 7.13.1A, use:

(a) the schedule of Planned Outages, Consequential Outages and Forced Outages provided by System Management in accordance with clause 7.3.4 and 7.13.1A;

(b) the amount of electricity sent out for that Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3 (a) (i) and step (b) (i); and

(c) the data provided by System Management in accordance with clause 7.13.1(i),

to estimate the amount of electricity (in MWh) that would have been sent out by that Facility had it not experienced a Forced Outage, Planned Outage or Consequential Outage . Use these estimated values to replace of the amount of electricity identified in step 2 for all the relevant Trading Intervals identified in step 3.

Step 7: If a Facility has not yet entered service, or if it entered service during the period referred to in step 1, use the estimates included in the expert report provided in accordance with clause 4.10.3 for the period that Facility was not in service, unless the IMO reasonably believes the report to be inaccurate.

Step 8: Determine, for each Trading Interval during the period described in step 1, the Fleet-Assessment Load for Scheduled Generation by subtracting the sent out generation contribution of all Facilities which applied to be certified under clause 4.11.2(b), as identified in step 2 and updated under steps 4, 5, 6 and 7 as applicable ("Fleet Interval Performance Level"), from the total sent out generation of all Facilities for each Trading Interval.

Step 9: Determine for each year during the period identified in step 1, the 12 Trading Intervals with the highest Fleet-Assessment Load for Scheduled Generation as identified under step 8.

Step 10: Determine for each year during the period identified in step 1, the mean of the Fleet Interval Performance Level ("Fleet Annual Mean Performance Level") during the 12 Trading Intervals identified under step 9.

Step 11 Determine using a t-distribution the mean ("Fleet Mean") and standard deviation ("Fleet SD") of the Fleet Annual Mean Performance Levels for the period identified in step 1.

Step 12: Determine the **Fleet Capacity Value (MW)** by calculating the 5 percent Probability of Exceedance level in accordance with the following formula:

Fleet Capacity Value = 2 x (Fleet Mean – (1.895 x Fleet SD))

Step 13: If the value for the Fleet Capacity Value determined under step 12 is equal to or less than zero then set the Fleet Capacity Value equal to zero.

Determining the Facility Performance Level

Step 14: Take all the Trading Intervals that occurred within the last three year period ending on the Trading Day ending on 1 April of Year 1 of the relevant Reserve Capacity Cycle.

Step 15: Determine the amount of electricity (in MWh) sent out by the Facility using the Meter Data Submissions received by the IMO in accordance with clause 8.4 during the Trading Intervals identified in step 14.

Step 16: Identify any Trading Intervals in step 15 where the Facility was affected by a Consequential Outage as notified under clause 7.13.1A.

Step 17 If, as identified in step 16, the Facility's output was reduced due a Consequential Outage, use

(a) the schedule of Consequential Outages a provided by System Management in accordance with clause 7.3.4 and 7.13.1A;

(b) the amount of electricity sent out for the Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 16; and

(c) the data provided by System Management in accordance with clause 7.13.1(i),

to estimate the amount of electricity (in MWh) that would have been sent out by the Facility had it not experienced a Consequential Outage for all the relevant Trading Intervals identified in step 16.

Step 18: If the Facility has not yet entered service, or if it entered service during the period referred to in step 15, use the estimates included in the expert report provided in accordance with clause 4.10.3 for the period that the Facility was not in service, unless the IMO reasonably believes the report to be inaccurate.

Step 19: Determine for each Trading Interval during the period described in step 14 the Facility-Assessment Load for Scheduled Generation by subtracting the sent out generation contribution of all Facilities which applied to be certified under clause 4.11.2(b), as identified in step 15 and updated under steps 17 and 18 as applicable, from the total sent out generation of all Facilities for each Trading Interval.

Step 20: Determine for each year during the period identified in step 14, the 250 Trading Intervals with the highest Facility-Assessment Load for Scheduled Generation as identified under step 19.

Step 21: Determine the **Facility Performance Level** for each Facility that applied to be certified under clause 4.11.2(b). The Facility Performance Level for Facility f is the mean of that Facility's sent out generation during the 750 Trading Intervals identified under step 15 and updated under steps 17 and 18, as applicable.

Determining the Relevant Level for a Facility

Step 22: Determine the Relevant Level for each Facility f (in MW) in accordance with the following formula:

Relevant Level(f) = Facility Performance Level(f) / Sum(f∈F, Facility Performance Level(f)) × Fleet Capacity

Where

F is the set of all Facilities which applied to be certified under clause 4.11.2(b), where "f" is a member of that set.

Step 21. Publish the Fleet-Assessment Load for Scheduled Generation. Facility-Assessment Load for Scheduled Generation and relevant Trading Intervals

identified in steps 1, 9 and 14 on the Market Web Site by 1 May of the relevant year.

APPENDIX 2: GRIFFIN ENERGY'S RULE CHANGE PROPOSAL (RC_2010_37)

Background

Griffin Energy notes in its Rule Change Proposal that a key outcome for the WEM is to ensure that electricity and related services are provided reliably and economically.

The Long Term PASA is a process through which the IMO determines the amount of capacity required to meet future peak system demand and reliability requirements.

The RCM provides incentives for investment in capacity in the WEM, and distinguishes broadly between Scheduled Generation and Intermittent Generation.

- Scheduled Generation – assigned Capacity Credits at a level equivalent to the level of electrical output produced on a sent-out basis at 41 degrees Celsius (in accordance with clause 4.11.1(a)); and
- Intermittent Generation – assigned Capacity Credits based on their average capacity factor over a three year period (in accordance with clause 4.11.2(b)1).[19] This has historically equated to valuing wind farms at 38 to 42 percent of their nameplate capacity. Modelling suggests that a solar generation plant would be valued between 20 percent and 30 percent of its nameplate capacity with this method.

The expanded MRET scheme has a national target for renewable generation to comprise 20 percent of all generation by 2020. As a result, it is expected that capacity (and energy) from renewable energy generation, particularly wind generation, will grow in the SWIS.

Issues

Griffin Energy notes that in the Planning Criteria used by the IMO in undertaking the Long Term PASA, there should be sufficient available capacity in each Capacity Year during the planning horizon to:

1. meet forecast peak demand, plus a reserve margin; and

2. limit expected energy shortfalls to 0.002 per cent of annual energy consumption.

The methodology for assigning Capacity Credits to Scheduled Generators focuses on meeting forecast peak demand by assessing the sent out capacity likely to be available at an ambient temperature of 41°C.

Griffin Energy however contends that the current methodology for assigning Capacity Credits to Intermittent Generators, which is based on the three-year average output, does not necessarily relate to the output of Intermittent Generators in peak demand periods. Rather, it is orientated towards the contribution that Intermittent Generators make to limiting expected annual energy shortfalls.

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[19] While there is no restriction on the ability of each type of technology to apply for certification in accordance with either of the Capacity Credit allocation methodologies, since market start Intermittent Generators have predominantly applied for certification in accordance with clause 4.11.2(b).

Given the expected increase in Intermittent Generation on the SWIS, Griffin Energy notes that the following concerns have been raised about the current methodology used to assign Capacity Credits to Intermittent Generators.

- System Management has suggested that the current methodology overstates the energy that wind farms can be expected to make available during periods of peak demand, and that as a result the methodology has the potential to jeopardise the security of the power system.
- The current methodology is unsuitable for solar generation because it includes overnight and winter periods during which solar output would be expected to be low. As these periods are generally outside periods of peak demand, the current methodology may undervalue the energy that solar can be expected to make available during periods of peak demand.

Renewable Energy Generation Working Group

The REGWG was convened by the MAC at its meeting on 12 March 2008 to consider and assess system and market issues arising from increasing penetration of Intermittent Generation.

A work program which broadly comprised four Work Packages was established to address these issues. Work Package 2 sought to develop a methodology that would accurately value the contribution of intermittent generators during periods of peak demand. MMA was appointed to undertake Work Package 2.

A key concept that was considered and recommended was the use of LSG when identifying the critical peak demand intervals. LSG is calculated using the load that remains after removing the level of intermittent generation in the market.

The use of LSG can change the timing of critical system reliability conditions towards those times where the demand on Scheduled Generators is highest. This technique accounts for increasing penetration of Intermittent Generation and promotes diversity of technology types and location. LSG has been incorporated into each of the valuation methodologies explained below.

MMA, through its analysis, recommended a methodology based upon the average output of each facility in 750 peak intervals for selected high demand years, which are scaled to future load forecasts. This methodology delivers valuations of between 35 and 40 percent of nameplate capacity for the existing wind farms, and between 50 and 60 percent for the modelled solar generation facilities. A more simple and transparent variant of this methodology, using 750 Trading intervals from the last three years, was also considered and was known as Proposal 2B. Proposal 2B is expected to deliver valuations of between 30 and 35 percent of nameplate capacity for the existing wind farms, and between 35 and 50 percent for the modelled solar generation facilities.

System Management expressed concern that this methodology relied on simulated data, and that, being based on an average performance level, did not represent the capacity that could reliably be delivered by Intermittent Generators.

Consequently, System Management proposed an alternative methodology that assessed the value of the fleet at the 90 percent probability of exceedance (PoE) level of the top 1 percent of Trading Intervals during the last three years (175 Trading Intervals per year). It then proportioned this fleet capacity value between the various Intermittent Generators according to their performance in the top 250 intervals during the last three years. The methodology proposed by System Management would deliver valuations of

between 6 and 17 percent of nameplate capacity for the existing individual wind farms, and between 10 and 30 percent for the modelled solar generation facilities.

The Office of Energy proposed a further alternative methodology that would assess the average performance of the intermittent generation fleet over 12 peak Trading Intervals for each year, and then value the fleet at the 95 percent PoE level of these averages from the preceding eight years. The fleet capacity value would then be apportioned between the various Intermittent Generators according to their performance in the top 250 Trading Intervals during the last three years. The Office of Energy's methodology is estimated to deliver valuations of between 16 and 20 percent of nameplate capacity for existing wind farms and between 40 and 50 percent for the solar generation facilities modelled.

Throughout the REGWG process, System Management maintained that valuations higher than around 20 per cent[20] of nameplate capacity could compromise the reliability of the power system.

System Management's views were countered by various REGWG members, including Market Participants with existing Intermittent Generation facilities (Alinta, Griffin Energy), proponents of new Intermittent Generation facilities (Pacific Hydro, Mid West Energy) and Synergy. These members supported Proposal 2A (or its variant 2B), suggesting that this proposal, developed and recommended by an expert consultant, has the strongest scientific basis and strongest link to system reliability. They also indicated that any reduction in the capacity valuation for Intermittent Generators would harm investment in the renewable energy sector in the SWIS and increase the perceived regulatory risk of investing in the WEM.

The IMO suggested Proposal 1 at the 2 September 2010 REGWG meeting, which was supported by LGP on the basis that it is a compromise between the other proposals. System Management indicated that it could accept Proposal 1 provided that the valuation did not exceed 20 percent of nameplate capacity. This was not supported by the other parties advocating Proposal 2A or 2B.

While failing to reach a consensus position on the matter of valuing Capacity Credits for Intermittent Generation, the REGWG supported the proposal that the IMO would recommend a way forward to the MAC[21]. The IMO has indicated to the MAC that it proposes to submit a rule change proposal based on Proposal 1 – the Office of Energy 'compromise' methodology.

Griffin Energy notes that itself - along with a number of other stakeholders with considerable interests in maintaining a viable investment environment in the SWIS, as well as ensuring long term system reliability - consider that the compromise methodology of Proposal 1 will create unnecessary distortions in the market. Importantly, Griffin Energy considers that:

1. The MMA Proposals 2A and 2B provide an explicit mechanism that will self regulate the contribution of intermittent generation to system peak periods in the SWIS. If an intermittent facility fails to produce energy during the periods when

[20] It is unclear if this represented a blanket capacity credit cap for all Intermittent Generation, or would be applied to each intermittent facility (wind, wave or solar), irrespective of the underlying renewable resource.

[21] While minuted as such, it was not my recollection that the REGWG agreed that the IMO would develop a rule change proposal for submission to the MAC, rather that it would provide a recommendation on what to do next.

most required (i.e. when scheduled generation is at peak output under the LSG concept – likely during summer peak demand periods), then the quantity of capacity credits allocated to the facility will be reduced and other generation facilities (or DSM) will be required to meet the IMO demand forecast.

2. The issue of system reliability, in the face of an expected increase in intermittent generation in the SWIS, it better managed through re-setting the system reserve margin and/or the expected energy shortfall limits. This will have the same effect of decreasing the quantity of capacity credits to intermittent facilities in that a greater capital stock of generation (or DSM) will be required to meet the same IMO demand forecast, but without distorting the market for, or disincentivising investment in intermittent generation in the SWIS[22].

Proposal

Griffin Energy proposes to change the current methodology for allocating capacity credits for intermittent generators in the Market Rules to that based on Proposal 2B, developed by MMA for the REGWG. While not as technically proficient as Proposal 2A (MMA's preferred methodology), Griffin Energy considers it delivers the following benefits:

- balances consideration of both the reliability and unserved energy impacts of the capacity valuation methodology with respect to the IMO Planning Criterion by only awarding capacity credits to intermittent generation facilities based on their output during periods of highest demand on scheduled generation (using the top 750 LSG intervals in a year);
- uses recent historical data averaged out over three years to smooth any annual variation;
- is the simplest and most transparent methodology;
- is the most consistent with the current methodology; and
- more fairly reflects the contribution of solar generation facilities to power system reliability at times of peak demand.

Griffin Energy specifically proposes the following methodology:

1. Identify the top 750 Trading intervals associated with the highest Load for Scheduled Generation output in each of the three previous years.

2. For each of the 2,250 intervals identified in Step 1, determine the metered output of the intermittent generation facility (or the estimated output if the facility is experiencing a Planned or Consequential Outage or where its output was curtailed following a request from System management).

[22] It should be noted that there will be little likelihood of too much intermittent generation being built in the SWIS to meet a greater reserve margin. In our market, all intermittent generation technologies require offtake agreements for the energy they produce. As there will only ever be a finite requirement for new energy to meet load growth, there will also be a finite quantity of intermittent generation capable of being financed. The remainder of reserve capacity requirement will likely be met by scheduled peaking generation or DSM.

3. Double the value determined in Step 2 and divide this number by 2,250. The result is the Relevant Level for that facility (or is the quantity of capacity credit allocated to that facility).

Griffin Energy notes that its proposal includes the proposed amendments presented in the Draft Rule Change Report: Adjustment of the Relevant Level for Intermittent Generation (RC_2010_24). Griffin Energy notes that Alinta's proposed amendments under RC_2010_24 adjust for Trading Intervals where a Planned or Consequential Outage occurred or where output was curtailed following a request from System Management.

Proposed Amending Rules

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

4.11.3A. The Relevant Level in respect of a Facility at a point in time is determined by the IMO following these steps:

(a) take ~~all~~ the top 750 Facility-Assessment Load for Scheduled Generation Trading Intervals that fell within each of the last three years up to, and including, the last Hot Season, excluding any Trading Intervals where the Facility either:

i. was owned, controlled or operated by a Market Participant other than the Electricity Generation Corporation and:

1. was affected by a Planned Outage or Consequential Outage as notified under clause 7.13.1A; or

2. was issued a Dispatch Instruction from System Management as notified under clause 7.13.1(c); or

ii. was owned, controlled or operated by the Electricity Generation Corporation and:

1. was affected by a Planned Outage or Consequential Outage as notified under clause 7.13.1A; or

2. was issued an instruction from System Management to deviate from its Dispatch Plan or change its commitment or output as notified under clause 7.13.1(cC);

(b) determine the amount of electricity (in MWh) sent out by the Facility in accordance with ~~meter data submissions~~ Meter Data Submissions received by the IMO in accordance with clause 8.4 during these Trading Intervals;

(c) ~~I~~if the ~~Generator~~ Facility has not entered service, or if it entered service during the period referred to in step (a), estimate in accordance with the Reserve Capacity Procedure the amount of electricity (in MWh) that would have been sent out by the ~~f~~Facility, had it been in service, for ~~all~~ the top 750

Facility-Assessment Load for Scheduled Generation Trading Intervals occurring during the period referred to in step (a) which are prior to it entering service;

(cA) if, during the period described in step (a), the Facility's output was reduced in order to comply with a Dispatch Instruction from System Management, issued in accordance with clause 7.7, use:

i. the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of System Management Dispatch Instructions, provided by System Management in accordance with clause 7.13.1(eB); and

ii. the amount of electricity (in MWh) sent out for the Facility in accordance with the Metered Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were excluded under step (a)(ii.), to estimate the amount of electricity (in MWh) that would have been sent out by the Facility, had it not complied with the Dispatch Instruction for all the Trading Intervals that were excluded under step (a)(ii.).

(cB) if, during the period described in step (a), the Facility's output was reduced in order to comply with an instruction from System Management under clause 7.6A.3(a) to deviate from its Dispatch Plan or change its commitment or output, use:

i. the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of an instruction from System Management in accordance with clause 7.6A.3(a), where this information has been either:

a. provided by System Management in accordance with clause 7.13.1(eD) for the relevant Trading Intervals that were excluded under step (a), where actual data for the site of the Facility has been provided to System Management under clause 7.7.5B; or

b. determined by the IMO in accordance with the Reserve Capacity Procedure for all the relevant Trading Intervals that were excluded under step (a), where actual data for the site of the Facility has not been made available to System Management under clause 7.7.5B; and

ii. the amount of electricity (in MWh) sent out for the Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were excluded under step (a)(iii.), to estimate the amount of electricity (in MWh) that would have been sent out by the Facility had it not complied with System

Management's instruction for all the relevant Trading Intervals that were excluded under step (a)(iii.); and

(d) set the Relevant Level as double the sum of the quantities determined in steps (b), ~~and~~ (c), (cA) and (cB) divided by the sum of the Trading Intervals identified in steps (a), (cA) and (cB) ~~52,560~~.

7.7.5B. A ~~Market Participant~~ Non-Scheduled Generator ~~may~~ must provide System Management with the information specified in the Power System Operation Procedure to support System Management's ~~the~~ calculation of the quantity described in clause 7.7.5A~~(a)~~ and 7.7.5E.

7.7.5C The Power System Operation Procedure must specify the data required to be provided by a Non-Scheduled Generator to System Management for each Facility during each Trading Interval, where this information must be ~~that actual wind data for the site of a wind farm and the number of turbines operating, if made available by a Market Participant to System Management, are~~ sufficient to allow System Management to determine, in accordance with clause 7.7.5A, what the output of ~~the~~ each Facility ~~a wind farm~~ would have been had no Dispatch Instruction or request to deviate from its Dispatch Plan or change its commitment or output been issued.

7.7.5E. Where the Electricity Generation Corporation has made actual wind data available in accordance with clause 7.7.5B and the Power System Operation Procedure, System Management must estimate the decrease, in MWh, in the output of each Electricity Generation Corporation Facility as a result of a instruction from System Management to deviate from its Dispatch Plan or change its commitment or output in accordance with clause 7.6A.3(a).

7.13.1. System Management must provide the IMO with the following data for a Trading Day by noon on the first Business Day following the day on which the Trading Day ends:

…

(c) a schedule of all of the Dispatch Instructions other than instructions with respect to Registered Facilities to which clauses 3.21A.14 or 4.25.10 apply, that System Management issued for each Trading Interval in the Trading Day by Market Participant and Facility, including the information specified in clause 7.7.3, or as agreed between the IMO and System Management;

(cA) a schedule of the MWh output of each generating system monitored by System Management's SCADA system for each Trading Interval of the Trading Day;

(cB) the maximum daily ambient temperature at the site of each generating system monitored by System Management's SCADA system for the Trading Day;

(cC) a schedule of all instructions provided to the Electricity Generation Corporation's Non-Scheduled Generators to deviate from its Dispatch Plan or change its commitment of output in accordance with clause 7.6A.3 for each Trading Interval of the Trading Day;

…

(eB) the estimated decrease, in MWh, in the output of each Non-Scheduled Generator, by Trading Interval, as a result of System Management Dispatch Instructions, as determined in accordance with clause 7.7.5A, where this is to be used in settlement as the quantity described in clause 6.17.6(c)(i)~~.~~;

(eC) the required decrease, in MWh, in the consumption of each Curtailable Load, by Trading Interval, as a result of System Management Dispatch Instructions, where this is to be used in settlement as the quantity described in clause 6.17.6(d)(i)~~.~~;

(eD) the estimated decrease, in MWh, in the output of each Electricity Generation Corporation Non-Scheduled Generator as a result of a instruction from System Management to deviate from its Dispatch Plan or change its commitment or output in accordance with clause 7.6A.3(a), as determined in accordance with clause 7.7.5E, where this is to be used in the calculation of the Relevant Level described in clause 4.11.3A;

…

(g) details of the instructions provided to:

i. Curtailable Loads that have Reserve Capacity Obligations; and

ii. providers of Supplementary Capacity;

on the Trading Day; ~~and~~

(h) the identity of the Facilities which were subject to either a Commissioning Test or a test of Reserve Capacity for each Trading Interval of the Trading Day.; and

(i) the data provided by a Market Participant in accordance with clause 7.7.5B.

10.5.1. The IMO must set the class of confidentiality status for the following information under clause 10.2.1, as Public and the IMO must make each item of information available from the Market Web-Site after that item of information becomes available to the IMO:

(a) the following Market Rule and Market Procedure information and documents:

…

(f) the following Reserve Capacity information (if applicable):

i. Requests for Expressions of Interest described in clause 4.2.3 for the previous five Reserve Capacity Cycles;

…

ix. The following annually calculated and monthly adjusted ratios:

1. NTDL_Ratio as calculated in accordance with Appendix 5, STEP 8;

2. TDL_Ratio as calculated in accordance with Appendix 5, STEP 8; and

3. Total_Ratio as calculated in accordance with Appendix 5, STEP 10.; and

x. Facility-Assessment Load for Scheduled Generation.

