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## Wholesale Electricity Market Rule Change Proposal Submission Form

### RC\_2010\_25 Calculation of the Capacity Value of Intermittent Generation - Methodology 1 (IMO)

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#### Submitted by

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#### Submission

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**1. Please provide your views on