Glossary

Facility-Assessment Load for Scheduled Generation: The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of Facilities which applied to be assigned Certified Reserve Capacity in accordance with clause 4.11.2(b) adjusted for the impact of Consequential Outages on those Facilities.

APPENDIX 3: SUMMARY OF MAIN COMMENTS RAISED IN SUBMISSIONS (RC_2010_25 & RC_2010_37)

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)

AGL	• Does not support Methodology 1.
	• Explicit recognition of capacity value currently assists with offsetting the significant connection costs experienced in the SWIS
	• Appears by proposing Methodology 1 that the IMO (and the Office of Energy) are comfortable with increasing the cost of energy to users in the SWIS while removing the SWIS's competitive position with regard to investment in renewables when this is not required.
	• Methodology 1 is complicated.
	• Supports a technology independent approach that avoids trying to pick winners.
	• System Management's argument around reliability is unclear.
	• Does not consider there is a strong case to use the Load for Scheduled Generation (LSG) methodology as incentivising output during the highest demand periods seems the most appropriate signal.
	• Higher regulatory risk with implementing Methodology 1.
		• Prefers Methodology 2 to Methodology 1 as Methodology 2:
		  • seems to be simple, transparent and consistent with current methodology
		  • would improve alignment of CC allocation to demand during peak periods
		  • would lower regulatory risk
		• Single submission for both rule changes. See also comments for RC_2010_25.

Alinta	• Does not support Methodology 1 as:
	  • Results from MMA report do not support the conclusion that the current methodology overstates value
	  • MMA concluded that Methodology 1 is too conservative, lacks stability and is unlikely to provide a robust and accurate assessment
	  • No evidence from the IMO that Methodology 1 will better
		• Did not supply a submission

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	achieve the market objectives. • Estimates that this would reduce existing revenue for intermittent wind generation by around $16 million or 17 percent • Consider that the reduction in CC assigned to wind will be offset by CC assigned to other facilities, therefore the overall cost of capacity would not change • Future participants can account for the loss in CC revenue through contract/or energy prices • Existing participants potentially write down the value of wind gen assets by around $160 million. • Supports grandfathering of current methodology for existing Intermittent Generators	

Collgar	• Does not support Methodology 1:
	  • As the IMO methodology does not reflect MMA's recommendations; and
	  • It represents a materially different and adverse position than is currently the case, which will unfairly penalise existing participants, and likely reduce investment by the private sector
	• Alongside the commercial ramifications, Methodology 1 increases the degree of regulatory uncertainty for proposed renewable energy developers.
	• Recommends adoption of proposal 2A/2B (as recommended by MMA).
		• Supports Methodology 2
		• Preferred Proposal 2A as the most technically sound but taking into account Market Objectives acknowledges that Proposal 2B is a preferred option.
		• Believes that the Rule Change Proposal will operate to better facilitate the achievement of Market Objectives, in particular Market Objective (c).

Griffin	• Does not support. • This methodology will have a detrimental effect on the WEM, will	• Supports this rule change • Single submission for both rule changes. See comments for

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)

	lead to wider policy and market failures and will impact on federal MRET legislation.
	• Strongly opposes and is disappointed that the IMO submitted a flawed proposal.
	• Two scenarios if this progresses:
	  • Loss of investment in WEM which will eventually lead to higher costs to the WEM over time (cost to consumers); or
	  • Will not impact investment in IGs in SWIS but investors will seek their required returns still, leading to increased costs to consumers.
	• Complicated market structures are barriers to entry.
	• This methodology (and its interdependency on fleet performance) introduces a risk to investors where their value is linked to the output of other facilities.
	• Questions the value of LSG, not seen as necessary.
	• SM may have a legitimate concern regarding the 1 in 10 year event due to IG penetration however this rule change is not the appropriate response. There should be a separate review of system security and reserve margin settings in the WEM. These issues should be dealt with in the clause 4.5.15 review.
		RC_2010_25.

Infigen	• Does not support. • Not a logical conclusion to REGWG work. • Does not have a sound basis. • Contrary to MMA recommendations. • Appears to have been progressed to appease System Management	• Did not provide a submission.

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	and Western Power. • Methodology is not statistically sound. • Methodology is neither simple nor transparent. • Uncertain that LSG is the best methodology. • Proposed change is a narrow targeting of IG and not a broader assessment of how the market could best meet its security requirements and what the economically appropriate level of reliability is. • Significant negative impact on the revenue of existing IGs (negotiated off take agreements have been financed on the current rules). • Significant negative impact on IGs in development. • Sends a negative investment signal.	

LGP	• Does not support either proposal.
	• Supports SM's contention that the system cannot be operated on basis of average outputs, accepts contention that operating experience indicates wind generation is unreliable during system peak.
	• LGP has previously pressed SM to be less conservative, and consider System Management has adopted a generous position of 20 percent
	• Opposes both proposals:
	  • Introduces regulatory risk without substantive justification.
	  • Not simple.
		• Nominally identical submission to both rule change proposals
		• See comments for RC_2010_25

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	• Increases volatility	
MHE	• Does not support. • Significant impact on investment in SWIS (current and future) • Financial viability of Flat Rocks Wind Farm is at risk if proposal proceeds. • At a loss as to how the IMO could propose a methodology that was not supported by its expert or a significant number of stakeholders. • Consider that Methodology 2 should be the preferred option.	• Single submission for both rule changes • See comments for RC_2010_25.
OoE	• Security and reliability of supply are key policy objectives for WA govt. • OoE recommends that the IMO takes into account the government's objective of ensuring that WA enjoys a secure and reliable supply of electricity. • With absence of 1 in 10 year data considers IMO should err on the side of caution in evaluating the proposals to ensure security and reliability is not put at risk.	• Single submission for both rule changes • See comments for RC_2010_25

Pacific Hydro	• Does not support either Methodology 1 or Methodology 2
	• Neither proposal adequately addresses system security or reliability concerns.
	• Does not support the integration of wind into the WEM.
	• Introduces uncertainty in relation to CC revenue
	• Contrary to MMA recommendations.
	• Use of fleet metric is very conservative and arbitrarily sets a
		• Single submission for both rule changes. See comments for RC_2010_25
		• In addition, regarding Methodology 2:
		  • has merit in its simplicity and transparency, both key criteria for investment certainty, and avoids the use of a fleet adjustment; and
		  • It is difficult to quantify this proposal as it differs from the MMA proposal in considering the previous 3 years of top 750 trading intervals.

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	discount to the value of Intermittent Generation. • Until further assessment of the potential impacts of both proposals is completed the current CC arrangements should be maintained. • Unreasonably complex • Likely to be transparency issues with the LSG calculations due to confidentiality issues. • Development of a wind forecasting system and real time dispatch control should be further considered by the IMO.	
Perth Energy	• Supports the proposal • Correct price signals required. • May be a case for direct Government subsidy that should be explicitly separate from the operation of the WEM. • Queries whether there may be some benefits with some limited form of grandfathering.	• Single submission for both rule changes • See comments for RC_2010_25.
SEA AUS	• SEA's opinion is that the proposed rule changes will provide assurance to the System Manager regarding reliability Market Objective (a) but will have both short and long term negative consequences for the electricity market by failing to address the Market Objectives (b) to (d). The sole exception to this current rule change impact is the inclusion of solar PV generation, which has been previously excluded contrary to Market Objective (c).	• Did not provide a submission.
System Management	• Strongly supports the proposal as it more accurately recognises the contribution of Intermittent Generators to system reliability at times of system peak compared to the existing Market Rules. • Use of an averaging methodology introduces an additional and	• Does not support the proposal 'in view of the unacceptable degree of risk to system security and reliability' • Determining CCs based on the average of the past 750 intervals is likely to lead to a level of incentive that is not

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	unacceptable risk to Power System Security and Reliability. • While a 1 in 10 year load event has not been experienced, what is clear for data to date is that the higher the level of CC attributed to wind farms (i.e. from an averaging methodology) the higher the risk to system reliability. • Greater penetration of wind resource will enhance these risks to system reliability. • As more data becomes available in the future, wind farm contributions at peak periods should be continuously monitored and where appropriate CCs should be revised.	supported by the actual contribution of the wind farm fleet at times of peak system load • Provided similar information to its submission on RC_2010_25.

Synergy	• Does not support:
	  • It does not address concerns of increased investment in Intermittent Generators or reduce the resulting impact that such investment will have upon system operation;
	  • It replaces the current arbitrary capacity crediting approach with another limited approach that still lacks complete recognition of the capacity value that the market derives from Intermittent Generators; and
	  • It unnecessarily introduces regulatory risk into the market.
	• Synergy's main concern is that the real issue of investment in Intermittent Generators and its impacts upon system operation and cost will not be addressed by the proposed rule change. Synergy considers it imperative that resolution of these issues is progressed as a priority so as to inform investors of the potential significant extra costs and constraints facing Intermittent Generators as investment in renewable energy continues to increase.
		• Supports this Rule Change Proposal
		• The current approach is arbitrary and the proposed methodology is more consistent with the criteria given in Market Rule 4.5.9.
		• The proposal minimises the impact of regulatory risk to the market.

Verve	• It is reasonable for the IMO to make a determination which will	• No submission

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
Energy	resolve this issue given that the REGWG failed to resolve the matter. • If the IMO elects to adopt the proposed change it should be on the premise that: • It is intended to resolve an immediate issue; • Concerns have been identified with the valuation method that will manifest in the longer term with increasing penetration; and • The suitability of the chosen methodology will be revisited, at the appropriate time, in that context. • Given that System Management (the primary protagonist) is prepared to accept the IMO's proposed solution, this should have some bearing on the outcome.	• Does not support Methodology 2 as it does not appear to satisfy concerns that have been raised by System Management (noted in Verve Energy's submission for RC_2010_25).

Vestas	• Does not support as the methodology is not what MMA recommended.
	• Considers that if adopted RC_2010_25 would:
	  • Fail to advance most if not all of the Market Objectives
	  • Expose existing investors to regulatory risk
	  • Deter new investors in renewable energy generation
	  • Increase costs and risks for Synergy over the long term, with a consequent increase in costs and risks for either the WA government (as an owner of Synergy) or WA electricity users, depending on whether these increased costs are passed through
	  • Not add to security of supply in any meaningful way
	  • Leave members and observers of the REGWG wondering why
		• Single submission for both rule changes
		• See comments for RC_2010_25.

Submitter	Main Comments	
	RC_2010_25 (IMO's original proposal)	RC_2010_37 (Griffin Energy's proposal)
	they bothered to participate in a process that culminated in stakeholder views and expert evidence being later disregarded by the IMO and OoE. • Understands the importance that the IMO, OoE and System Management places on the issue of security of supply. However, Vestas strongly disagrees that the RCM is the best measure to achieve this. Considers that the system reserve margins should be revised instead.	

APPENDIX 4: IMO'S RESPONSE TO SUBMISSIONS RECEIVED DURING THE FIRST SUBMISSION PERIOD (RC_2010_25 & RC_2010_37)

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
1.	RC_2010_25 & RC_2010_37	Investment Incentives	AGL	By directly reducing the Capacity Credit Allocation to Intermittent Generators, one of two outcomes could likely follow: • Intermittents will be less viable to build in the SWIS, so the forecast demand (or capacity requirement) will be met by Scheduled Generation (or DSM); or • Intermittents will still be built in the SWIS (at higher cost), but would require an additional capital base to meet the same forecast demand/capacity requirement (as the Intermittents built will not produce sufficient Capacity Credits). This will lead to ineffective investment increasing the cost to end users, and potentially increase reliability beyond economic levels.	Under the current methodology for valuing the capacity of Intermittent Generators, these facilities are being provided with an income stream associated with their level of Capacity Credits which is considered to be inconsistent with their contribution to peak demand periods. In particular, wind farms are generally considered to be over allocated Capacity Credits, based on their performance during system peak events, while solar generation is considered to be under allocated Capacity Credits. In the case of wind farms, the market is, in effect, providing an unintentional subsidy to these facilities (while the opposite is generally true for solar generation facilities). The IMO considers that it is important for the capacity valuation methodology for Intermittent Generators to reflect their contribution to system reliability during peak events to ensure that market signals are not distorted. As such the IMO considers any unintentional subsidies (or negative discrimination in the case of solar generation facilities) should be removed from the Market Rules to ensure that correct market signals are provided. While one of the key strategic initiatives of the State Government is to support the production of cleaner energy there has been no policy direction to date to enact this outcome relevant to the RCM. In particular, the Office of Energy notes in its submission that the Government is currently researching policy initiatives in this area. In the absence of the policy initiative, the IMO considers that it must continue to ensure that the Market Rules are consistent with the Wholesale Market Objective of avoiding discrimination against particular energy options and technologies (Market Objective (c)). The current role of the Market Rules in the WEM is to create an efficient decision making environment within a bilateral market with no discrimination against particular energy options and technologies.

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
2.	RC_2010_25 & RC_2010_37	Investment Incentives	AGL	There is a low likelihood of an over-build of Intermittent Generators in the SWIS. Intermittent must be able to sell that energy to have a chance of being financed. There is a limit to the energy requirement/growth (and viable off takers) in the SWIS. So intermittents will only be built to the degree that their energy can be viably sold into the market. Where no such case can be made, any deficit in capacity requirement will be met by facilities that can be financed by Capacity Credits only – such as OCGTs and DSM.	Refer to response in item 1 above. While the IMO notes AGL's comments regarding the need to be able to on-sell energy when developing a facility, the IMO considers that the Market Rules need to be amended to ensure that correct market signals are provided and so efficient investment decisions can be made to meet reliability requirements.
3.	RC_2010_25	Investment Incentives and Impacts	MHE	RC_2010_25 will have significant impacts on investment in the SWIS, impacting both projects currently under development and also future investment in renewable energy.	Refer to response in item 1 above. The IMO notes that better reflecting the contribution of Intermittent Generators to periods of peak demand should, in the longer term, result in more efficient investment outcomes.
4.	RC_2010_25 & RC_2010_37	Investment Incentives and Government Policy	MHE	Believe that the introduction of such a change is at odds with Australian and West Australian Government policy and inconsistent with the Market Objectives. The West Australian government has previously shown a commitment to the development of renewable energy sources in this state. The 2007 Premiers climate change action statement entitled, "Making Decisions for the Future", established a local Renewable Energy Target (RET) with aims to increase energy generation from renewable sources in	Refer to response in item 1 above. The IMO notes that during early 2010 the MAC wrote to the Minister for Energy seeking guidance on its position with respect to investment in renewable energy generation in the State. The response received by the Minister for Energy stated that: *"… there is no intention to direct liable parties in Western Australia to procure RECs[23] solely from within the State. I also note that such a proposal would represent a significant change to the governance arrangements for the electricity market within Western Australia."*

[23] The IMO notes that "RECs" (Renewable Energy Certificates) is now an umbrella term for Small-Scale Technology Certificates (STCs) and Large-Scale Generation Certificates (LGCs).

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				the SWIS by 6 percent by 2010, 15 percent by 2020 and 20 percent by 2025.	The IMO notes that a copy of the letter from the Minister is available on the following IMO Web Page: http://www.imowa.com.au/REGWG Additionally, the IMO notes that while both modified Methodology 1 and Methodology 2 will potentially reduce the level of Capacity Credits provided to some wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system reliability during peak events.
5.	RC_2010_25 & RC_2010_37	Investment Incentives and Government Policy	MHE	Believes that the West Australian Government has recently reinforced this, with "Cleaner Energy" being one of the four major strategic goals of the Strategic Energy Initiative: Energy 2031. Specifically, the objectives include: "increase penetration of embedded or local distributed generation and commercial scale renewable energy (e.g. wind and solar farms) and technologies which facilitate penetration". It would seem that a Rule Change Proposal that significantly reduces the valuation of capacity credits for intermittent generators is inconsistent with these policy initiatives.	Refer to response in item 4 above.
6.	RC_2010_25 & RC_2010_37	Investment Impacts and Regulatory Risk	MHE	RC_2010_25 will impact the prospective investment market for renewable energy generation projects. This is not only from a direct impact of project returns, but from an increase in the perceived regulatory risk as highlighted above. The impact on Intermittent Generator projects will see a lessening of	Refer to response in item 3 above. The IMO considers that each and every generation and DSM facility should receive the correct and appropriate allocation of CRC and Capacity Credits for the contribution it makes to the RCM. This will ensure consistency with the Market Objectives and promote appropriate market outcomes.

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				competition for projects and will therefore result in higher costs in the longer term for consumers.	The IMO notes that modified Methodology 1 will correct the currently overly generous outcomes and result in more efficient investment decisions. The IMO considers that developing the most appropriate long-term signals is necessary for a well functioning market. On the issue of regulatory risk, the IMO notes that the WEM is constantly evolving. Concerns over the capacity valuations of Intermittent Generators have been raised by market stakeholders for some time. More formally, a review of and potential changes to the level of CRC and Capacity Credits for Intermittent Generator facilities were identified in the last 4 Statements of Opportunities Reports, with the intention of notifying existing and potential investors of possible changes. The IMO notes that many of the existing Intermittent Generator facilities were developed prior to the establishment of the current market arrangements in a time when the provisions around the certification of Intermittent Generators under the Market Rules were uncertain (as indicated in the Statement of Opportunities reports). A brief overview of the first year of operation of existing wind farms is presented below: • Albany Wind Farm - October 2001 • Bremer Bay Wind Farm – June 2005 • Emu Downs Wind Farm - October 2006 • Kalbarri Wind Farm – July 2008 • Walkaway Wind Farm - January 2006. Additionally, the IMO notes that the financial burden of the currently overly generous Capacity Credit allocation to Intermittent Generator is being paid for by other Market

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
					Participants. Failing to correct this will propagate inefficient signals to other sectors of the market in the long term. The IMO Board has decided that the implementation of a three year glide path will strike an appropriate balance between mitigating financial impacts to existing Intermittent Generators and removing an inefficient market signal. For further details of the glide path refer to section 5.3.2.
7.	RC_2010_25 & RC_2010_37	Investment Incentives	MHE	RC_2010_25 can only act as a discouragement to new investment and ultimately competition in both Intermittent Generators and generators in general. Market Rules that discourage new Intermittent Generator investment (either in favour of investing in other technologies or in other jurisdictions such as the NEM) will be counter to this objective. Strong competition and promotion of investment in the WEM are important, given that there will always be limited scope for contracting for output and financing new projects.	Refer to response in item 6 above. While the IMO agrees that there is the need to ensure that the right amount of investment in generation in the SWIS is encouraged, the Market Rules must avoid discrimination against particular energy options and technologies. The proposed amendments will ensure that correct signals for investment decisions in the SWIS are provided.
8.	RC_2010_25 & RC_2010_37	Investment Incentives and Policy	MHE	Believes that the proposed rule change seems incongruent with policies to encourage renewable energy projects, and fundamentally inconsistent with the WEM objectives. MHE suggests the IMO reconsider its support for this rule change.	Refer to responses in item 4 and 7.
9.	RC_2010_25 & RC_2010_37	Efficient Investment	MHE	Is not supportive of an alternative methodology change that will significantly reduce the capacity valuation for Intermittent Generators.	The IMO notes MHE's position.
10.	RC_2010_25	Efficient Investment	SEA	Concerned that inadequate recognition and compensation for renewable energy capacity	Refer to response in item 3 above.

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				will lead to renewable energy projects effectively subsidizing a fossil fuel based generation.	The IMO notes that the counter to this argument must also apply. That is, if the CRC and Capacity Credit allocation to Intermittent Generators is too generous (when compared to their actual output during peak periods), other elements of the market will subsidize the inefficiency. Further the IMO notes that its assessment of the IMO's modified methodology indicates that some wind farms will actually receive a greater allocation of Capacity Credits to better reflect their contribution to peak periods. The IMO considers that an efficient investment environment should be encouraged, which supports an appropriate level of reliability. Also see the IMO's assessment against the Market Objectives presented in Section 6.2.1 of this report.
11.	RC_2010_25	Efficient Investment	Synergy	Less concerned about the approach adopted for capacity crediting Intermittent Generators but is more concerned that the market has still not progressed how it will manage the expected increase in Intermittent Generators and ensure that the market investment signal is clear and not confused, exposing investors to cost and revenue uncertainty.	The IMO notes that the proposed amendments to the current methodology for valuing the capacity of Intermittent Generators will correct a current market inefficiency and result in more efficient investment decisions. While the IMO acknowledges Synergy's request for greater certainty around the ongoing treatment of Intermittent Generators, wider consideration of how Intermittent Generators are treated within the market is outside the scope of this Rule Change Proposal, which simply seeks to more accurately value the capacity of Intermittent Generators. The IMO notes that modified Methodology 1 provides a viable mechanism to continue to value the capacity of Intermittent Generators under conditions of increased penetration in the SWIS (up to 300MW). For further details refer to the Sapere report. Refer also to item 6 above.
12.	RC_2010_25	Broader Impacts of Investment in Intermittent	Synergy	Main concern is that the real issue of investment in Intermittent Generators and its impacts on system operation and cost will	The IMO considers that investment risk associated with particular technology types should be borne by investors, and that it is not appropriate that the market bears this risk. The IMO

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
		Generators		not be addressed by the proposed rule change. Synergy considers it imperative that resolution of these issues is progressed as a priority so as to inform investors of the potential significant extra costs and constraints facing Intermittent Generators as investment in renewable energy continues to increase.	notes the role of the market is to ensure the capacity valuation methodology for Intermittent Generators is robust and reflective of their actual contribution to peak output so as to ensure that correct market signals are provided for investment in Intermittent Generator assets (as indirectly other generation assets). The IMO also notes and acknowledges there are other areas of review ongoing such as the current RCM review and allocation of Load Following costs that are related to Intermittent Generators facilities and will impact on the overall revenue stream and business cases for new and existing facilities. The IMO is endeavouring to resolve these additional review areas as soon as is practicable.
13.	RC_2010_25	Viability of Investment in the WEM	Vestas	If RC_2010_25 is implemented, it will reduce the returns available for renewable energy projects in WA and discourage new investment in intermittent generators in the SWIS, and will reduce the opportunities for Synergy to enter into agreements to source RECs. This in turn leads to a less economically efficient supply of electricity to WA consumers and businesses, who will face price rises if this additional cost to Synergy's business is passed through to them.	Refer to responses in item 6 and 10 above. The IMO considers that the Market Rules need to be amended to ensure that correct market signals are provided and so efficient investment decisions can be made. The IMO notes that as a result of the Minister's clarification to the MAC (that LGCs and STCs can be procured from the eastern states — see item 4) there appears to be no regulatory-based restrictions of Synergy's options for entering into agreements to purchase LGCs and STCs from WA to the extent that these represent the most cost effective option. Once a more robust Capacity Credit valuation methodology for Intermittent Generators (which is reflective of their actual contribution to peak output) is implemented in the WEM, if it is cheaper for liable entities (typically electricity retailers) to secure LGCs (and STCs) from the eastern states then to do so will represent the most efficient outcome.
14.	RC_2010_25	Efficient Investment	Vestas	It is clear that RC_2010_37 is the superior option when compared to RC_2010_25, as it	The IMO notes that the proposed amendments to the current methodology for valuing the capacity of Intermittent Generators

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				does not have the same negative impact on renewable energy project returns and therefore preserves Synergy's options to enter into the bundled electricity/REC agreements with WA renewable energy generators.	will correct a current market inefficiency and result in more efficient investment decisions. The IMO considers that modified Methodology 1 more closely aligns to the reliability criteria (as illustrated in section 6.2 of this report). Additionally, the IMO notes that while both methodologies will potentially reduce the level of Capacity Credits provided to some wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system reliability during peak events. Also refer to response in item 4, 10 and 13 above.
15.	RC_2010_25	Efficient Investment	Vestas	One of the biggest problems with RC_2010_25 is its likely impact on competition, and its likely impact on discouraging new renewable energy projects (and in many cases new entrants) from connecting to the SWIS. By reducing the levels of capacity values calculated for renewable energy generators, RC_2010_25 makes future renewable energy investments in the SWIS far less attractive when compared to projects in the NEM.	Refer to responses in items 3, 6, and 13.
16.	RC_2010_25 & RC_2010_37	Efficient Investment	Office of Energy	The OoE notes that another of the State Government's key strategic initiatives is to support the production of cleaner energy. Government is researching policy initiatives in this area.	Refer to response in item 1 above. The IMO notes this strategic initiative and welcomes any future policy direction in this area. The IMO notes concerns raised by the Office of Energy through the REGWG process. The IMO notes the comment made by the Acting Coordinator for the Office of Energy in the April 2010 REGWG meeting who "*stressed that system security is the top*

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
					priority and mentioned that the final method for valuing intermittent generation capacity will need to reflect this."[24]
17.	RC_2010_25 & RC_2010_37	Efficient Investment	Pacific Hydro	Believe that the proposals would introduce greater uncertainty in the ability to predict revenue flows from wind projects.	Refer to item 12 above. The IMO considers that both methodologies would provide transparent mechanisms for valuing the capacity of Intermittent Generators. The ability to predict revenue flows will be a commercial matter between the various parties involved in any transaction. The IMO notes Pacific Hydro's comments, but considers that such matters would need to be addressed between commercial parties.
18.	RC_2010_25 & RC_2010_37	Efficient Investment	Griffin Energy	There will be a loss of investment in Intermittent Generators in the SWIS as investors seek the greater (and more stable) returns in the NEM. This may initially seem like efficient market forces at work (allocative efficiency), however this scenario will likely lead to greater costs in the WEM over the longer term.	Refer to responses in items 3, 6 and 7. A long term increase in costs would only occur if the amount currently being paid to Intermittent Generators in Western Australia is less than the cost of procuring LGC's from else where. The IMO however notes that investors in Intermittent Generators in either the NEM or WEM should be looking at the overall balance of LGCs and reserve prices in order to make an effective investment decision. To ensure that the correct price signals are sent to enable investment decisions it is important to correctly reflect the value of all Intermittent Generators technologies to system reliability during peak periods in the WEM.
19.	RC_2010_25 & RC_2010_37	Efficient Investment	Griffin Energy	If RECs have been purchased bundled with the unit of energy as a single price (as is the common way of bilaterally contracting the output of such facilities), they would be	Refer to item 13, 14, and 18. The IMO notes the advice from the Minister reflecting the State Government's commitment to the cost reflective distribution of

[24] For a copy of the relevant REGWG minutes refer to the following Web Page: http://www.imowa.com.au/REGWG

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				hedged against cost differences between the NEM and WEM. If not, a common national REC price will apply as well as the higher local energy prices. This will lead to costs to consumers in the SWIS to meet the federal MRET targets. Additionally there will be a macro-economic impact in the state as investment (mostly in regional areas) is foregone. This would be a substantial policy failure for WA, given the governments commitment to the Ministerial Council on Energy to contribute its share of investment to reach the national 20 percent by 2020 targets under MRET.	LGCs at a national level under the Large Scale Renewable Energy Target (LRET) scheme. Also refer to response in items 4 and 13 above
20.	RC_2010_25 & RC_2010_37	Efficient Investment	Griffin Energy	RC_2010_25 will have a big impact on the ability of new investors to finance Intermittent Generator projects in the WEM. It acts as an explicit disincentive, lowering the value of the output of a facility compared to RC_2010_37 or the current methodology. Financiers will be very likely to seek better and more stable returns in other jurisdictions. There will be less competition to win the limited investment opportunities in the SWIS.	Refer to responses in items 3, 6 and 13.
21.	RC_2010_25 & RC_2010_37	Efficient Investment	Griffin Energy	RC_2010_25 will reduce the incentive for new Intermittent Generators to be constructed in the SWIS. It will also have a large negative impact on the asset values of existing Intermittent Generators. Without making similar changes to other capacity types (scheduled generation and DSM), this discriminates against Intermittent Generators.	Refer to responses in items 3, 6 and 13. The IMO disagrees that the proposed amendments will discriminate against Intermittent Generators but rather correct the capacity valuation of Intermittent Generators (e.g. Wind farms, landfill gas generation, solar generation etc) thereby ensuring efficient investment decisions can be made in the longer term. The IMO acknowledges that there may be negative impacts on the asset values of existing Intermittent Generators and has decided to implement a 3 year glide path for the new

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
					methodology. Refer to section 5.3.2 and 6.4 for further details.
22.	RC_2010_25 & RC_2010_37	Efficient Investment	LGP	Wind should be valued very conservatively for the purposes of generation planning, but without materially impacting the value of the subsidy. LGP also consider that an energy payment could be structured into peak and off peak periods so as to signal the desired behaviour and properly reward the contribution of solar generation.	Refer to responses in items 3, 6 and 13. The IMO does not consider it appropriate to continue to incorrectly value the contribution of Intermittent Generators to system reliability during peak periods. While the IMO acknowledges that LGP's alternative option may provide a mechanism to ensure that the contribution of Intermittent Generators during peak periods is better reflected, Intermittent Generators are by their nature unstable and so unlikely to be able to provide a full response to the anticipated signals. Capacity payments in the WEM need to reflect a facility's availability of capacity. Any impact on energy payments is readily reflected in STEM and Balancing market prices which is in turn reflected in contracts. The IMO considers that subsidising energy payments for Intermittent Generators (particularly wind generation) is contrary to the design of the market.
23.	RC_2010_25 & RC_2010_37	Viability of Investment in the WEM	AGL	If the policy position of the State is to attract its fair share of renewable investment into the SWIS (given the load in the SWIS is subsidising renewable investment via MRET), it would be economically inefficient to allow the subsidy paid by users in the SWIS to flow to other jurisdictions where the investments are actually made. This would be the likely result if investment signals for Intermittent Generators are distorted as proposed by Methodology 1.	Refer to responses in items 4 and 7. The IMO notes that the proposed amendments will correct a current market inefficiency and result in more efficient investment decisions. To the extent that this impacts on a renewable energy generation projects viability then the development of more cost efficient renewable energy projects or Scheduled Generators will be encouraged. Additionally, the IMO notes that while both modified Methodology 1 (the original Methodology 1) and Methodology 2 will potentially reduce the level of Capacity Credits provided to some wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
					reliability during peak events. The IMO notes the Minister's clarification (that LGCs and STCs can be procured from the eastern states — see item 4).
24.	RC_2010_25 & RC_2010_37	Viability of investment in the WEM	Pacific Hydro	The proposals raise broader issues on the ability of WA to remain competitive and attract renewable investment, particularly where the risks and costs associated with these proposals become the marginal factor influencing the project's viability. These marginal projects will not proceed as developers seek to ensure hurdle rates required by investors are met. Where projects do proceed the additional risks and lower returns from CCs will ultimately be borne by all energy consumers in WA.	Refer to responses in items 3, 6 and 13. The IMO notes that the proposed amendments will more accurately value the contribution of all Intermittent Generator technologies to system reliability during peak periods. Additionally, the IMO notes that while both methodologies will potentially reduce the level of Capacity Credits provided to some wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system reliability during peak events.
25.	RC_2010_25 & RC_2010_37	Viability of Investment in the WEM	Griffin Energy	Reducing the capacity value of the output (as will be the case under RC_2010_25) leads to a reduction in the comparable value of the facility in the WEM relative to the NEM. In short, it acts to discourage investment in Intermittent Generators in the SWIS.	Refer to responses in items 3, 6 and 13. To the extent that this reduces investment in comparison to the NEM this will be reflective of any subsidies that may exist in the NEM and any differences in investment conditions between the two markets such as higher development costs in Western Australia. The IMO notes that a wind farm investing in the NEM is assumed to receive in the order of 5 percent of nameplate capacity for reliability planning purposes. This is compared to the WEM where Capacity Credits assigned to Intermittent Generators have historically equated to valuing wind farms at 38 to 42 percent of their nameplate capacity. It should be noted that the NEM does not have a capacity market.
26.	RC_2010_25	External drivers	Verve	Another interesting issue is that it appears to	The IMO notes Verve Energy's comments.

	Investment Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
		of investment in Intermittent Generators	Energy	be increasingly expressed that, due to the influence of other policy settings, the relationship between Intermittent Generator capacity payment and Intermittent Generator penetration is tenuous. That is, it could be found that the outcome of this rule change process may have no influence on how many Intermittent Generators are established in the future. This means that the focus should clearly be on implementing a valuation methodology that accurately determines the extent to which installed Intermittent Generators can be relied upon in relation to system security so that, regardless of the level of Intermittent Generator penetration, System Management is able to identify whether it has a system security issue and flag the need for additional scheduled generation.	The IMO considers that each and every generation and DSM facility should receive the correct and appropriate allocation of CRC and Capacity Credits for the contribution it makes to peak periods the RCM.
27.	RC_2010_25	External drivers of investment in Intermittent Generators	Synergy	Agrees with the IMO that the 20 percent RET is the principal driver that will result in a continued increase in Intermittent Generator capacity in the SWIS. Synergy does not, however, consider that the level of Intermittent Generator reserve capacity crediting will impact on the volume or, to a lesser extent, the choice of Intermittent Generators that will be constructed in the SWIS.	The IMO notes Synergy's comments. Refer also to response in item 26.
28.	RC_2010_25	Impact of Investment in Intermittent Generators	Synergy	Concerned that the scope of work for the REGWG did not extend to addressing how to operationally manage an increased volume of Intermittent Generators; the likely costs this would produce; and how those costs	The IMO notes Synergy's concerns. It should be noted that the scope of work for the REGWG was agreed by the MAC. The IMO notes that this is not a matter for this Draft Rule Change Report.

	Investment Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				would be allocated over Market Participants. Synergy hold that the future intensity of Intermittent Generators in the SWIS is largely externally predestined and that all the market can do is determine how it will operate these facilities to promote their economic value while maintaining reasonable system security.	
29.	RC_2010_25 & RC_2010_37	Holistic view	LGP	Considers that the financial impact on wind generation as a result of the initiatives of the REGWG must be considered holistically rather than in isolation. In particular, we perceive the combined impact of the present proposals plus the prospective Ancillary Services changes will impair the economics of wind generation to such an extent as to avert the high wind penetration that they supposedly seek to facilitate.	Refer to response to item 31. The IMO also notes Synergy's submission which suggest there would be no change to the quantity /type of future investment (Item 27)
30.	RC_2010_25 & RC_2010_37	Incentives for Intermittent Generators performance	Griffin Energy	Given that Intermittent Generators only receive around 35-40 percent of their installed capacity anyway (in the case of wind farms), there is already an explicit devaluation of the installed capability of these facilities – far greater than the annual expected capacity refunds of Scheduled Generators or DSM.	The IMO notes it considers it desirable to develop provisions in the Market Rules to allow for an appropriate level of certification of Reserve Capacity for all types of generation and DSM.

	REGWG Process				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
31.	RC_2010_25 & RC_2010_37	REGWG process	AGL	The underlying issues need to be considered from a more holistic perspective than currently undertaken by the REGWG.	The IMO notes that the REGWG's consideration and assessment of the issues associated with Intermittent Generators spanned a period from April 2008 until September 2010. While failing to reach either consensus or compromise on the matter of valuing the capacity of Intermittent Generators, the REGWG supported the proposal that the IMO would nominate the valuation methodology that it felt best served the Market Objectives and would recommend a solution to the MAC. The REGWG is no longer active and the Rule Change Proposals are now the matter of consideration before the IMO at this point in time.
32.	RC_2010_25 & RC_2010_37	REGWG process	Pacific Hydro	Considers that although MMA's allocation option was appropriate for the scope of work, the scope did not allow market design issues to be addressed and therefore could not move the market forward towards a holistic integration of Intermittent Generators.	Refer to response in items and 28 and 31.
33.	RC_2010_25 & RC_2010_37	REGWG process	MHE	If the REGWG was generally supportive and comfortable with the MMA concept, it is simple and more consistent with the current methodology and its impact is not as significant on the investment already made on renewable projects (based on the current rules), than the alternative as proposed by Griffin in RC_2010_37 should be the preferred option.	Refer to response in items and 28 and 31. The IMO notes MHE's preferred option and reiterates that throughout the discussions at the REGWG, System Management maintained that higher valuations could compromise the reliability of the power system.
34.	RC_2010_25	REGWG process	Verve Energy	Under the circumstances, and given the inability of the REGWG to resolve the matter itself, even after lengthy deliberation, it is reasonable for the IMO to make a determination which will resolve the matter. It is also understood that System Management is prepared to accept the IMO's	The IMO notes Verve Energy's comments.

	REGWG Process				
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				proposed solution. Given that it is the primary protagonist here, that should have some bearing on the outcome.	
35.	RC_2010_25	REGWG process	Infigen Energy	The REGWG was unable to achieve a consensus. The proposed change is not a logical conclusion of the REGWG's nearly 2.5 years of effort. The proposal is the IMO's attempt at a "compromise solution", but does not have a sound basis and is not one of the several methodologies examined in detail and debated during the Working Group.	While failing to reach either consensus or compromise on the matter of valuing the capacity of Intermittent Generators, the REGWG supported the proposal that the IMO would nominate the valuation methodology that it felt best served the Market Objectives and would recommend a solution to the MAC. The REGWG is no longer active and the Rule Change Proposals are now the matter of consideration before the IMO Board at this point in time. The IMO considers that the modified Methodology 1 has a sound basis being consistent with theory and international practice. Refer to the Sapere report for further details.
36.	RC_2010_25	REGWG process	Vestas	If RC_2010_25 was to be adopted it would leave members and observers of the REGWG wondering why they bothered to participate in a process that culminated in stakeholder views and expert evidence being later disregarded by the IMO and OOE.	This is a detailed and complicated issue, and it is not surprising that there were polarised views from a number of sectors within the REGWG. There are market processes to provide for multiple levels and forms of consultation. The IMO facilitated extensive consultation through the REGWG. While the REGWG is no longer active, there are other forms of consultation that have been and will be ongoing until the Rule Change Proposals have been finalised.
37.	RC_2010_25 & RC_2010_37	REGWG process	Pacific Hydro	The IMO should be congratulated on its efforts to present the information and discussion in a transparent forum (REGWG) however, it was clear different views were held and consensus was not achieved by the IMO's deadline.	The IMO notes Pacific Hydro's comments.
38.	RC_2010_25	MMA review	Infigen Energy	The basis for the methodology is contrary to independent expert consultant	The IMO is not bound to necessarily adopt individual consultant advice and the IMO's consideration is informed

	REGWG Process				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				recommendations from the REGWG.	by the views of these experts. Refer to the Sapere report and the IMO's assessment of the alternative methodologies presented in section 6.2 of this report. Also refer to the discussion of MMA's work presented in section 6.4.3
39.	RC_2010_25	REGWG Process	Infigen Energy	The proposed methodology appears to have been progressed to appease System Management and Western Power, based on their stated views that capacity values for wind farms should be no more than 20 percent, and more properly 10 percent or less. This view remained unchanged despite the examination of available data by independent expert consultants, and its conclusions that the capacity value for Intermittent Generators as calculated by the current methodology is about right.	The IMO notes Infigen Energy's views on the rule change. Refer to the Sapere report.
40.	RC_2010_25	MMA review	Alinta	MMA, an independent expert consultant engaged by the IMO, found that the available empirical evidence does not support a conclusion that the current methodology used to establish the Relevant Level for intermittent generators overstates the energy that can be expected to be available from these facilities during periods of peak system demand.	The IMO is not bound to adopt individual consultant advice and the IMO's consideration is informed by the views of these experts. Also refer to the Sapere report and the IMO's assessment section of this report.
41.	RC_2010_25	MMA review	Vestas	It is incredibly disappointing to private sector investors that the IMO would go to the trouble of seeking expert advice and consulting with industry on this important issue, only to reject the advice and findings of the expert consultant.	The IMO is not bound to adopt individual consultant advice and the IMO's consideration is informed by the views of these experts. Also refer to the Sapere report and the IMO's assessment section of this report.

	REGWG Process				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
42.	RC_2010_25 & RC_2010_37	Need for Holistic Review	Pacific Hydro	Consider that the potential impacts of the proposed rule changes should be fully explored before such a change is implemented. Until that assessment is completed, Pacific Hydro believes that the current CC arrangements should be retained. Any review should ensure a holistic approach is taken for all stakeholders in the WEM.	The IMO has sought additional analysis from Sapere Research Group, which has included a preliminary assessment of the implications of the rule change. The IMO notes there will always be more analysis and investigation that could potentially be done in any review, there are however likely to be diminishing returns associated with this. In this instance the IMO has satisfied itself it has considered the various information and views put before it such that it can make an informed decision on these Rule Change Proposals.
43.	RC_2010_25 & RC_2010_37	MRET	Griffin Energy	Whatever its merit, the federal MRET legislation is in force and will have an impact on the WEM. The REGWG was tasked with identifying these impacts, then identifying how the WEM might manage them. RC_2010_25 is a poor response to this.	The IMO notes Griffin Energy's comments.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
44.	RC_2010_25 & RC_2010_37	Regulatory Risk	AGL	The regulatory risk in the market would be lower with Methodology 2. While the rule is changing, the change is fairly simple (and a whole new complex methodology is not being introduced). This has implications for existing facilities, but also on the developers who have outlaid dollars on a number of projects based on the current Market Rules. It also has implications on the relative benefits in investing in renewables in the SWIS rather than other jurisdictions (affecting state policy outcomes).	The IMO recognises that regulatory risk is an important consideration and as such has signalled that there would be amendments to the capacity valuation methodology for Intermittent Generators in the past 4 Statements of Opportunities. The IMO has decided to apply a 3 year glide path. For further details refer to section 7.1 of this report) Also refer to the response presented in item 6.
45.	RC_2010_25 & RC_2010_37	Regulatory Risk	MHE	Since the initiation of the Flat Rocks Wind Farm development in 2008, MHE has made significant investment under the current Market Rules, Developers of projects in the WEM, should be confident that the regulatory regime in Western Australia is stable and provides encouragement for current and future investors. The proposed rule change brings into question the stability of the regulatory regime in the WEM.	The IMO notes that the WEM has a rule change process which by implication allows the market to evolve over time and that the proposed changes to the valuation of Capacity Credits for Intermittent Generators have been signalled to the market in the past 4 Statements of Opportunities. Refer to the response presented in item 44.
46.	RC_2010_25	Regulatory Risk	Alinta	The likely effect of RC_2010_25 will be to increase the perceived level of risk associated with investing in the WEM. This is likely to lead to higher risk premiums and contingencies being included in any future investment in generation in the WEM, which would: • Impede the efficient entry of new competitors; • Increase the long-term cost of electricity supplied to customers; and • Undermine the economically efficient, safe and reliable production and supply of	The IMO notes Alinta's concerns. Refer to the response presented in item 1 and 44.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				electricity and electricity related services.	
47.	RC_2010_25	Regulatory Risk	Alinta	Considers that the most effective approach to avoiding these detrimental consequences will be to grandfather the current methodology for establishing the Relevant Level for capacity provided by existing intermittent wind generators. Such an approach would also be consistent with the recommendation made the Economic Regulation Authority that consideration be given to a clear transition regime to manage changes in the treatment of intermittent generators.	The IMO notes Alinta's suggestion. Refer to the response presented in item 44.
48.	RC_2010_25	Regulatory Risk	Synergy	A concern that Synergy has previously voiced at the MAC regarding this proposal is that it introduces a perception of regulatory risk, not only to potential intermittent investors but to all market investors. Synergy's view is that allowing significant regulatory risk to be associated with the WEM is unacceptable and will result in renewable energy investors demanding significantly higher risk premiums, leading to unnecessarily high costs being passed to customers.	The IMO notes Synergy's concerns. Refer to the response presented in item 44.
49.	RC_2010_25	Regulatory Risk	Synergy	Notes that other markets have acknowledged the potential for such detrimental outcomes and have used grandfathering at times of significant rule changes. A local example is the AEMC rule determination concerning restrictions on Intermittent Generator dispatch, as detailed in their May 2008 final report, which introduced grandfathering to counter market concerns.	Refer to the responses in items 6 and 44.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
50.	RC_2010_25	Regulatory Risk	Synergy	With the mandatory RET continuing to drive the expansion of Intermittent Generators in the SWIS, renewable energy investors currently have no clear signal how, in the future, the market will limit their production for system security purposes i.e. will it be achieved by capping the capacity (MW) of wind generation built (a constrained solution) or by curtailing energy production (a market pricing solution). Determining answers to these questions is now critical to minimise the regulatory risk for both existing facilities and those shortly to be decided on.	The IMO notes Synergy's comments. The IMO considers that each and every generation and DSM facility should receive the correct and appropriate allocation of CRC and Capacity Credits for the contribution it makes to the RCM. Refer to the response presented in item 2, 44 and 57.
51.	RC_2010_25	Regulatory Risk	Synergy	Concerned that the fleet-based nature of the proposal introduces uncontrolled investment risk given that a new facility, by its locational and technology choice, could deteriorate or improve the crediting of existing facilities through changes in the CC value assigned to the fleet of renewable energy generators as a whole. At this juncture, Synergy states that this is an uncertain concern because of ignorance regarding how future investment would ultimately impact CCs assigned to existing facilities.	The IMO notes that modified Methodology 1 does not have a fleet based component. See section 6 of this report for further details. The IMO acknowledges that fleet-based proposals will potentially introduce some investment risk. They would also introduce cash flow uncertainty to existing participants. Refer to the response presented in item 44.
52.	RC_2010_25	Regulatory Risk	Infigen Energy	The proposed changes have a significant negative impact on the revenue of existing Intermittent Generators, that have negotiated off take arrangements and have been financed based on certain revenue assumptions.	The IMO acknowledges that there may be negative impacts on the asset values of some existing Intermittent Generators and notes its proposed decision to introduce a glide path for the new methodology. Also refer to responses in items 44, 13 and 21.
53.	RC_2010_25	Regulatory	Infigen	The proposed changes have a significant	Refer to response in items 6, 21 and 44.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
		Risk	Energy	negative impact on the potential revenue, and more significantly potential for off take arrangements for Intermittent Generator projects under development. Parties such as Infigen have a considerable investment in project development in WA also based on certain regulatory and revenue assumptions. Future investment in WA is constantly evaluated against other jurisdictions in Australia and internationally. This proposed rule change is one of several being considered that send a significant negative investment signal to renewable energy developers in WA.	
54.	RC_2010_25	Regulatory Risk	Vestas	RC_2010_25 would impose regulatory risk on existing investors in renewable energy generators and would deter future investors. By contrast RC_2010_37 goes a long way to maintaining a prospective investment market, which will be likely to promote greater competition for new renewable energy projects.	Refer to responses in items 13, 14, 44 and 52.
55.	RC_2010_25 & RC_2010_37	Regulatory Risk	LGP	Both of the proposals violate the Regulatory Risk ideal that was originally distilled by the REGWG from the market objectives in respect of renewable energy, without substantive justification. LGP submits that while well-considered and substantiated wealth transfers can in principle support the Market Objectives, the wealth transfers contemplated by both proposals are arbitrary and neither was recommended by the consultant undertaking the study. While LGP considers the consultant's recommendation to also be arbitrary, it is of higher standing with respect to political or commercial bias. That said LGP also does not	The IMO notes LGP's comments. The IMO however does not consider the proposals to be arbitrary but rather reflective of the outcome of a REGWG process and informed by analysis that has been undertaken (as presented in section 6.2) and feedback provided during consultation. The IMO notes that modified Methodology 1 has been informed by the recommendations of the Sapere report. Refer to response in items and 6, 21, 44 and 47.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				support the consultant's proposal, but would be willing to accede to it on the grounds that it is a consultant's recommendation at the end of a thorough and well resourced deliberation amid a complex and commercially-competitive context.	
56.	RC_2010_25 & RC_2010_37	Regulatory Risk	Perth Energy	It seems evident that existing owners of wind farms will suffer different degrees of economic loss should either proposal be implemented. This could increase the perceived regulatory risk in the WEM. That in turn would make it harder to obtain funding for future Intermittent Generator projects and most likely increase the cost of obtaining such funding. This risk could spill over to dispatchable generation projects although this is an unknown.	The IMO notes Perth Energy's comments. Also refer to item 44.
57.	RC_2010_25 & RC_2010_37	Regulatory Risk	Perth Energy	While acknowledging the regulatory risk, Perth Energy considers it more imperative that the WEM is developed to accommodate an increased proportion of renewables while still maintaining the principles of economic efficiency and system security. This dual objective cannot be achieved without true cost reflection.	The IMO considers there is nothing within the WEM design at present, or under either Rule Change Proposal that would preclude an increase to the proportion of renewables on the system. The IMO seeks to evolve the Market Rules to appropriately value the contribution all facilities (Scheduled Generators, Intermittent Generators and DSM) make to the RCM. Also refer to item 50.
58.	RC_2010_25 & RC_2010_37	Regulatory Risk: Government Subsidy	Perth Energy	With regard to the economic impact on existing Intermittent Generators, there may be a case to be made about a direct Government subsidy that should be explicitly separated from the operation of the WEM. A community service obligation equivalent payment to existing Intermittent Generators impacted by the change in the Market Rules can be developed and negotiated between these plants and the	Refer to response to item 44. The IMO notes Perth Energy's comments. The implementation of a direct government subsidy is a much wider consideration.

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				Government.	
59.	RC_2010_25 & RC_2010_37	Regulatory Risk: Grandfathering	Perth Energy	An often used mechanism to tackle difficult transitional issues is to grandfather current rights to existing users for a defined period. This way new investment can be given the right economic signals while existing projects are not penalised for investment decisions that were made in good faith based on the rules as they applied at the time. But grandfathering can also prolong the effect of inefficiencies that the change in question is trying to address. It would also open up discriminatory treatment of pre-and post rule change investment activities. There is no reason why existing wind farms should be accorded preferential treatment compared to new ones. The most that could be argued for would be a defined period for adjustment of just over 2-3 years to create a gradual impact path for a rule change. Perth Energy therefore asks the IMO to carefully consider whether the benefits of some form of grandfathering in this instance would be justifiable and would outweigh any regulatory costs.	Refer to response to item 44. The IMO notes Perth Energy's comments that transitional arrangements can: • prolong the effect of inefficiencies that the change in question is trying to address; • introduce discrimination for pre- and post-rule participants; and • lead to longer term efficiency issues. As per the IMO's response to item 44, the IMO has decided to implement a 3 year glide path.
60.	RC_2010_25 & RC_2010_37	Regulatory Risk	Perth Energy	On the practical side of contractual commitment, Perth Energy's experience is that suppliers do tend to have in their power supply agreements covering changes in law and in this case changes in the Market Rules. It would be reasonable to assume that Intermittent Generators would have covered themselves with such clauses.	The IMO notes Perth Energy's comments and notes that it would also reasonably expect change of law provisions to exist in bilateral contracts.
61.	RC_2010_25 & RC_2010_37	Regulatory Risk	Pacific Hydro	Reducing the CC price or introducing uncertainty about future cash flows from CCs will not impact	The IMO notes Pacific Hydro's comments and further notes that the RCM is designed on the premise of a bilateral

	Regulatory Risk				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				the wind developer unless the developer chooses to take on the market risks and operate against the spot market. In our experience this type of arrangement is less likely to be supported by financiers who seek certainty, prior to putting forward capital to invest in such projects.	market, with a general expectation that capacity is often developed under bilateral arrangements. The IMO also refers to comments made in item 21 and 44.
62.	RC_2010_25	Financial Impacts	Alinta	Although the financial effects of the proposal may largely represent wealth transfers between Market Participants, the impact on existing intermittent wind generators is both material and disproportionate to their contribution to the overall level of Capacity Credits approved and assigned by the IMO.	The IMO notes Alinta's position. As per the IMO's response to item 44, IMO has decided to implement a 3 year glide path.
63.	RC_2010_37	Regulatory Risk	Synergy	Synergy also notes that estimated capacity crediting values resulting from using the method proposed in RC_2010_37 would approximate the values currently attributed to wind farms, although would be slightly lower. This methodology, if adopted, would therefore minimise any regulatory risk associated with existing wind farms changing the method of capacity crediting. In saying this, Synergy recognises that capacity crediting levels may change as a result of wind farm annual production and this may produce an even lower figure in future years. This is regrettable, though given 3 year averaging is used to determine the capacity level, it is considered an acceptable risk.	The IMO notes Synergy's comments. As per the IMO's response to item 44, IMO has decided to implement a 3 year glide path.

	Market Objective Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
64.	RC_2010_25 & RC_2010_37	Balance of Market Objectives	AGL	It appears in this instance that some stakeholders have incentives (to maintain system reliability) that could impede such investments encouraging Scheduled Generators rather than cleaner and renewable generation.	The IMO acknowledges there are often competing objectives in complex issues such as this.
65.	RC_2010_25	Market Objective assessment	Alinta	No evidence has been provided by the IMO in its Rule Change Proposal to support its assertion that the Methodology 1 will better the Market Objectives.	The IMO notes its proposed decision to accept modified Methodology 1 based on the recommendations of the Sapere report. Refer to the IMO's assessment (Section 6) of this report.
66.	RC_2010_25	Market Objective assessment	Alinta	While the available evidence does indicate that the current methodology will understate the amount of energy that may be available from solar thermal and photovoltaic generators during periods of peak system demand, Alinta considers that Methodology 1 would be unlikely to be the methodology that best achieved the Market Objectives.	The IMO notes Alinta's comments. Refer to item 65 and the IMO's assessment (Section 6) in this report.
67.	RC_2010_25	Balance of Market Objectives	Collgar	Believes that the methodology that should be adopted (as recommended by MMA) is proposal 2A/2B of Work Package 2. Based on MMA's findings this proposal represents the best solution to achieve system reliability while not unduly penalising renewable technologies.	The IMO notes Collgar's position on this issue. Refer to the IMO's assessment (Section 6) in this report.
68.	RC_2010_37	Balance of Market Objectives	Collgar	Collgar believes the Proposal 2A developed by the external expert McLennan Magasanik Associates (MMA) engaged to investigate this issue as part of Work Package 2 of the Renewable Energy Generation Working Group is the most technically sound option to value the contribution of intermittent generators during periods of peak demand.	The IMO notes Collgar's preference. Refer to item 65 and the IMO's assessment (Section 6) in this report.

	Market Objective Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				However, taking into account the Market Objectives, Collgar acknowledges that Proposal 2B is a preferred option.	
69.	RC_2010_25	Balance of Market Objectives	SEA	SEA's opinion, based on consultation with members, is that RC_2010_25 will provide assurance to System Management regarding reliability (Market Objective (a)) but will have both short and long term negative consequences for the electricity market by failing to address Market Objectives (b) to (d). The sole exception to this current rule change impact is the inclusion of solar PV generation, which has been previously excluded contrary to Market Objective (c).	The IMO notes SEA's opinion. Refer to the IMO's assessment (Section 6) in this report.
70.	RC_2010_25	Energy shortfalls reliability criterion	Synergy	Does not perceive that the capacity market exists for the sole purpose of meeting the system peak. Rather, capacity has the dual requirements, as defined under clause 4.5.9, of meeting the peak demand and having an annual tolerance to limit loss of supply. The proposal is based on the view that capacity exists solely to meet the peak, failing to recognise that capacity also exists to minimise expected energy shortfalls. The IMO's proposal is insufficient in this regard as it exclusively focuses on the peak and fails to recognise the full capacity value of wind based Intermittent Generators.	The IMO notes Synergy's comments and has discussed the issue of the reliability criteria in section 6.2 of this report.
71.	RC_2010_37	Recognition of value of Intermittent Generators	Synergy	The proposed rule change has been developed based upon modelling assessments undertaken by consultants MMA using simplified option 2B. This simplified methodology retains most of the benefits of the original proposal including	The IMO notes Synergy's comments and has discussed the issue of the reliability criteria and the relative merits of the proposals in meeting the criteria in section 6.2 of this report

	Market Objective Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				greater consistency with the reliability criteria as given in Market Rule 4.5.9. In this regard, in Synergy's view, Methodology 2 (RC_2010_37) is superior to the current method of capacity crediting Intermittent Generators which is based upon annual production not aligned to system peaks, and therefore better allocates performance across both wind and solar facilities.	
72.	RC_2010_37	Data availability	Synergy	There has been criticism that the methodology of RC_2010_37 has insufficient data to be considered reliable. In particular it has been pointed out that no 1-in-10 year peak demand data was used in its assessment. Synergy understands these comments, but differs in that it believes the data quality questions are overstated and are therefore insufficient in themselves to discount this approach being considered for use in the SWIS. Extra data will arrive with time and will improve the predictability of the method, but given its one-in-three year rolling structure makes it inherently stable, suggesting extra data will only tinker the results.	The IMO notes Synergy's comments and has discussed the issue of the reliability criteria in section 6.2 of this report. The IMO reiterates that the lack of data available to date makes it difficult to accurately assess the real contribution that Intermittent Generators make to the RCM. The IMO considers that this will remain an issue for some time, as even the occurrence of a 1-in-10 year event will only provide one data point for an assessment of performance in extreme circumstances. The IMO notes that one of the intentions of the 3 year reviews is to allow the methodology to be reconsidered in light of greater data availability over time which may make other options such as regression analysis more applicable.
73.	RC_2010_37	Appropriate Allocation Level	Synergy	System Management has rightly expressed concern that the market may be paying too much for the capacity crediting of Intermittent Generators. Synergy considers, given that the method used to determine the level of capacity crediting is based upon the Long Term Projected Assessment of System Adequacy (LT PASA) criteria in Market Rule 4.5.9, that the cost value equation inherent in the methodology proposed in RC_2010_37 is	The IMO notes Synergy's comments. Refer to item 65 and the IMO's assessment (Section 6) in this report.

	Market Objective Impacts				
Item	Proposal	Clause/Issue	Submitter	Comment/Change Requested	IMO's response
				balanced and that the resulting crediting value represents a fair value for performance.	
74.	RC_2010_37	Reliability criteria	Synergy	Synergy supports this Rule Change Proposal for the reasons that the current approach for capacity crediting Intermittent Generators is arbitrary, the proposed methodology (RC_2010_37) is more consistent with the criteria given in Market Rule 4.5.9 and this proposal minimises the impact of regulatory risk to the market.	The IMO notes Synergy's comments. The IMO discusses the issue of the consistency of the 2 methodologies with the reliability criteria in section 6.2 of this report. Refer to item 65 and the IMO's assessment (Section 6) in this report.
75.	RC_2010_25	Reliability criteria	Synergy	Has concerns regarding the present formulation of capacity crediting for intermittent facilities. It is questionable whether the current practice of crediting based solely on annual energy production satisfies all of the reliability criteria described in clause 4.5.9, which is undoubtedly biased towards wind technology and against solar technology. It is understood why the current approach was adopted for the commencement of the market, but the approach is not sustainable, lacking the justification delivered via a value based methodology.	The IMO notes Synergy's comments that it considers there are issues (bias) in the current determination methodology of Capacity Credits for Intermittent Generators.
76.	RC_2010_25	Balance of Market Objectives	Infigen Energy	The proposed changes can not be considered economically efficient, as it is not part of any holistic assessment of the costs of system reliability, or the best means of delivering the appropriate level of reliability, or what the most economically appropriate level of system reliability actually is. At the least, it should be considered as part of a complete review of CCs.	Refer to response in items and 28 and 31. The IMO also notes there are provisions for regular reviews of the reliability criterion, which includes among other things a cost-benefit study on the effects on stakeholders of a variety of levels of generation adequacy (Clause 4.5.15). Refer to item 65 and the IMO's assessment (Section 6) in this report.
77.	RC_2010_25	Discrimination	Infigen Energy	Considers that the proposal discriminates	The IMO notes Infigen's contention that RC_2010_25

	Market Objective Impacts				
Item	**Proposal**	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
		against Intermittent Generators		against renewable generation, noting the following points: • The assessment of Scheduled Generators is not compulsory, and even if performance is below the stated standards, the IMO is not obligated to reduce the CCs for the facility; • The relevant period for assessing Scheduled Generators is 36 months, over the entire Capacity Year, and has no bias towards the supposed all-important summer peak period; • The 36 month, whole of Capacity Year "assessment" criteria for Scheduled Generators matches the current methodology for determining capacity credits for Intermittent Generators; • Despite any major outage requiring primarily a failure of Scheduled Generation, this has not been overlooked; and • The argument that the capacity refund fines imposed of scheduled generation that is not available to meets its capacity obligations cover this eventuality do not improve system reliability during the event.	discriminates against renewable generation. However the intention is to remove a potential discrimination towards some types of Intermittent Generator facilities (i.e. wind farms) and against others (i.e. solar generation facilities) on the basis that they are currently not receiving the correct allocation of Capacity Credits. In particular the IMO notes that currently some wind farms are provided a level of Capacity Credits in excess of their contribution to power system reliability during peak events. Alternatively solar generation facilities are not allocated enough Capacity Credits to reflect their contribution to peak events. On the other points raised, the IMO notes that: • The assessment of Scheduled Generators is compulsory if the Market Participant wishes to receive CRC and Capacity Credits for the Facility. Further, physical tests are conducted of any Scheduled Generation facility that fails to perform throughout the year and Capacity Credits will be reduced for failure to perform. • The IMO assumes the 36 month period Infigen refers to is in relation to clause 4.11.1(h) which provides that the IMO may decide not to award any Capacity Credits to a facility that has had poor Forced Outage rates over a 36 month period. This is not a similar provision to that being contemplated in this Draft Report. • Neither of the proposals contemplate capacity cost refunds.
78.	RC_2010_25	Increased costs of electricity	Infigen Energy	The proposal will increase the cost of electricity in the SWIS. There will be a requirement for the system to install more generation to cover the same capacity requirement, based on an unsubstantiated	The IMO notes Infigen's comments. The IMO notes that in making its proposed decision contained in this report a balance between reliability and cost has to be struck. The IMO notes there is little available data on the

	Market Objective Impacts				
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				argument that system security is at threat (and against the recommendations of independent expert consultants)	performance of Intermittent Generator facilities during extreme peak events. Refer to section 6.2 of this report for the IMO's assessment of the alignment of modified Methodology 1 and 2 with the reliability criterion. Refer also to the IMO's assessment (Section 6) in this report.
79.	RC_2010_25	Balance of Market Objectives	Vestas	While the proponents of RC_2010_25 clearly place a high emphasis on the reliability aspect of this objective, the proposal has serious weaknesses when the economically efficient supply of electricity is considered. Security of supply is an important issue, but there are other ways in which to achieve it without amending the RCM to do so at the cost of other objectives.	Refer to response to item 78. The IMO notes concerns raised by the Office of Energy through the REGWG process. The IMO notes the comment made by the Acting Coordinator for the Office of Energy in the April 2010 REGWG meeting who: *"stressed that system security is the top priority and mentioned that the final method for valuing Intermittent Generation capacity will need to reflect this."*
80.	RC_2010_25	Discrimination against Intermittent Generators	Vestas	RC_2010_25 is clearly a form of discrimination against renewable energy generators, relative to the existing rules. Primarily it does this by reducing the valuation of their contribution to WA's needs for generation capacity at key times. Meanwhile, it does not alter the capacity payments for thermal generators. RC_2010_37 is a far better option, as it rewards generators for their contribution to WA's needs for capacity at the times when it is most needed. It relies on evidence, it rewards performance and it penalises underperformance. Such a regime appears consistent with the aims of having a capacity market in the first place.	Refer to response to item 77 and the IMO's assessment (Section 6) in this report. Additionally, the IMO notes that while both methodologies will potentially reduce the level of Capacity Credits provided to some wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system reliability during peak events.
81.	RC_2010_25	Increased costs of	Vestas	It could equally be argued that the economic inefficiency of RC_2010_25, which will	The IMO notes Vestas' comments.

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		electricity		expose WA to higher retail electricity prices, may in fact provide a price signal that helps to bring forward the widespread adoption of energy efficiency technologies in homes and businesses.	Refer to the IMO's assessment (Section 6) in this report.
82.	RC_2010_25 & RC_2010_37	Discrimination against Intermittent Generators	LGP	Both proposals violate Market Objective (c) by utlizing the new concept in a manner quarantined to this issue without contemplating its generalization to the entire market. In particular, if LSG has merit on the supply side in this regard, it would presumably also have merit on the demand side that drives the supply side. LGP considers that for the use of LSG to be non-discriminatory, it would first be necessary to assess its use in respect of the Peak Demand forecast in the Statement of Opportunities, the 12 Peak Intervals on which the IRCR is based, and the valuation of DSM. LGP notes the conclusion of the REGWG that the use of LSG instead of the traditional system demand leads to lower valuations. While that may be a logical outcome of a full review of the use of LSG, in its present form, its use just aggravates their arbitrary nature.	The IMO notes LGP's comments. This Draft Rule Change Report must however restrict its consideration to the matters before it. With regard to the use of the LSG concept refer to the discussion in Section 6.2 and 6.3 of this report. The IMO also notes other reviews are underway at present to consider more widely the efficacy of the RCM. Refer also to the IMO's assessment (Section 6) in this report.
83.	RC_2010_25 & RC_2010_37	Planning Criteria	LGP	The present valuation method was established as a means of building into the Market Rules a subsidy favouring Intermittent Generators. While LGP acknowledges that Market Objective (c) provides for non-discrimination across technologies, we submit that this objective was intended to operate so as to preserve the initial subsidy. LGP perceive that it was decided at the outset that Market Customers would fund the	The IMO notes LGP's comments that the Market Rules currently include a subsidy favouring Intermittent Generators. The IMO, on behalf of the MAC requested guidance on this issue from the Minister for Energy. The response received from the Minister did not suggest favour for renewable energy generation within the SWIS. The IMO considers that incorporating a subsidy that potentially places system security at risk would not be appropriate and notes the requirement for the Market Rules

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				subsidy and that they would do so via the Capacity Mechanism. That said, we note that the outcome of the present system is effectively an energy payment and that it could equally be allocated to Market Customers on the basis of consumption in a similar manner to Market Fees. Furthermore, LGP submits that the amount of the subsidy has increased significantly beyond energy-price escalation via the linkage to capacity. LGP perceive that philosophically the subsidy is payable on the grounds that wind generation from time-to-time displace Scheduled Generation and consequently drives the Balancing Market down the cost curve to lower prices. Noting that recent certifications of new capacity have centred on DSM and diesel fuel, this phenomenon will become increasingly important as a principal source of low SRMC energy. The error in the Market Rules that needs to be remedied is the linking of this energy payment to the forecast of required capacity via the Planning Criteria.	to avoid discrimination against particular energy options and technologies. Direct subsidies for Intermittent Generator technologies through other mechanisms outside the WEM may be more appropriate. The IMO also notes LGP's contention that capacity prices have risen beyond that of energy prices, and that this would magnify any subsidy in this area. Refer also to the response in item 1 and the IMO's assessment (Section 6) in this report.
84.	RC_2010_25 & RC_2010_37	Balance of Market Objectives	Perth Energy	Providing cross subsidies via market mechanisms, such as by awarding higher or lower levels of CCs to facilities than the actual levels that they contribute towards achieving system security at times of peak demand will in general lead to inefficient economic outcomes and unfair cost burdens to different market participants.	The IMO agrees with Perth Energy on this matter.
85.	RC_2010_25 & RC_2010_37	Efficiency	Perth Energy	If system security and economic efficiency dictate that the Market Rules be improved	The IMO notes Perth Energy's support.

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				then there is no alternative but to support the IMO in this endeavour. This is the more important if the market has to provide feedback through correct pricing signals to policy makers and consumers to ensure rigorous scrutiny of the potential impact of Government policy. The longer the market is prevented from sending back correct pricing signals the higher the risk of a market implosion along the line of unsustainable retail price caps that caused the collapse of the Californian electricity market in 2000. For this reason, Perth Energy would be inclined to support the IMO approach and its implementation as early as practicable.	
86.	RC_2010_25 & RC_2010_37	Discrimination of Intermittent Generators	Pacific Hydro	Methodology 1 falls down in relation to new entrants, and in avoiding technology discrimination particularly for renewable technologies. While the main basis for the proposed rule change appears to have merit – to improve security and reliability – the proposed rules do not adequately address the concerns of system security and reliability that have been raised by System Management. Specifically, Pacific Hydro believe that setting a higher or lower quantity of CCs assigned to wind farms will not resolve the system security and reliability concerns if wind generation continues to be adopted by WA as part of its future energy mix.	The IMO notes Pacific Hydro's comments. The IMO would also note the 3-year review of the methodology, which will include a consideration of the penetration of Intermittent Generators, and the review of the Planning Criterion required under clause 4.5.15.
87.	RC_2010_25 & RC_2010_37	Discrimination against Intermittent Generators	Pacific Hydro	Ultimately if retailers prescribe too great a discount to the value of CCs and the wind developers bundled rates cannot be met, developers will defer investment in WA and	Refer to responses in items 1, 3, 6, 7 and 18 *et al.* The IMO notes that a wind farm investing in the NEM is assumed to receive in the order of 5 percent of nameplate

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				establish projects in other jurisdictions. Accordingly Pacific Hydro considers that the proposed rule changes increase uncertainty for wind farm viability and discriminates against renewable energy (inconsistent with Market Objective (c)).	capacity for reliability planning purposes. This is compared to the WEM where Capacity Credits assigned to Intermittent Generators have historically equated to valuing wind farms at 38 to 42 percent of their nameplate capacity. It should be noted that the NEM does not have a capacity market.
88.	RC_2010_25 & RC_2010_37	Balance of Market Objectives	Griffin Energy	Alternatively, if RC_2010_25 were to not impact on investment in Intermittent Generators in the SWIS the perceived issue around system security would not be addressed, the same investment in Intermittent Generators would remain however they would be less efficient and cost consumers more.	Refer to responses in items 1, 3, 6, 7 and 18 *et al* and to the IMO's assessment (Section 6) in this report.
89.	RC_2010_25 & RC_2010_37	Price Impacts	Griffin Energy	Intermittent Generators, with a SRMC of around $0/MWh, will have the effect of lowering the cost of supply in the STEM and Balancing markets. This is not a trivial outcome.	The IMO notes Griffin Energy's comment.
90.	RC_2010_25 & RC_2010_37	Balance of objectives	Griffin Energy	Markets cannot effectively function by only giving regard to the set of Market Rules governing its operation at the expense of ignoring all other inputs.	The IMO notes Griffin Energy's comment.
91.	RC_2010_25 & RC_2010_37	Price impacts	Griffin Energy	RC_2010_25 will almost certainly reduce the economic efficiency of the market. It is unlikely that making new investment in Intermittent Generators in the SWIS less competitive with respect to the NEM will mean that no more investment is made. Retailers will pay a premium to hedge their exposure to diverging energy costs in different jurisdictions (and the impact this has on the relative value of a REC). And the state government will likely intervene to address	The IMO notes Griffin Energy's contention that RC_2010_25 would reduce economic efficiency and that the relative merit of investing in the SWIS may change. The IMO reiterates its comments that a more robust Capacity Credit valuation methodology for Intermittent Generators (which is reflective of their actual contribution to peak output) implemented in the WEM will encourage more efficient investments. The IMO is not in a position to comment about intervention by the State Government as contended by Griffin Energy or

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				policy failure by building non-commercial facilities. In both cases, consumers will face higher prices for their renewable energy.	the efficiency of investment in the NEM..
92.	RC_2010_25 & RC_2010_37	Long term costs	Griffin Energy	The IMO forecast of demand will still need to be met. By decreasing the quantity of CCs to Intermittent Generators, there will need to be a greater capital base installed to meet the forecast demand. This cost will be borne by consumers.	The IMO agrees that the forecast of demand will still need to be met. However, if Capacity Credit assignment level to Intermittent Generators (or to any plant for that matter) is higher than it ought to be (or in the case of solar generation facilities, lower than it ought to be), the reliability expectations will not be met appropriately.
93.	RC_2010_25 & RC_2010_37	Price impacts	Griffin Energy	By discouraging new investment in Intermittent Generators, it is likely that STEM and Balancing prices will be higher.	The IMO notes Griffin Energy's comments, but the IMO contends that there are many factors which will impact and influence pricing in STEM and Balancing.
94.	RC_2010_25 & RC_2010_37	MRET	Griffin Energy	Considers that progression of RC_2010_25 will have a detrimental impact on the WEM and will lead to wider policy and market failures with regard to the likely impact of federal MRET legislation. This is counter to the objectives of the REGWG and would represent a very poor outcome of IMO and MAC process.	The IMO notes Griffin Energy's comments. Refer to the IMO's assessment (Section 6) of this report.
95.	RC_2010_25 & RC_2010_37	Balance of Market Objectives	Griffin Energy	The consultant engaged by the IMO on behalf of the REGWG (MMA) has approached the issue in a manner more consistent with the scope of works of the REGWG. That is, MMA has developed a methodology that it believes will accommodate a greater penetration of IGs in the WEM (as is expected in response to the MRET legislation) in a manner that will incentivise new IG entrants to produce energy at times of peak system demand – which in the WEM normally occurs during summer afternoons. Put simply, if an IG facility does not consistently produce energy	The IMO acknowledges Griffin Energy's position. Refer to the IMO's analysis, including the Sapere report (section 5) and the IMO's assessment (Section 6) of this report.

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				during times of high system demand, ***then the quantity of capacity credits it receives will be reduced.*** RC_2010_37 is based on the methodology developed by MMA. Griffin Energy believes that this methodology, of those considered by the REGWG, best meets the objectives of the REGWG as well as the Market Rules. It is relatively simple, transparent, is consistent with the existing methodology (reducing the perception of regulatory risk) and, fundamentally, incentivises output at times when the market most requires it.	
96.	RC_2010_25 & RC_2010_37	Long term costs	Pacific Hydro	As costs and risks incurred by wind developers are passed through to retail customers, the result of the proposed rule change could ultimately drive higher charges and volatility. This is entirely contrary to market objective (d).	The IMO considers that both proposals would better with Market Objective (d). Refer to the IMO's assessment against the Market Objectives in Section 6 of this report.
97.	RC_2010_25	Balance of objectives	Alinta	MMA also concluded that the Methodology 1 is too conservative, lacks stability and is unlikely to provide a robust and accurate assessment of the energy that can be expected to be available from these facilities during periods of peak system demand.	The IMO is seeking to strike a balance between conservatism, stability and alignment with the objectives of the Planning Criterion.
98.	RC_2010_25 & RC_2010_37	Discrimination	Perth Energy	Without transparent and proper costing and pricing of the system security gap caused by increasing entry of wind farms, other Market Participants will continue to bear the unfair burden of their operation.	The IMO notes Perth Energy's comments.

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99.	RC_2010_25 & RC_2010_37	Changing Reserve Margin	AGL	Increasing the reserve margin would result in an increase in the capital base required to meet the forecast demand (the forecast demand will not change), which will in turn increase the cost to users and likely improve reliability.	The IMO agrees that there is a trade off between the reliability of energy supply in the WEM and the cost associated with ensuring that level of reliability. The current reliability criterion was established after consideration of that trade off. However, increasing the reserve margin is outside of scope of either Rule Change Proposal.
100.	RC_2010_25 & RC_2010_37	Security and Reliability impacts	AGL	The System Management argument around reliability is unclear. Methodology 2 is an explicit mechanism to award CCs based on output during peak time. If an Intermittent Generator is not producing energy during these intervals, then its CC allocation will reduce. AGL considers this a more transparent concept.	The IMO notes that Methodology 2 is an average figure based on a large number of Trading Intervals. That is, non-availability of plant during peak periods would not be equivalently reflected in future cycles when certifying Capacity Credits. This is because the large number of Trading Intervals being used would dilute the impact on the Facility's future certification. The core consideration to be taken into account in assessing modified Methodology 1 and Methodology 2 is how well each aligns with the Planning Criterion. For further details of the IMO's assessment refer to section 6.2 of this report.
101.	RC_2010_25 & RC_2010_37	Security and Reliability impacts	AGL	Given the demand/supply position in the SWIS it is likely that, along with a low output day for the intermittent fleet, a large Scheduled Generator would have to be offline due to a Forced Outage. This is as uncontrollable by System Management as the wind is. While a Scheduled Generator is subject to capacity refunds – this does not prevent the load shedding in real time.	The IMO agrees that this would not prevent load shedding in real time. The high level design of the capacity market is that: • a Scheduled Generator is accredited based on full capacity and subject to full capacity refunds; while • an Intermittent Generator is accredited based on expected availability and not subject to any capacity refunds once commissioned.

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					The IMO notes that amendments to this high level design are out of scope of either proposal.
102.	RC_2010_25	Security and Reliability Impacts	Alinta	To date no conclusive or persuasive evidence has been presented that a change to the methodology used to establish the Relevant Level of Facilities in the WEM, and therefore the quantity of Certified Reserve Capacity that may be assigned to those Facilities is necessary in the near term to protect either Power System Security of Power System Reliability.	The IMO notes that the case for change is that the Planning Criterion requires effective capacity to meet the 8.2 percent reserve requirement. The IMO considers that the current valuation methodology: • overestimates the contribution of wind generation to peak demand periods; • would not adequately account for the contribution of solar to peak demand periods; • has the potential to overestimate the contribution of Intermittent Generators to system reliability. Refer to Section 5 and 6 of this report.
103.	RC_2010_25 & RC_2010_37	Security and Reliability Impacts	System Management	System Management's view is that over allocation of Capacity Credits to Intermittent Generators would conflict with the objectives of the Reserve Capacity Mechanism, which is intended to support the objective of Power System Security and reliability and act to minimise or prevent load shedding.	The IMO agrees that over allocation of Capacity Credits to any facility would conflict with the general intention of supporting the objective of Power System Security and Reliability.
104.	RC_2010_25 & RC_2010_37	Security and Reliability Impacts	System Management	The proposal to determine the Capacity Credit payments for wind farms based on the average of the past 750 intervals is likely to lead to a level of incentive that is not supported by the actual contribution of the wind farm fleet at times of peak system load.	The IMO notes System Management's contention. Refer to Section 5 and 6 of this report.
105.	RC_2010_25 &	Security and	System	The averaging methodology introduces	The IMO notes System Management's view that the

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	RC_2010_37	Reliability Impacts	Management	additional and unacceptable risk to Power System Security and Reliability. MMA's analysis for the REGWG has shown that on average 40 percent of the wind farms output can be counted as reliable though with a large degree of variation on specific days. However the SWIS power system cannot be operated on averages. This is why the reliability criteria refer to the 1 in 10 year peak load day not the average.	averaging methodology introduces additional and unacceptable risk to Power System Security and Reliability. More detail on the use of averages is provided in the IMO's assessment presented in Section 6.2 of this report.
106.	RC_2010_25 & RC_2010_37	Availability of Data	System Management	To date the SWIS has not experienced a 1 in 10 year load on which the load forecasts used for the SOO are based. The wind farm contribution for this extreme event is not known. What is clear from data analysis so far is that the higher the level of Capacity Credit attributed to wind farms (e.g. from averaging wind farm outputs for a higher number of intervals) the higher the risk that there would be insufficient available capacity to meet the peak loads.	The IMO agrees with System Management's comments. Refer to Sections 5 and 6 of this report.
107.	RC_2010_25 & RC_2010_37	Security and Reliability Impacts	System Management	As wind farm capacity on the SWIS is expected to more than double within the next 12 months, the degree of risk resulting from over allocation of wind farm Capacity Credit is likely to double. This risk would be expected to continue to increase as the capacity of wind farms on the SWIS increases.	The IMO notes System Management's comments. The IMO would comment that the relationship between the amount of Intermittent Generator capacity on the SWIS and risk may not scale linearly. The IMO recognises the risk of increased penetration and has proposed a three year review.
108.	RC_2010_25 &	Availability of	System	To date, given the scarcity of data, all	The IMO agrees with System Management's comments

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	RC_2010_37	Data	Management	analyses have used some form of prediction of expected outputs for the future and back-cast for the past. As more data becomes available in the future wind farm output contributions at peak periods should be continuously monitored and where appropriate the Capacity Credits should be revised.	and notes that one of the intentions of the 3 year review is to allow the methodology to be reconsidered in light of greater data availability over time which may make other options such as regression analysis more applicable. .
109.	RC_2010_25	System Management analysis	System Management	In its report of 29 October 2010 the REGWG provided a summary of 4 methodologies and analysis by MMA indicating the wind farm contributions for each methodology. Methodology 1, which forms the basis of this proposal, was accepted by System Management on the basis that the wind farm Capacity Credit agreed fairly well with System Management's findings.	The IMO notes System Management's comments.
110.	RC_2010_25	Security and Reliability Impacts	System Management	System Management strongly supports the changes proposed by the IMO as they recognise more accurately the contribution Intermittent Generators make to system reliability at times of system peak compared to the existing rules.	The IMO notes System Management's comments.
111.	RC_2010_37	Security and Reliability Impacts	System Management	In view of the unacceptable degree of risk to system security and reliability associated with RC_2010_37 System Management does not accept these changes as they do not recognise the actual contribution intermittent generators make to system reliability at time of system peak when compared to the	The IMO notes System Management's position in respect of RC_2010_37.

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				analyses performed by System Management and others	
112.	RC_2010_25	Security and Reliability Impacts	Verve Energy	Does not support Griffin Energy's proposed methodology (Methodology 2) as it appears to not satisfy concerns that have been raised by System Management.	The IMO notes Verve Energy's position with respect to RC_2010_37 as relating to the concerns raised by System Management.
113.	RC_2010_25	Security and Reliability Impacts	Verve Energy	System Management understandably takes what could be seen by some as a conservative view on how that contribution should be determined and, in the method it proposed, sought to use a very limited number of system peak Trading Intervals. In the strictest sense, this would appear to be appropriate. However the level of volatility associated with this method was of concern to the REGWG and it appears necessary to choose a methodology that resolves that issue while remaining acceptable to System Management by not assessing IG performance over an excessive number of Trading Intervals, which would mask performance at critical times.	The IMO notes Verve Energy's comments and acknowledges that the issue of selecting an appropriate number of Trading Intervals and the associated volatility level is a difficult issue. The IMO notes that the 3 year review will consider the selection of Trading Intervals, among other things.
114.	RC_2010_25	Security and Reliability Impacts	Infigen Energy	The proposed change is a narrow targeting of Intermittent Generators (primarily wind), rather than a broader assessment of how the market can best meet its security requirements and, given the sharp rises in electricity prices to consumers, what the economically appropriate level of reliability is.	Economic considerations were taken into account in setting the Planning Criterion in previous reviews. The next review to be conducted in accordance with clause 4.5.15 is due in 2012.

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115.	RC_2010_25	Security and Reliability impacts	Infigen Energy	Every scenario that System Management has put forward in support of the unreliability of Intermittent Generators involves a scenario where a significant amount of Scheduled Generation is unavailable then lays the blame for any system reliability solely on the potential unavailability of wind.	The IMO notes Infigen Energy's comments on this issue. The IMO notes that where System Management has approved a Planned Outage this may be revoked if system security or reliability is at risk. Where a Scheduled Generator suffers a Forced Outage capacity refunds will apply during the relevant Trading Intervals – as the Facility has been certified assuming it can deliver during these periods. This is not true for an Intermittent Generator; whose failure to deliver at peak does not result in capacity refunds. The IMO therefore considers it appropriate that their Capacity Credit level aligns with their expected contribution to peak periods. Refer also to item 125.
116.	RC_2010_25	Security and Reliability impacts	Vestas	Understands the importance that the IMO, OOE and System Management place on the issue of security of supply. However, Vestas strongly disagrees that the RCM is the best measure to achieve this. Rather than damage the business case for renewable energy investors in WA by implementing RC_2010_25, the goal of security of supply could be better met, for example, by revising WA's system reserve margins.	The IMO notes the contention by Vestas to resolve this issue elsewhere. The reserve margin is set in accordance with the Market Rules, which includes a 5 year review of the Planning Criterion and the process by which the IMO forecasts SWIS demand under clause 4.5.15. Additionally, the IMO notes that while both methodologies will potentially reduce the level of Capacity Credits provided to wind farms they will however potentially increase the level of Capacity Credits provided to solar generation facilities. This amended level of certification for solar generation will more fairly represent the contribution of these facilities to power system reliability during peak events. Furthermore, the IMO does not consider it appropriate to amend the system-wide reliability criterion purely to accommodate distorted allocations to specific facilities.

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117.	RC_2010_25	Security and Reliability impacts	Vestas	RC_2010_25 might well have the aim of improving system security but it has no benefits on the issue of reliability, and a negative impact on economic efficiency. The methodology by which RC_2010_25 values the capacity of Intermittent Generators has already been characterised by MMA as conservative and inaccurate. So it follows that it is unlikely to be reliable either, unless of course it is reliably inaccurate.	The IMO considers that the methodology proposed in RC_2010_25 more closely aligns with the reliability criteria. Refer to Section 6.2 of this report.
118.	RC_2010_25	Security and Reliability	Vestas	Urges the IMO to reject RC_2010_25 and adopt RC_2010_37 as there are other proven measures available to the IMO and System Management that will enhance the security of supply in WA without penalising existing and future investors.	The IMO notes Vesta's preferred outcome between RC_2010_25 and RC_2010_37. Refer to the IMO's assessment of the methodologies against the reliability criterion.
119.	RC_2010_25 & RC_2010_37	Security and Reliability	Office of Energy	The OoE strongly recommends that, in assessing the two Rule Change Proposals, the IMO takes into account the Government's objective of ensuring that WA enjoys a secure and reliable supply of electricity.	The IMO notes the Office of Energy's recommendation that the IMO takes into account the Government's objective of ensuring that WA enjoys a secure and reliable supply of electricity. In making its proposed decision the IMO has placed significant weight on the alignment of each methodology with the reliability criterion.
120.	RC_2010_25 & RC_2010_37	Security and Reliability	Office of Energy	In the absence of a one-in-ten year event, the data used in support of both proposals is not as comprehensive as would be desired. In light of this the IMO should err on the side of caution in evaluating the proposals to ensure that security and	The IMO notes the Office of Energy's preference for the IMO to err on the side of caution in evaluating these proposals to ensure security and reliability is not put at risk. Refer to item 119.

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				reliability of supply is not put at risk.	
121.	RC_2010_25 & RC_2010_37	Reserve Margin	Pacific Hydro	System reliability should be primarily managed through re-setting the system reserve margin and/or the expected shortfall limits. The current 0.002 percent unserved energy and 8.2 percent reserve margin should be reviewed to reflect the system security concerns of stakeholders in the market with and without additional wind generation.	Refer to response to item 76, 86, 114, and 116 *et al*.
122.	RC_2010_25 & RC_2010_37	Security and Reliability	Pacific Hydro	Both Methodology 1 and Methodology 2 may have the effect of discouraging new (renewable) technology and reducing the effectiveness of intermittent technologies. Pacific Hydro is of the view that the underlying concern around the management of system reliability and security should be addressed before considering such rule changes.	The IMO notes Pacific Hydro's view on this matter. Refer to the IMO's assessment of the methodologies against the reliability criterion (Section 6.2) and Wholesale Market Objectives (Section 6.3).
123.	RC_2010_25 & RC_2010_37	Reserve Margin	Griffin Energy	Believes that System Management may have a legitimate concern regarding the possibility of a one-in-ten-year load shedding event due to an increased penetration of Intermittent Generators in the WEM. However, RC_2010_25 is not an appropriate response. This concern should be the subject of a separate review of the system security and reserve margin settings in the WEM. Given the call for a mandatory review of the Planning Criterion (clause 4.5.15) is nearing, Griffin Energy strongly recommends that the	Refer to response to item 76, 86, 114, and 116 e*t al*.

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				issues raised by System Management in the REGWG relating to load shedding potential be managed in this process, some time in 2011.	
124.	RC_2010_25 & RC_2010_37	Security and Reliability	Griffin Energy	The premise of improving security of supply is that RC_2010_25 will either reduce the quantity of new Intermittent Generators in the SWIS, or ensure that a larger capital base is installed to meet the IMO forecast capacity requirement.	Refer to responses to items 76 3, 10, and 57 *et* al.
125.	RC_2010_25 & RC_2010_37	Comparison with SG	Griffin Energy	There is no doubt that despite the extraordinary reliable summer afternoon sea breeze that originates off the south west coast of WA, there will be periods of high demand (correlating with high temperatures) where the wind resource is not available. This is akin to the fact that modern scheduled generators (gas turbine or thermal steam driven) are also extremely reliable. However they are not infallible and, from time to time, will be unavailable when required. The Market Rules use refunds and other penalties to attempt to incentivise availability from these facilities. However, ex-post penalties will not prevent load shedding in real time due to the loss of scheduled facility.	The IMO notes Griffin's comments and agrees that there are likely to be times when Scheduled Generation facilities will be on outages during peak demand events. The IMO notes that refunds should be designed to incentivise appropriate long and short term behaviour and further notes that no such refund regime applies to Intermittent Generator facilities in the WEM. That is, Capacity Credit refunds only apply to Intermittent Generators until such time as they are deemed to be commissioned by the IMO. *The IMO notes that the Rule Change Proposal: Partial Commissioning of Intermittent Generators (RC_2010_22) proposes to amend these requirements for new facilities . For further details refer to the following webpage: http://www.imowa.com.au/RC_2010_22* Refer also to item 115.

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
126.	RC_2010_25 & RC_2010_37	LSG methodology	AGL	While clearly preferring Methodology 2, AGL does not consider there is a strong case to use the Load for Scheduled Generator (LSG) methodology. Incentivising intermittent output during the highest demand periods seems the most appropriate signal to send a potential developer.	The IMO notes that the concept of LSG will broadly follow demand to the extent that the output of Intermittent Generators is low or flat. The use of LSG incentivises intermittent output when the demands on Scheduled Generation are greatest. The IMO considers that it is on this basis the use of the LSG concept has merit.
127.	RC_2010_25	LSG methodology	Verve Energy	In assessing the proposal, there has been significant concern expressed in some quarters about the use of LSG in the determination of the Trading Intervals of higher system security importance. Its use has been promoted in the proposal as accounting for increased penetration of IG and promoting diversity of technology. The former is true to the extent that it removes the influence of IG and allows for the identification of which days scheduled generation was most required. However it has been argued that, in doing so, it unfairly discounts the contribution IG may have made on those peak days and that this will become a more significant issue with increasing IG penetration.	The IMO acknowledges that the impact of the use of an LSG methodology will be greater as the penetration of Intermittent Generators increases. The IMO notes the modified Methodology 1 removes the fleet adjustment. Also refer to responses in item 126 and to the discussion of the LSG methodology in the IMO's assessment presented in Section 6 of this report.
128.	RC_2010_25	LSG methodology	Synergy	Recognises that the proposal, based on load for scheduled generation, may promote diversity of facility location and improve the collective production response. However, the absolute production of renewable energy and	The IMO notes that it does not consider that consideration of RC_2010_25 and RC_2010_37 extends to the wider issues associated with RECs.

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				RECs may be reduced in response to the diversity mechanism inherent in the fleet-based CC approach and so, benefits become uncertain and the overall costs of bringing renewable energy into the SWIS is increased.	
129.	RC_2010_25	Number of Trading Intervals used	Infigen Energy	The proposed methodology focuses on 12 Trading Intervals each year for determination of the Fleet Capacity Value. By selecting such a small number of intervals each year, the methodology does not take a statistically sound approach.	The IMO notes that there is a balance to be met between confidence in outcomes and volatility. It should also be noted that Market Customers make their contribution to capacity based on performance during 12 peak intervals for IRCR purposes. The modified Methodology 1 uses 60 Trading Intervals selected over 5 years taken from 12 separate days in each year. Also refer to the IMO's assessment presented in section 6.2 of this report.
130.	RC_2010_25	Number of Trading Intervals used	Infigen Energy	It is Infigen's opinion that 750 Trading Intervals is a reasonable amount.	The IMO notes Infigen's opinion. The IMO is concerned that using 750 Trading Intervals per year will not reflect the reliability requirements. Refer to the IMO's assessment presented in section 6.2 of this report.
131.	RC_2010_25	Simplicity of Methodology	Infigen Energy	The proposed methodology is neither simple, nor transparent.	The IMO notes Infigen's opinion. Modified Methodology 1 is simpler that the original Methodology 1.
132.	RC_2010_25	LSG methodology	Infigen Energy	Is not convinced that this is the best methodology, as it may focus on the intervals where Intermittent Generators are at lower output, than other higher	The IMO notes Infigen's comments. The methodology used is to select Trading Intervals when Intermittent Generator output is of highest value to

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				overall demand intervals where Intermittent Generator output is higher. The concept is also more complicated than simply using higher demand intervals.	reliability. Refer to the IMO's assessment presented in Section 6 of this report and in particular the discussion on the use of the LSG concept.
133.	RC_2010_25	POE Factor	Verve Energy	It could be argued that applying a PoE factor after discount already associated with the use of LSG, is akin to double contingency, further eroding what may be considered to be the contribution of IG in meeting system peaks.	The IMO notes Verve Energy's contention but considers that because the output of Intermittent Generators cannot be scheduled to meet load at other times, where as the output of Scheduled Generators can, the use of LSG methodology is appropriate for determining the contribution of those facilities to the capacity requirements. The impact of LSG is taken into account in determining the parameters of the methodology. Also refer to responses in item 126 and LSG in Section 6 of this report. Modified Methodology 1 removes the fleet assessment and is simpler than the methodology originally proposed by the IMO.
134.	RC_2010_25 & RC_2010_37	Fleet adjustment	Griffin Energy	Simplicity in regulated markets is underrated. Complicated market structures act as barriers to entry. RC_2010_25, with its interdependency on fleet performance, introduces a risk to potential investors where the value of their own investment is linked to the output of other facilities and to the management and maintenance of those facilities by third parties.	The IMO acknowledges that simplicity is often desirable in regulatory settings, but also comments that as the market and its participants mature, there is likely to be increased complexity in some areas of the Market Rules. The IMO notes that Consequential Outages will be excluded from the capacity credit valuations as the incidence of these outages is outside the control of Market Participants.
135.	RC_2010_25 &	LSG	Griffin	Introducing complicated new concepts	The IMO notes Griffin Energy's position on this matter but

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
	RC_2010_37	methodology	Energy	into the Market Rules is simply not warranted. On this point, Griffin Energy questions the value of the LSG concept introduced by MMA. While clever in its origin, Griffin Energy does not believe that introducing a new concept that applies only to a small section of the Market Rules is necessary. Griffin Energy believe it would be better to incentivise output based solely on actual demand.	considers that use of the LSG concept will produce better outcomes overall. Refer also to discussion of the LSG concept in Sections 6.2 and 6.3 of this report.
136.	RC_2010_25 & RC_2010_37	Fleet adjustment	Griffin Energy	The risk profile of RC_2010_25, where individual facilities are interdependent with the fleet with regard to setting CC allocation quantities will also deter investors – and hence competition.	The modified Methodology 1 does not use a fleet adjustment.
137.	RC_2010_25 & RC_2010_37	Fleet adjustment	Pacific Hydro	The use of a fleet metric is very conservative and arbitrarily sets a discount to the value of Intermittent Generators. To assign CCs to individual projects based on the sum of fleet capacity results in new projects being penalised for existing projects decisions to site in areas of unsuitable coincident wind conditions to LSG. These decisions were based on Regulations applicable at the time of investment and should not drive new entrant's investment. This concern is due to both the actual and "modelled" data being used and the likelihood that the transparency of the calculations will be ultimately bound by confidentiality issues.	The modified Methodology 1 does not use a fleet adjustment.. The IMO notes that at present, Intermittent Generator allocations for new projects are based on a combination of actual and modelled data for the first few years of operation. Refer to the IMO's assessment presented in Section 6.4 of this report for the IMO's further comments on the issue of fleet adjustment.

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
138.	RC_2010_25 & RC_2010_37	Time period	Pacific Hydro	The use of the 12 highest LSG Trading Intervals may lead to increased volatility although this has been improved by using the 8 year fleet review rather than the MMA recommended 3 year determination. However this extended time period will place an unreasonable lead time and barrier for wind developers to fast track projects.	It is expected that under modified Methodology 1, modelled data could be used to support applications for new developments.
139.	RC_2010_25 & RC_2010_37	LSG methodology	LGP	The use of LSG would eventually lead to Solar PV generation not contributing to the system peak because SPV penetration would displace the peak into the evening.	The IMO notes LGPs concerns around solar generation facilities. The IMO considers that the likely penetration level of solar generation would not be sufficient to cause the problem referred to by LGP before the first review of the adopted methodology to be conducted in three years time.
140.	RC_2010_25 & RC_2010_37	Simplicity	LGP	Both the proposals violate the simplicity ideal. Developers and their financiers need to be able to understand the valuation and accurately forecast it. Capacity Payments represent highly credible cash flows and complication reduces their credibility. The switch to LSG also aggravates this; while system demand data is readily available, LSG is not.	The IMO notes LGP's concern over the issue of simplicity but acknowledges that developers and financiers are most often sophisticated entities with an ability to understand and value risk. It would be expected that data and tools will be made available by the IMO to assist in the determination of such analyses and forecasts.
141.	RC_2010_25 & RC_2010_37	Volatility	LGP	Both proposals violate the volatility ideal. In addition to financiers requiring stable cash flows in order to minimize financial risk, it is in the best interests of the market to avoid dislocations in the forecast capacity shortfall published in the Statement of Opportunities. LGP perceives that under both options a "high-	The IMO comments that developers and financiers are most often sophisticated entities with the ability to model cash flows. Under any determination methodology, there may be a risk of a Supplementary Reserve Capacity event. This can be the result of a range of reasons.

Methodology					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				wind year" could impair system security via a false signal of no requirement for peaking capacity two years out, leading to a potential call on Supplementary Reserve Capacity and its associated expense and disruption.	The risk of a "high-wind year" is mitigated in the modified Methodology 1 by using multiple years of data.
142.	RC_2010_25 & RC_2010_37	Volatility	LGP	Both proposals violate the practicality and robustness ideals in a similar manner to the present system. While they potentially halve the magnitude of the potential capacity shortfall, the fact remains that there is no guarantee that the wind will blow at the required time to the statistically determined level.	The IMO notes LGP's concerns around practicality and LGP's contention that under any allocation methodology, there is no guarantee that the available fuel source for an Intermittent Generator will be available at the required time to the statistically determined level.

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
143.	RC_2010_25 & RC_2010_37	Simplicity of proposal	AGL	Understands there is an alternative proposal from Griffin Energy (RC_2010_37). It appears to be simple, transparent and consistent with the current methodology, but better aligns CC allocation to wind farms and solar facilities with their contribution to demand in peak periods (summer).	The IMO notes that the use of an average figure does not equate with reliability. Refer to the IMO's assessment.
144.	RC_2010_25 & RC_2010_37	Simplicity of proposal	AGL	Methodology 1 is a completely different and quite complicated methodology which links fleets performance (mixing technologies) with individual facilities. As a developer AGL has concerns with this approach. AGL supports a technology independent approach that avoids trying to pick winners.	The IMO notes AGL's support for avoiding discrimination against particular energy options and technologies. The IMO has modified Methodology 1 to make it simpler and remove the link to fleet performance. Also refer to response to items 76 and 51 and section 5.2 of this report.
145.	RC_2010_25	MMA review	Alinta	Neither the IMO's Rule Change Proposal nor its Rule Change Notice indicate that the independent analysis conducted for it by MMA indicates that the amendments proposed by RC_2010_25 would most likely lead to the resultant Relevant Demand calculated for intermittent wind generators being around half of that under the current Market Rules.	A draft application of the modified Methodology 1 and Methodology 2 is incorporated in the Sapere Report. I Refer to Section 6 of this report.
146.	RC_2010_25	MMA review	Alinta	The analysis conducted by MMA, an independent consultant appointed by the IMO, concluded that the available empirical data: • Does not support a conclusion that the current methodology used to establish the Relevant Level for intermittent wind generators overstates the amount of energy that can (reliably) be expected to be available from	Refer to Section 6 of this report.

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				intermittent wind generators during periods of peak system demand, but • Does support a conclusion that the current methodology will understate the amount of energy that may be available from solar thermal and photovoltaic generators during periods of peak system demand.	
147.	RC_2010_25	MMA review	Alinta	While MMA recognised that there was a shortage of observations about the output of intermittent wind generators at times of extreme system conditions, at no time was it persuaded that the available data supported a conclusion that the current methodology used to establish the Relevant Level for intermittent wind generators overstated the amount of energy that can be expected to be available from these facilities during periods of peak system demand.	Refer to Section 6 of this report.
148.	RC_2010_25	Choice of methodology	Alinta	Considers it reasonable to expect that the IMO, as the independent operator of the market, should provide at least some insight into the basis on which it concluded that Methodology 1 (option 1 in Alinta's table) would result in an outcome that is more consistent with the Market Objectives, when the independent consultant it engaged to advise it, consistently recommended an alternative approach.	Refer to Section 6 of this report.
149.	RC_2010_25	Choice of methodology	Collgar	Does not support Methodology 1 as it does not reflect the recommendations of the external experts MMA engaged to investigate this issue as part of Work Package 2.	The IMO is not bound to adopt individual consultant advice but the IMO's consideration is informed by the views of these experts. Also refer to Section 6 of this report.

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
150.	RC_2010_25 & RC_2010_37	Calculation of Non-Scheduled Generator Curtailment Energy	System Management	Believes that the obligation to provide an estimate of the decrease in wind farm energy to the IMO by the next Business Day should not exist if the Non-Scheduled Generator has not provided it with the necessary information. While System Management understands that the Non-Scheduled Generator is obliged to provide this data by modification to clause 7.7.5B, System Management believes the first part of clause 7.7.5A should remain in order not to create an obligation that it can not fulfil. That is the following words should remain: "where System Management has been provided with information in accordance with clause 7.7.5B,"	The IMO agrees and has amended the proposed Amending Rules accordingly. Refer to Appendix 5 for further details.
151.	RC_2010_25 & RC_2010_37	Calculation of Non-Scheduled Generator Curtailment Energy	System Management	Notes that estimation of the output curtailed for some technologies is problematic, for example biomass, geothermal and tidal facilities.	The IMO notes there may need to be procedures developed to assist in this estimation.
152.	RC_2010_25 & RC_2010_37	Transfer of Non-Scheduled Generator Data used to calculate Curtailment Energy	System Management	System Management has raised concerns about the transfer of data daily to the IMO.	The IMO agrees that the data used to calculate curtailment should only be provided to the IMO annually following a request. However, the IMO disagrees that the most appropriate place to include these requirements would be in Chapter 4 of the Market Rules. The IMO has proposed a number of changes to Chapter 7 to reflect this amended process for the provision of information. For further details refer to Appendix 5 of this report.
153.	RC_2010_25	Basis of	Verve	If the IMO elects Methodology 1, it should be on	The IMO notes Verve Energy's comments. The IMO

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
		determination	Energy	the premise that: • It is intended to resolve an immediate issue; • Concerns have been identified with the valuation method that will manifest in the longer term with increasing IG penetration; and • The suitability of the chosen methodology will be revisited, at the appropriate time, in that context.	will make its determination on all the matters before it, and will make its decision in accordance with the Market Rules and in support of the Wholesale Market Objectives. The IMO also notes the inclusion of a requirement to review the allocation methodology every three years, as reflected in the proposed Amending Rules presented in Section 8 of this report.
154.	RC_2010_25	General Position	Synergy	Does not support this rule change for the following reasons: • It does not address concerns of increased investment in Intermittent Generators or reduce the resulting impact that such investment will have on system operation; • It replaces the current arbitrary capacity crediting approach with another limited approach that still lacks complete recognition of the capacity value that the market derives from Intermittent Generators; and • It unnecessarily introduces regulatory risk into the market.	The IMO notes Synergy's position. Also refer to the IMO's assessment in Section 6 of this report, in particular with regards to the issue of regulatory risk. Refer to item 6.
155.	RC_2010_25	Review Findings	Infigen Energy	Although the proposal purports to provide better system reliability, there has been no whole of Market review of the Capacity Credit Mechanism, or on the major causes of disruption of supply to the SWIS. The process started with a presumption "wind is unreliable and receives too many	The IMO notes this comment. Refer to the IMO's assessment in Section 6 of this report.

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	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				Capacity Credits and will compromise system security", and despite independent expert reports to the contrary, concluded with the same view.	
156.	RC_2010_25	Comparison with SG	Infigen Energy	The proposed methodology involves looking at specific historical peak period Trading Intervals as a means of determining whether wind deserves Capacity Credits, but utilises no comparable mechanism for evaluating Scheduled Generators.	The methodology and processes used for determining CRC and Capacity Credits for Scheduled Generators is based on assessing demonstrable technical performance at temperatures of 41 degrees Celsius. No such assessment can be made of Intermittent Generator facilities and hence a different method is applied.
157.	RC_2010_25	Definition of Intermittent Generator	Vestas	Raises concerns with the use of the term "intermittent generation" to describe renewable energy technologies. The output of renewable energy might be variable but that does not mean it is unreliable or unpredictable.	The IMO acknowledges Vestas' concerns. The IMO notes that the term 'Intermittent Generator' refers to a class of Registered Facility. In particular, it is defined as a Non-Scheduled Generator that cannot be scheduled because its output level is dependent on factors beyond the control of its operator (i.e. wind). Further the IMO notes that if a renewable energy technology can meet the criteria for being registered as a Scheduled Generator then there would be no exclusion from them being able to apply for Capacity Credits under clause 4.11.1(a).
158.	RC_2010_25	Correlation between intermittents and peak periods	Vestas	RC_2010_25 ignores strong evidence that WA's intermittent resources in fact have a very good correlation with system peak demand. For example, WA's best wind periods occur during summer mornings (easterly) and afternoons (sea breeze). These findings from studies done for the IMO and Senergy Econnect appear to have been ignored.	Modified methodology 1 rewards Intermittent Generators whose output correlates with peak demand (as measured by LSG). As such, the methodology provides incentives for new intermittent resources to be supplied at peak times.

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
159.	RC_2010_25	Accuracy of methodology	Vestas	While the methodology used by RC_2010_37 has also been characterised by MMA as conservative, its accuracy was deemed to be better than RC_2010_25 and it is the only alternative, given that there appears to be agreement across the REGWG membership that the current RCM status quo is untenable.	The IMO is not bound to adopt individual consultant advice but the IMO's consideration is informed by the views of these experts. The IMO considers the methodology proposed in RC_2010_25, and updated to reflect the advice of Sapere, more accurately reflects the reliability requirements. Refer to the Sapere report and the IMO's assessment in Section 6 of this report.
160.	RC_2010_25 & RC_2010_37	5 year review of methodology	Office of Energy	It is understood that the proposal will require the IMO to conduct a five year review of the methodology for determining the Relevant Level of Capacity Certification for a Facility, to ensure it is effective in its application. The OoE considers that there is merit in reviewing the valuation methodology at a future date to take into account the operational impacts of rule changes and any additional information that may be available. The review should be independent and take into account the impacts of the implementation on the methodology in relation to the Market Objectives. It is contemplated that the review would also consider the impacts of the methodology on market revenue and the views of Rule Participants. Evaluation of studies of Capacity Credit allocations to wind in other markets would also provide useful context. The OoE considers that such a review would require modelling in order to better understand the	The IMO agrees with this suggestion and has broadened the scope of the review of the methodology along with the timeframe until it is undertaken (from 5 to 3 years) in the proposed Amending Rules presented in section 8 of this report.

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				relationship between Intermittent Generators and the most critical periods of high system risk. It is considered that this analysis should be conducted as a priority ahead of commencement of such a review process. The timing for the review may need to take into account the impacts of the rule change over the first Reserve Capacity Cycle implementation period.	
161.	RC_2010_25 & RC_2010_37	Balancing and Ancillary Services	Perth Energy	Considers that it is likely that similar hard decisions will soon need to be made with regard to other issues relating to the increased penetration of Intermittent Generators in the SWIS. In particular, the costs of providing energy Balancing and Ancillary Services are likely to keep increasing with higher penetration of Intermittent Generators. Perth Energy's view is that amendment to the Market Rules in this regard will need to be made in conjunction with a decision on Capacity Credits allocation methodology for Intermittent Generators.	The IMO notes Perth Energy's view but considers this to be beyond the scope of the considerations of this Draft Rule Change Report. Additionally the IMO notes the inclusion of a three year review of the methodology, which will among other things consider the level of penetration of Intermittent Generators and continued appropriateness of modified Methodology 1.
162.	RC_2010_25 & RC_2010_37	Further suggestions	Pacific Hydro	Welcomes the direction taken by the IMO in establishing the Market Evolution Programme (MEP) but believes this exercise should not be limited in its review but consider broader market design changes necessary for developing best practice renewable generation integration within the WEM.	The IMO notes Pacific Hydros recommendations around the scope of the MEP. The scope of work being considered by the MEP has however already been determined and is not subject to further consideration at this point in time. Refer to response in items and 28 and 31 *et al*.
163.	RC_2010_25 & RC_2010_37	Further suggestions	Pacific Hydro	Based on its experience in the NEM, recommends	The IMO considers these issues are outside the scope of this Draft Rule Change Report.

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	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				that the WEM: • Adopt wind forecasting practices to improve the efficient management control and design of its electrical control systems; and • Explore real time market dispatch controls for demand and wind generation plant, including the dispatch obligations for wind generators during periods of high wind and lower demand, or during other periods where system reliability and security is at risk.	
164.	RC_2010_25 & RC_2010_37	Further suggestions	Pacific Hydro	An alternative dynamic approach could optimise existing capacity and share the underutilised network promoting efficiency and cost savings. With this in mind, Pacific Hydro recommends that the IMO further investigate market design alternatives to better reflect the diversified electricity generation system and enable effective integration of renewable energy within the SWIS.	The IMO considers these issues are outside the scope of this Draft Rule Change Report.
165.	RC_2010_25 & RC_2010_37	Further suggestions: Wind Forecasting	Pacific Hydro	Considers that existing solutions are available which could enhance the capacity of the WEM to manage and operate the network with additional wind generation. It is Pacific Hydro's experience that a key element in managing energy output relating to wind generation is the utilisation of an accurate wind forecasting tool.	While the IMO considers these issues are outside the scope of this Draft Rule Change Report, the IMO supports initiatives which would provide better forecasting and transparency of output for all generation and DSM facilities.
166.	RC_2010_25 & RC_2010_37	Further suggestions: Wind Forecasting	Pacific Hydro	Statistical information presented by Senergy and MMA to the IMO and the REGWG acknowledged the high correlation of wind generation to demand in the WEM. The present arrangements in the SWIS actually ignore this contribution. However,	While the IMO considers these issues are outside the scope of this Draft Rule Change Report, the IMO supports initiatives which would provide better forecasting and transparency of output for all generation and DSM facilities.

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	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				with the addition of a wind-forecasting tool, this fortuitous diurnal wind speed trend can be utilised by System Management and included in dispatch required to maintain "reserves and system security".	
167.	RC_2010_25 & RC_2010_37	Further suggestions	Pacific Hydro	Recommends a review to determine whether the incentives for generation are adequate during high system demand as this underpins the development of peaking plant.	The IMO notes Pacific Hydro's suggestion and will consider the merits of such a review at a later date.
168.	RC_2010_25 & RC_2010_37	Solar Energy	Pacific Hydro	Considers a Capacity Credit solution for solar should be adopted to provide the necessary development decisions to be supported, however Capacity Credit changes across all Intermittent Generators should be delayed until a broader review of the market design is completed.	The IMO disagrees with Pacific Hydro's recommendation and notes that the Market Rules must avoid discrimination against particular energy options and technologies (consistent with Market Objective (c)).
169.	RC_2010_25 & RC_2010_37	General position	Pacific Hydro	Methodology 2 appears to be based on MMA Proposal 2B however it is difficult to quantify this proposal as it differs from the MMA proposal in considering the previous 3 years of top 750 Trading Intervals. The MMA proposal selected 3 years based on load profiles with a peak period POE of 10percent, 30percent and 50percent (which are currently the 02/03, 03/04, and 04/05 years). While Methodology 2 has merit in its simplicity and transparency, both key criteria for investment certainty and avoids the use of fleet adjustment, neither proposal provides support for integration of wind into the WEM.	The IMO notes Pacific Hydro's comment.
170.	RC_2010_25 & RC_2010_37	General position	Pacific Hydro	Recommends that the IMO: • Retains the existing CC methodology for wind	The IMO notes Pacific Hydro's suggestions, however the Market Rules make no distinctions between technology types within the Intermittent

General Comments					
	Proposal	**Clause/Issue**	**Submitter**	**Comment/Change Requested**	**IMO's response**
				generators; • Establishes a CC methodology for Solar generators; and • Develops a wind forecasting system and real time dispatch control for the integration of Intermittent Generators within the WEM to support Federal and State renewable energy targets.	Generator class. Refer also to items 168 and 169.
171.	RC_2010_25	Progression of rule change	Synergy	Although there is argument here to change the current capacity crediting formulation for Intermittent Generators, Synergy would suggest that the IMO not expeditiously change the method for capacity crediting Intermittent Generators but instead wait until the completion of the Reserve Capacity Mechanism review and after Synergy's above mentioned concerns have been modelled and the market has had an opportunity to discuss the results. This adjournment is suggested on the assumption that the results of these two pieces of work may lead the market to seriously consider different solutions.	The IMO acknowledges Synergy's suggestion to await the outcome of the RCM Review currently underway, but notes that a review such as that suggested by Synergy is not included in the scope of work for the RCM Review. Progressing and resolving the Rule Change Proposal to amend the valuation methodology for Intermittent Generators is a matter for the IMO as part of this Draft Rule Change Report.

APPENDIX 5: ADDITIONAL AMENDMENTS MADE BY THE IMO FOLLOWING THE FIRST SUBMISSION PERIOD

The IMO has made some amendments to the Amending Rules following the first submission period. These changes are as follows (~~deleted text~~, added text)[25]:

4.11.3A. ~~Where the IMO accepts a nomination to use the methodology prescribed in clause 4.11.2(b) to assign Certified Reserve Capacity, the IMO must determine the Relevant Level for that Facility using the methodology described in Appendix 9.~~ In order to determine the Relevant Level for a Facility under clause 4.11.2(b), the IMO must apply the methodology described in Appendix 9.

4.11.3B. ~~At least once in every five year period, commencing from 1 October 2011, the IMO must conduct a review of the methodology for determining the Relevant Level for a Facility specified in clause 4.11.3A.~~For each three year period, beginning with the period commencing on 1 January 2015, the IMO must, by 1 April of the first year of that period, conduct a review of the methodology described in Appendix 9. In conducting the review, the IMO must:

(a) examine the effectiveness of the methodology in meeting the Wholesale Market Objectives; and

(b) determine the values of the parameters K and U used in the methodology to be applied for each of the three Reserve Capacity Cycles commencing in the period,

and the IMO may examine any other matters that the IMO considers to be relevant.

4.11.3C. In conducting a review under clause 4.11.3B, the IMO must publish a draft report and invite submissions from Rule Participants and any other stakeholders the IMO considers should be consulted.

4.11.3D. At the conclusion of a review under clause 4.11.3B, the IMO must publish a final report containing:

(a) details of the IMO's examination of the methodology;

(b) a summary of the submissions received during the consultation period;

(c) the IMO's response to any issues raised in those submissions;

(d) the values of the parameters K and U to be applied for each of the Reserve Capacity Cycles commencing during the relevant period; and

(e) any recommended amendments to the methodology described in Appendix 9.

[25] Note that the proposed amendments to clause 7.7.5B, 7.7.5E, 7.13.1 and 7.13.1C reflect the changes made in the Final Rule Change Report for the Rule Change Proposal: Adjustment of Relevant Level for Intermittent Generation Capacity (RC_2010_24) which will commence at 8:00AM on 1 July 2011. Likewise, clause 7.13.1 reflects the changes made in the Final Rule Change Report for the Rule Change Proposal: Curtailable Loads and Demand Side Programmes (RC_2010_29) and clause 7.7.5D reflect the changes made in the Final Rule Change Report for the Rule Change Proposal: Demand Side Management – Operational Issues (RC_2008_20), both of which will commence at 8:00AM on 1 October 2011

6.17.6 The Dispatch Instruction Payment, DIP(p,d,t), for Market Participant p and Trading Interval t of Trading Day d equals either:

(a) zero, if Market Participant p:

i is the Electricity Generation Corporation; or

ii was issued no Dispatch Instructions for Trading Interval t;

or the sum of:

...

(c) the sum over all Non-Scheduled Generators registered by the Market Participant of the amount that is the product of:

i. the quantity, defined as a negative value, by which the Non-Scheduled Generator was instructed by System Management to reduce its output, as provided to the IMO by System Management under clause 7.13.1(eB) (where for the purpose of this calculation a Loss Factor adjustment is to be applied to the quantity specified by System Management so that the result is measured at the Reference Node); and

ii. the Standing Data price defined in Appendix 1(e)(v) that was current at the time of the Trading Interval for the Non-Scheduled Generator for a decrease in generation, (accounting for whether the Trading Interval is a Peak Trading Interval or an Off-Peak Trading Interval) less MCAP for the Trading Interval; and

…

7.7.5A. ~~For the purposes of determining the quantity described in clause 6.17.6(c)(i) for each Trading Interval the quantity is System Management's estimate of the MWh reduction in output, by Trading Interval, of the Non-Scheduled Generator as a result of System Management's Dispatch Instruction.~~ System Management must document in a Power System Operation Procedure the information required to be provided by a Market Participant to System Management for each of its Non-Scheduled Generators for each Trading Interval to allow estimation of the output of each Facility (in MWh) by:

(a) System Management, as required under clause 7.7.5B(a); and

(b) the IMO, as required under Appendix 9,

and System Management and Market Participants must follow that documented Market Procedure.

7.7.5B. ~~A Non-Scheduled Generator must provide System Management with the information specified in the Power System Operation Procedure to support System Management's calculation of the quantity described in clauses 7.7.5A and 7.7.5E and the IMO's estimation in Appendix 9 of the impact of Planned Outages, Consequential Outages and Forced Outages on the output, by Trading Interval, of a Facility assigned Certified Reserve Capacity in accordance with the methodology~~

~~specified in clause 4.11.2(b).~~ The quantity reduction in the output of a Non-Scheduled Generator as a result of a Dispatch Instruction from System Management (in MWh) for each Trading Interval to be used in clause 6.17.6(c)(i) is:

(a) where information has been made available to System Management under the Power System Operation Procedure referred to in clause 7.7.5A, System Management's estimate of the decrease in output of the Non-Scheduled Generator (in MWh) during the Trading Interval; or

(b) in the case of a Non-Scheduled Generator included in a Resource Plan, for which System Management has not been provided with information under the Power System Operation Procedure referred to in clause 7.7.5A, the greater of zero and the difference between the Resource Plan quantity of the Non-Scheduled Generator (in MWh) less the output of the Non-Scheduled Generator (in MWh) over the Trading Interval implied by its Dispatch Instruction.

~~7.7.5C. The Power System Operation Procedure must specify the data required to be provided by a Non-Scheduled Generator to System Management for each Facility during each Trading Interval, where this information must be sufficient to allow:~~

~~(a) System Management to determine, in accordance with clause 7.7.5A, what the output of each Facility would have been had no Dispatch Instruction or request to deviate from its Dispatch Plan or change its commitment or output been issued; and~~

~~(b) the IMO to determine, in accordance with Appendix 9, what the output of the Facility would have been had a Planned Outage, Consequential Outage or Forced Outage not occurred.~~

~~7.7.5D [Blank]~~

~~7.7.5E Where the Electricity Generation Corporation has made information available to System Management in accordance with clause 7.7.5B and the Power System Operation Procedure, System Management must estimate for each Trading Interval the decrease, in MWh, in the output of each Electricity Generation Corporation Non-Scheduled Generator as a result of an instruction from System Management to deviate from the Dispatch Plan or change its commitment or output in accordance with clause 7.6.A.3(a).~~

7.13.1. System Management must provide the IMO with the following data for a Trading Day by noon on the first Business Day following the day on which the Trading Day ends:

…

(eB) the estimated decrease, in MWh, in the output of each Non-Scheduled Generator, by Trading Interval, as a result of System Management Dispatch Instructions, as determined in accordance with clause 7.7.5~~A~~B~~;, where this is to be used in settlement as the quantity described in clause 6.17.6(c)(i).~~

…

(g) details of the instructions provided to:

i. Demand Side Programmes that have Reserve Capacity Obligations; and

ii. providers of Supplementary Capacity;

on the Trading Day; and

(k) the identity of the Facilities ~~which~~ that were subject to either a Commissioning Test or a test of Reserve Capacity for each Trading Interval of the Trading Day.~~; and~~

~~(i) the data provided by a Market Participant in accordance with clause 7.7.5B~~.

7.13.1C The IMO may request, and System Management must provide~~,~~ within 10 Business Days of receipt of a request from the IMO, ~~provide the IMO with the following information:~~ all information made available to System Management under the Power System Operation Procedure referred to in clause 7.7.5A for each Facility and each Trading Interval during the time period specified by the IMO in its request.

~~(a) a schedule of all instructions provided to the Electricity Generation Corporation's Non-Scheduled Generators to deviate from the Dispatch Plan or change their commitment or output in accordance with clause 7.6A.3(a) for each Trading Interval during the time period specified by the IMO in its request; and~~

~~(b) where the Electricity Generation Corporation has made actual wind data available in accordance with clause 7.7.5B, the estimated decrease, in MWh, in the output of each Electricity Generation Corporation Non-Scheduled Generator as a result of an instruction from System Management to deviate from the Dispatch Plan or change their commitment or output in accordance with clause 7.6A.3(a), as determined in accordance with clause 7.7.5E(a), for each Trading Interval during the time period specified by the IMO in its request, where this is to be used in the calculation of the Relevant Level described in clause 4.11.3A.~~

10.5.1. The IMO must set the class of confidentiality status for the following information under clause 10.2.1, as Public and the IMO must make each item of information available from the Market Web-Site after that item of information becomes available to the IMO:

(a) the following Market Rule and Market Procedure information and documents:

…

(f) the following Reserve Capacity information (if applicable):

i. Requests for Expressions of Interest described in clause 4.2.3 for the previous five Reserve Capacity Cycles;

…

ix. The following annually calculated and monthly adjusted ratios:

1. NTDL_Ratio as calculated in accordance with Appendix 5, STEP 8;

2. TDL_Ratio as calculated in accordance with Appendix 5, STEP 8; and

3. Total_Ratio as calculated in accordance with Appendix 5, STEP 10; and

x. ~~Fleet Assessment~~ Load for Scheduled Generation~~, Facility Assessment Load for Scheduled Generation~~ and the relevant Load for Scheduled Generation Trading Intervals as determined under Appendix 9.

Glossary

~~Facility Assessment~~ Load for Scheduled Generation: The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of all Facilities ~~which~~ that have applied to be assigned Certified Reserve Capacity ~~in accordance with~~ under clause 4.11.2(b) adjusted for the impact of Consequential Outages on those Facilities~~.~~, as determined in accordance with Appendix 9, step 6.

~~Fleet Assessment Load for Scheduled Generation~~: ~~The total sent out generation of all Facilities minus the sent out generation (measured or estimated) of Facilities which applied to be assigned Certified Reserve Capacity in accordance with clause 4.11.2(b) adjusted for the impact on the output of those Facilities due to Consequential Outages, Planned Outages, Forced Outages, Dispatch Instructions and deviations from Dispatch Plans due to instructions from System Management.~~

Appendix 9: Relevant Level Determination

This Appendix presents the methodology for determining the Relevant Levels for ~~a Facility which has~~ Facilities that have applied for certification of Reserve Capacity ~~in accordance with the methodology prescribed in~~ under clause 4.11.2(b) for a given Reserve Capacity Cycle ("candidate Facilities").

The IMO must perform the following steps ~~in determining~~ to determine the Relevant Level for each candidate Facility ~~in accordance with clause 4.11.3A~~:

~~Determining the Fleet Capacity Value~~

~~Step 1: Take all the Trading Intervals that occurred with the eight year period ending on the Trading Day ending on 1 April of Year 1 of the relevant Reserve Capacity Cycle.~~

~~Step 2: Determine the amount of electricity (in MWh) sent out by all Facilities applying for Certified Reserve Capacity under clause 4.11.2(b) using the Meter Data Submissions received by the IMO in accordance with clause 8.4 during the Trading Intervals identified in step 1.~~.

~~Step 3: Identify any Trading Intervals in step 1 where a Facility, as identified in step 2, either:~~

(a) was owned, controlled or operated by a Market Participant other than the Electricity Generation Corporation and was issued a Dispatch Instruction from System Management as notified under clause 7.13.1(c); or

(b) was owned, controlled or operated by the Electricity Generation Corporation and was issued an instruction from System Management to deviate from its Dispatch Plan or change its commitment or output as notified under clause 7.13.1(cC); or

(c) was affected by a Forced Outage, Planned Outage or Consequential Outage as notified under clause 7.13.1A.; or

Step 4: If, as identified in step 3(a), a Facility's output was reduced in order to comply with a Dispatch Instruction from System Management, issued in accordance with clause 7.7, use:

(a) the estimated decrease (in MWh) in the output of each Facility, by Trading Interval, as a result of System Management Dispatch Instructions, provided by System Management in accordance with clause 7.13.1(eB); and

(b) the amount of electricity (in MWh) sent out for the Facility in accordance with the Metered Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3(a)(ii),

to estimate the amount of electricity (in MWh) that would have been sent out by the Facility, had it not complied with the Dispatch Instruction for all the Trading Intervals identified under step 3(a)(ii). Use these estimated values to replace the amount of electricity identified in step 2 for the relevant Trading Intervals.

Step 5: If, as identified in step 3(b), a Facility's output was reduced in order to comply with an instruction from System Management under clause 7.6A.3(a) to deviate from its Dispatch Plan or change its commitment or output, use:

(a) the estimated decrease (in MWh) in the output of that Facility, by Trading Interval, as a result of an instruction from System Management in accordance with clause 7.6A.3(a), provided by System Management in accordance with clause 7.13.1(eD) ; and

(b) the amount of electricity (in MWh) sent out for that Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3(b)(ii.),

to estimate the amount of electricity (in MWh) that would have been sent out by that Facility had it not complied with System Management's instruction for all the relevant Trading Intervals that were excluded under step 3(b)(ii). Use these estimated values to replace of the amount of electricity identified in step 2 for all the relevant Trading Intervals identified in step 3.

Step 6: If, as identified in step 3(c), a Facility's output was reduced due to a Forced Outage, Planned Outage or Consequential Outage, as notified under clause 7.13.1A, use:

(a) the schedule of Planned Outages, Consequential Outages and Forced Outages provided by System Management in accordance with clause 7.3.4 and 7.13.1A;

(b) the amount of electricity sent out for that Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 3 (a) (i) and step (b) (i); and

(c) the data provided by System Management in accordance with clause 7.13.1(i),

to estimate the amount of electricity (in MWh) that would have been sent out by that Facility had it not experienced a Forced Outage, Planned Outage or Consequential Outage . Use these estimated values to replace of the amount of electricity identified in step 2 for all the relevant Trading Intervals identified in step 3.

Step 7: If a Facility has not yet entered service, or if it entered service during the period referred to in step 1, use the estimates included in the expert report provided in accordance with clause 4.10.3 for the period that Facility was not in service, unless the IMO reasonably believes the report to be inaccurate,.

Step 8: Determine, for each Trading Interval during the period described in step 1, the Fleet-Assessment Load for Scheduled Generation by subtracting the sent out generation contribution of all Facilities which applied to be certified under clause 4.11.2(b), as identified in step 2 and updated under steps 4, 5, 6 and 7 as applicable ("Fleet Interval Performance Level"), from the total sent out generation of all Facilities for each Trading Interval.

Step 9: Determine for each year during the period identified in step 1, the 12 Trading Intervals with the highest Fleet-Assessment Load for Scheduled Generation as identified under step 8.

Step 10: Determine for each year during the period identified in step 1, the mean of the Fleet Interval Performance Level ("Fleet Annual Mean Performance Level") during the 12 Trading Intervals under step 9.

Step 11: Determine using a t-distribution the mean ("Fleet Mean") and standard deviation ("Fleet SD") of the Fleet Annual Mean Performance Levels for the period identified in step 1.

Step 12: Determine the **Fleet Capacity Value (MW)** by calculating the 5 percent Probability of Exceedance level in accordance with the following formula:

Fleet Capacity Value = 2 x (Fleet Mean – (1.895 x Fleet SD))

~~Step 13: If the value for the Fleet Capacity Value determined under step 12 is equal to or less than zero then set the Fleet Capacity Value equal to zero.~~

Determining the Facility Average Performance Level

Step 1~~-4~~: ~~Take all the Trading Intervals that occurred within the last three~~ Identify the five year period ending at 8:00 AM ~~on the Trading Day ending~~ on 1 April of Year 1 of the relevant Reserve Capacity Cycle.

Step ~~15~~2: Determine the~~ amount~~ quantity of electricity (in MWh) sent out by ~~the Facility~~ each candidate Facility using ~~the~~ Meter Data Submissions ~~received by the IMO in accordance with clause 8.4 during the~~ for each of the Trading Intervals in the period identified in step 1~~identified in step 14~~.

Step ~~16~~3: For each candidate Facility, identify ~~Identify~~ any Trading Intervals in ~~step 15~~ the period identified in step 1 where the Facility was affected by a Consequential Outage as notified to the IMO under clause 7.13.1A.

Step ~~17~~4: ~~If, as identified in step 16, the Facility's output was reduced due a Consequential Outage,~~For each candidate Facility and Trading Interval identified in step 3 use:

(a) the schedule of Consequential Outages ~~a~~ provided by System Management ~~in accordance with~~ under clause ~~7.3.4 and~~ 7.13.1A;

(b) ~~the amount of electricity sent out for the Facility in accordance with the Meter Data Submissions received by the IMO in accordance with clause 8.4 for all the Trading Intervals that were identified under step 16~~the quantity determined for the candidate Facility and Trading Interval in step 2; and

(c) the ~~data~~ information provided by System Management ~~in accordance with~~ under clause ~~7.13.1(i),~~7.13.1C

to estimate the~~ amount~~ quantity of electricity (in MWh) that would have been sent out by the Facility had it not experienced a Consequential Outage ~~for all the relevant Trading Intervals identified in step 16~~ during the Trading Interval.

Step ~~18~~5: ~~If the Facility has not yet entered service, or if it entered service during the period referred to in step 15, use the estimates included in the expert report provided in accordance with clause 4.10.3 for the period that the Facility was not in service, unless the IMO reasonably believes the report to be inaccurate.~~If a candidate Facility was not in service for one or more of the Trading Intervals in the period identified in step 1, then determine, for each Trading Interval in the period during which the Facility was not in service, an estimate of the quantity of electricity (in MWh) that would have been sent out by the Facility had it been in service. The estimates must reflect the estimates in the expert report provided for the Facility under clause 4.10.3, unless the IMO reasonably does not consider the expert report to be accurate.

Step ~~19~~6: ~~Determine for~~ For each Trading Interval ~~during~~ in the period ~~described~~ identified in step ~~14~~ 1, determine the ~~Facility Assessment~~ Load for Scheduled Generation (in MWh) as:

(a) the total sent out generation of all Facilities, as determined from Meter Data Submissions; minus

(b) the total sent out generation of all the candidate Facilities, as determined in step 2 or as estimated under steps 4 or 5 as applicable.

~~by subtracting the sent out generation contribution of all Facilities which applied to be certified under clause 4.11.2(b), as identified in step 15 and updated under steps 17 and 18 as applicable, from the total sent out generation of all Facilities for each Trading Interval.~~

Step ~~20~~7: ~~Determine~~ Identify for each year during the period identified in step ~~14~~ 1, the ~~250~~ 12 Trading Intervals occurring on separate Trading Days with the highest ~~Facility Assessment~~ Load for Scheduled Generation as ~~identified~~ determined under step ~~19~~ 6.

Step 8: For each candidate Facility and each of the 60 Trading Intervals identified in step 7, multiply the sent out generation (in MWh) of the Facility in the Trading Interval, as determined in step 2 or as estimated under steps 4 or 5 (as applicable) by 2 to convert to units of MW.

Step ~~21~~9: Determine the **Facility Average Performance Level** for each candidate Facility ~~that applied to be certified under clause 4.11.2(b)~~. The Facility Average Performance Level for Facility f (in MW) is the mean of the MW quantities determined for the Facility in step 8 for the 60 Trading Intervals identified under step 7.~~that Facility's sent out generation during the 750 Trading Intervals identified under step 20 15 and updated under steps 17 and 18, as applicable.~~

Determining the Facility Adjustment Factor

Step 10: Determine the **Facility Variance** for each candidate Facility. The Facility Variance for Facility f (in MW) is the variance of the MW quantities determined for the Facility in step 8 for the 60 Trading Intervals identified in step 7.

Step 11: Determine the **Facility Adjustment Factor** for each Facility f (in MW) in accordance with the following formula:

Facility Adjustment Factor = G x Facility Variance (f)

Where

G = K + U/Facility Average Performance Level (f)

K is determined in accordance with the following table:

Reserve Capacity	**Capacity Year**	**K value**

Cycle		
2012	2014/15	0.001
2013	2015/16	0.002
2014	2016/17	0.003
2015 onwards	From 2017/18 onwards	To be determined by the IMO as part of the review required under clause 4.11.3B.

U is determined in accordance with the following table:

Reserve Capacity Cycle	Capacity Year	U
2012	2014/15	0.211
2013	2015/16	0.422
2014	2016/17	0.635
2015 onwards	From 2017/18 onwards	To be determined by the IMO as part of the review required under clause 4.11.3B.

Determining the Relevant Level for a Facility

Step 1222: Determine the Relevant Level for each candidate Facility f (in MW) in accordance with the following formula:

Relevant Level (f) = max(0, Facility Average Performance Level (f) - Facility Adjustment Factor (f)) ~~Facility Performance Level (f)/ Sum (f∈F, Facility Performance Level (f)) × Fleet Capacity~~

~~Where~~

~~F is the set of all Facilities which applied to be certified under clause 4.11.2(b), where "f" is a member of that set.~~

Publication of information

Step ~~21.~~13: Publish the Trading Intervals identified in step 7 and the ~~Fleet Assessment~~ Load for Scheduled Generation calculated in step 6 ~~.Facility Assessment Load for Scheduled Generation and relevant Trading Intervals identified in steps 1, 9 and 14~~ on the Market Web Site by 1 ~~May~~ August of the relevant Reserve Capacity Cycle ~~year~~.

APPENDIX 6: DISCUSSION AT THE MARKET ADVISORY COMMITTEE

The MAC discussed the proposals at the 10 November 2010 (RC_2010_25) and 15 December 2010 (RC_2010_25 and RC_2010_37) MAC meetings. An overview of the discussion is presented in below. Further details are available in the MAC meeting minutes available on the IMO website: http://www.imowa.com.au/market-advisory-committee

November 2010 Meeting (Discussion of PRC_2010_25)

The IMO noted that the Pre Rule Change Discussion Paper proposes to implement Proposal 1 from the REGWG's Work Package 2. The IMO noted that there were likely to be competing views on the IMO's proposal as there had been neither a compromise nor consensus regarding a potential solution at the REGWG. The Chair noted that the issues around the valuation of capacity from Intermittent Generators had been discussed at many levels, noting the large amount of work done by the REGWG.

The following points were raised during the meeting:

- Mr Stephen MacLean noted that the REGWG had not agreed for a Rule Change Proposal to be developed at this stage. Mr Corey Dykstra noted that it was agreed that the IMO would present a recommendation to the MAC for discussion. Mr Shane Cremin said that the recommendation to progress the proposed solution is not appropriate at this point in time. Dr Steve Gould disagreed stating that he had anticipated that a Rule Change Proposal would be presented to the MAC. Mr Troy Forward clarified that the minutes from the REGWG reflected the agreement that IMO would present a solution to the MAC for consideration, noting that a Pre Rule Change Discussion Paper is not inconsistent with this. Mr Forward noted that the recommendation presented in the cover paper was intended to represent the fact that the IMO considered it would be unlikely that consensus would be achieved at the MAC. Mr Dykstra stated that the IMO should be more mindful to not imply that a decision had already been made. Mr Andrew Everett disagreed that this was an issue.
- Mr Cremin questioned the imperative to push forward with a proposal given the polarised opinion on what capacity valuation methodology should be adopted. Mr Dykstra noted that further consideration of any movement from the status quo is required.
- Mr Dykstra questioned what the deficiencies were in MMA's proposed approach. Mr Forward noted that there was a shortage of data and that System Management had a serious concern about system security under the outcomes of MMA's proposed methodology. Mr Phil Kelloway noted that this had been discussed in detail at REGWG meetings. Dr Gould noted System Management's concern had been with Capacity Credits being allocated at greater than 20 percent of nameplate capacity as this would not represent the capacity that could be made available reliably. Mr MacLean thought that System Management had some concern about wind farms not performing. Mr Dykstra stated that the available data set had generated certain results and other than "gut feelings" about appropriate valuation levels there was no reason to not adopt MMA's approach. Mr Kelloway clarified that System Management had undertaken its own assessment which had informed its position on this. Mr Dykstra noted that the intent of the RCM is to ensure sufficient energy as well as sufficient peak capacity. Mr Cremin noted that if an Intermittent Generator was to be unavailable during peak periods the methodology presented by MMA would take this into account in assigning Capacity Credits to the facility. Mr Forward clarified that under MMA's proposed methodology the Facility's availability would be determined based on 750 Trading Intervals.

- The Chair noted that the data set used does not include a one in ten year event and the lack of core data around these extreme events has had a powerful influence on the IMO's considerations.
- Mr Dykstra noted that the analysis undertaken by ROAM Consulting (ROAM) around the capacity for Load Following services indicates that there is enough plant on the system to deal with a greater penetration of Intermittent Generators. Mr Kelloway noted that the mix of plant on the system has an impact on whether this is the case. Mr Kelloway noted that if the value of Intermittent Generators overstates their ability to deliver then System Management will not be able to ensure that the available supply of energy can meet peak demand.
- Mr Dykstra noted that after MMA had delivered its original report significant discussions on the proposal had been held among the IMO, System Management and the Office of Energy (OoE), and yet MMA was not persuaded to move away from its proposed solution. Mr Forward noted that MMA had no experience in operating a power system. Mr Dykstra considered that this may encourage MMA to take a more conservative approach.
- Mr Dykstra suggested that from a system security and reliability perspective System Management would prefer to have a situation of no Intermittent Generators on the system. Mr Kelloway responded that this would not be in the best interests of the market.
- The Chair noted that it is difficult to ignore the system operator when it notes that there may be potential impacts on system security. The Chair noted that during the discussions at the REGWG System Management had moved towards the less conservative proposal.
- Mr MacLean noted that the MMA's proposed methodology, which was based on system security and reliability criteria, was being rejected in favour of an arbitrary alternative approach.
- Mr Cremin noted that at one of the first REGWG meetings chaired by the IMO, Ms Anne Hill had noted the OoE's position as being conservative on this issue. Mr Cremin noted that this position had no regard for the Market Objectives and appeared to be politically motivated. Mr Cremin noted that the proposal would need to meet the Market Objectives if it was progressed, and that the IMO would have to take into account any comments raised in submissions. Mr Cremin considered that to contradict MMA's recommendation would require strong justification. Ms Nerea Ugarte clarified that Ms Hill's view had related to the security of supply. Mr Cremin noted that previous statements from the OoE around encouraging renewable energy sources is at odds with the Minister's previous advice to the MAC that only commercial incentives should be taken into account.
- Mr Cremin questioned why there was the need to change the current commercial mechanisms when it is in fact the reliability criteria that should be reviewed. Mr Forward questioned who should bear the costs of changes to the reliability criteria. Mr Cremin considered that end users should bear the costs of generation where inefficient generation is incentivised by Federal Law.
- Mr Dykstra noted the volatility of the results from Proposals 1 and 3 over time, noting that investors would be unlikely to enter the market with such volatile potential Capacity Credit allocations. Mr Dykstra stated that the 3 year averaging approach currently provides a much smoother option, as does MMA's proposed solution.
- Mr Dykstra questioned whether there would be a different methodology applied for determining the capacity valuation for DSM during the 12 peak periods or for Scheduled Generators. Mr Dykstra noted that currently there is no certainty over DSM's availability during these times. Mr Cremin noted that these issues have been

discussed by the REGWG previously. The proposal is likely to result in inconsistent treatment of Scheduled and Non-Scheduled Generators.

- Mr MacLean noted that the proposed changes would more correctly allocate Capacity Credits to solar facilities.
- Mr Cremin noted that an existing weakness in the rule change assessment process will be re-highlighted in this case as the IMO's assessment of the proposal will not take into account other potential methodologies that could be alternatively implemented.
- Mr Everett noted that REGWG had been provided with an opportunity to put forward a recommendation to the MAC but had been unable to do so. Mr Dykstra noted that the commercial views of the REGWG had not made this possible. Mr Dykstra noted that the MAC is required to act in the best interests of the market and not according to the individual commercial interests of its members. Mr Dykstra considered that, irrespective of the resultant capacity valuations, moving away from progressing MMA's proposed approach would be inconsistent with the best interests of the market.
- Mr MacLean questioned if a bias should be applied, noting that it is important to supply customers during the majority of the year. Mr Forward noted that generally the whole RCM is geared towards delivering energy for the peak especially when peak demand is the dominant factor in the reliability criterion.
- The Chair noted that no matter the reason for the lights going out, there will be a large problem if the market had insufficient capacity to service load. Dr Gould noted that the impact of these situations is compounded during the Hot Season.
- Mr Dykstra noted that the IMO's proposal would change the economics of developing an Intermittent Generator considerably. The Chair agreed, noting that the IMO had been conscious of signalling potential changes in the Reserve Capacity allocations to Intermittent Generators in the last three Statement of Opportunities Reports.
- Mr Cremin noted that existing Intermittent Generators should not be exposed to regulatory risk due to the "gut feelings" of the system operator. Any decision to progress with a solution needs to account for the impacts on existing Intermittent Generators. The Chair noted that the system operator's opinion is of vital importance with regard to system security.
- Mr Forward noted that the IMO is required to review the reliability criteria by the end of 2012. Dr Gould suggested that reviewing the reliability criteria and ensuring that the costs are correctly allocated to Market Customers would be a preferable outcome.
- Dr Gould noted that Mr Greg Thorpe's previous comments that Capacity Credits are in effect a pre-payment for energy. The Capacity Credit factor is a representation of the amount of energy that will be available from a wind farm. MMA's concept of Load for Scheduled Generation effectively treats a wind farm as a negative load which ultimately drives down the need for energy from the Balancer, resulting in lower balancing prices. Mr Kelloway agreed with Dr Gould's synopsis.
- Dr Gould considered that a significant regulatory risk would be introduced by the proposed amendments.
- The Chair noted that the OoE had advised the IMO that there are a number of wind investors looking at entering the market despite this proposal being considered.
- Mr Cremin noted that customers will be the parties that ultimately pay for the amendments.
- Mr Alastair Craib noted that the proposed changes would impact on the viability of constructing a wind farm in the WEM. Mr Everett noted that Verve Energy was considering building a wind farm and that the proposed amendments have not resulted in an adjustment to their decision.

- Mr Forward noted that the decision around the capacity valuation for Intermittent Generators is one of the hardest decisions the market has faced since market start. Mr Forward noted that he was unsure that the market would be in any better position in a year's time to reconsider this issue and so there was no reason to not progress a solution now. Dr Gould agreed, stating that it would be best to progress the IMO's solution through the Rule Change Process, flush out all the issues, appoint an expert to consider these issues further and then the IMO can make a final decision on the proposal.
- Mr Cremin noted that the methodology for assigning Capacity Credits to Intermittent Generators needs to make some better allowances for solar as the current Market Rules are not appropriate for this technology. However, Mr Cremin noted that he was concerned that a non-optimal solution was being progressed. Mr Dykstra suggested that maybe the IMO should be considering a solution simply for solar facilities. Mr Forward noted that solar technologies are not the main issue needing attention as there is less penetration of these technologies and less potential penetration in the near future.
- The Chair noted that the IMO has an obligation to move forward with proposing a solution to this issue and that the process forward would provide sufficient opportunities for Market Participants to provide their comments. The MAC agreed, although Mr Andrew Sutherland questioned how much progressing through the Rule Change Process would cost the market.
- Mr Cremin agreed with the IMO that the data available is limited but considered that MMA's proposed methodology would ensure that if the relationship between peak periods and output has been incorrectly identified due to the data restrictions, this will be reflected in the Capacity Credit allocations to these facilities in time. Mr Dykstra noted his concern that progressing with the IMO's proposed solution would set a bad precedent as this would ignore the available evidence and would result in a solution being progressed based purely on the system operator's "gut feel". Mr Dykstra noted that if the IMO is not going to progress with MMA's proposal then Market Participants will need to clearly understand why the IMO's proposed solution is a better approach. Mr Kelloway agreed to provide details of System Management's modelling to assist the MAC in understanding its position. Mr Kelloway noted that System Management is taking no position on the further development of renewable energy options in the WEM.
- The Chair questioned whether MAC members would have a different position on the IMO's proposal if there was no existing wind generation on the system. Mr Dykstra considered that there would be nothing to gain from considering this hypothetical view. Mr Huxtable questioned what the impact of allowing for grandfathering would be. The Chair noted that he did not support the introduction of grandfathering provisions.
- Mr Pablo Campillos questioned if System Management had considered the impacts of improving the reliability criteria. Mr Kelloway noted that it had not to date but that it would do so moving forward.
- Mr Dykstra suggested that the IMO progress the Rule Change Proposal and simply note that it was discussed at the MAC. Mr Cremin noted that it is unlikely that different views will be raised and it will be a costly process.

The IMO agreed to progress the proposal, noting that it is likely that a number of issues will be raised during the consultation process.

December 2011 Meeting (Discussion of RC_2010_25 and RC_2010_37)

The Chair noted that the IMO had received a Rule Change Proposal from Griffin Energy (RC_2010_37) proposing an alternative approach to calculating the capacity value for Intermittent Generators to that proposed by the IMO in RC_2010_25. The Chair noted that the IMO had sought external advice on how to proceed with the two proposals with the prospect

of joining the two rule changes. This was not possible under the Market Rules and the IMO had subsequently aligned the two consultation timelines to allow participants to have an opportunity consider both proposals.

Mr Cremin noted that the process undertaken by the IMO in progressing the two Rule Change Proposals at the same time appears reasonable and well constructed. Mr Cremin noted that progressing the proposals together will allow interested parties to compare the proposals. Mr Cremin noted that the Griffin Energy Rule Change Proposal had the support of a number of members of the REGWG.

The Chair welcomed a discussion from the MAC on both proposals. The following points were raised:

- Mr Sutherland expressed concern around having two rule changes in the formal process which would have significant impacts on new and existing projects. Mr Sutherland stated that the IMO needs to be conscious of the regulatory risks being created and the signals that are being provided to the market. Mr Sutherland also noted a higher level concern that existing assets will be devalued. Mr Sutherland was uncertain which of the proposed methodologies was the right one to implement.
- Mr Paul Biggs considered that any delay in addressing this issue would lock in the current arrangements as more wind farms continue to enter the market and that this would be an investment concern.
- Mr Sutherland suggested that the IMO consider grandfathering of these Market Rules. Mr MacLean noted that although the IMO was not in favour of grandfathering, the current proposal sends a signal that any investment could be subject to changed market conditions in the future. The Chair noted that the construct of the WEM is currently based around the possibility that the Market Rules would change, noting the IMO signals this in advance where possible. Specifically, this change had been signalled in the past three Statement of Opportunities.
- Mr Dykstra questioned the driver of the change and the solution being proposed. Mr Dykstra reiterated his concerns around the IMO's independent expert's proposed solution being rejected in favour of another methodology. In response, the Chair noted that the IMO had proposed a methodology on the basis that that the independent expert's solution was based on modelling using a limited data set which did not reflect a one in ten year event. The Chair also noted that System Management had raised concerns around the security associated with allocations of Capacity Credits to Intermittent Generators at the current levels. Mr Ken Brown noted that system security is paramount, stating that comparatively other electricity markets (with and without capacity markets) make much lower capacity allowances to wind farms.
- Mr Cremin noted that the REGWG process had continued to look at the outcome from a reliability perspective. Mr Cremin noted that the fundamentals are that federal legislation is driving investments in renewables and that these will be built in Western Australia. Mr Cremin considered that a lower capacity valuation for this would mean that additional gas turbines would need to be built to cover existing wind farms. Mr Cremin noted that this would result in the same outcome as changing the reliability criteria - that is a bigger capital base would be required to meet the IMO's forecast capacity requirements. Mr Cremin questioned why the path of changing the capacity valuation for Intermittent Generators was being pursued when the same outcome could be achieved using a different process. Mr Cremin stated that the current path would result in disincentives for wind farms.
- Mr Brown noted that even if the reliability criteria were changed there would still be a number of wind farms who would claim to be able provide a large amount of the required capacity. Mr Brown stated that it was perverse that Western Australia

wanted to make capacity payment of 40 percent to Intermittent Generators when other markets recognise that they are less reliable and so make reduced payments. Mr Cremin noted that he was suggesting that Intermittent Generators should be certified at 40 percent and that additional generation should then be procured to meet the reliability criteria. Mr Cremin suggested that the additional capacity would be naturally restricted to not coming from other Intermittent Generators. Mr Cremin suggested that this would result in the same outcome without distorting the investment signals to Intermittent Generators.

- Mr Kelloway noted that Mr Cremin's suggestion would result in the market paying a larger amount to a wind farm than the true value of its capacity. Mr Cremin responded that he was unsure whether the macro implications of what was being done were considered. Mr Kelloway noted that the data available now shows some trends that the capacity contribution of wind farms during peak periods is quite variable. Mr Kelloway noted that taking an averaging approach when determining their contribution hides these peak periods.
- Mr Brown agreed with Mr Cremin that there should be separate security and capacity payments but noted that this is inconsistent with the current market design. Mr Brown noted that he is not aware of any other power system that uses averages to value the capacity of Intermittent Generators. Mr Kelloway reiterated that there is a lot of variance in the output of wind farms that even on a given day can range between 5 and 45 percent. Furthermore, the average from one year to the next can vary significantly.
- Mr Cremin considered that the decision being made around the valuation of capacity from Intermittent Generators will have significant impacts at a policy level and that this should have been more consciously considered through the REGWG deliberations.
- Mr Everett noted that it is not the MAC's role to decide what types of technology should be installed but rather the job of policy makers. The Chair noted that the requirement is for 20 percent of capacity to be from renewable sources by 2020 and noted the previous advice the MAC had received from the Minister on this. Mr Biggs noted that other mechanisms existed to incentivise the development of renewable technologies and stressed the importance of providing transparency on costs. Mr Biggs noted that if the Market Rules provide this transparency then it is a policy decision as to what incentives are required to achieve the targets for renewables.
- Mr Campillos noted that if the policy setting is fundamentally changed then a transition process should be considered. The Chair noted that he would support a transition process.
- The Chair noted that grandfathering a range of provisions could result in a different set of Market Rules applying to each Market Participant. This creates distortions in the market and results in Market Participants finding it difficult to determine what their risks are as any costs are allocated differently to each Market Participant. Mr Cremin noted that there may however be cases where grandfathering of clauses is warranted. The Chair suggested that the MAC consider the timing of implementation of any Amending Rules rather than the introduction of grandfathering provisions. The Chair noted that the Reserve Capacity Cycle creates a natural timeframe for the implementation of any Amending Rules.
- Mr Brown expressed his surprise with the large allocations of Capacity Credits to be made to Photovoltaic (PV) technologies under both of the proposed methodologies. Mr Brown noted that modelling of the impacts of PV are starting to indicate that if the proposed incentives were put in place, then the system peak would be likely to no longer occur in summer. Mr MacLean noted that neither of the proposed methodologies would impact on household investment in PV. The Chair noted that

the 12 peak periods may have a significant impact on this clarifying that if the peak periods move away from the periods when solar is experiencing its peak output then this would be accounted for in the Load for Scheduled Generation calculation.

- Mr Dykstra questioned whether it would make sense to defer a decision around the capacity valuation methodology to the broader review of the RCM process. Mr Dykstra noted that the level of capacity from Intermittent Generators currently in the market is much lower than for DSM which also has restricted availability. The Chair noted that it is important to resolve the current issues around the capacity valuation methodology from an investment perspective. Mr Forward noted that there was benefit in pursing an amended capacity valuation methodology as it is arguable that the current mechanism was a manifest error at market start.
- Mr Dykstra questioned how the IMO would consider two competing proposals designed to achieve the same outcome as both may be considered consistent with the Market Objectives. The Chair responded that the IMO was likely to compare how well the two proposals served the Market Objectives.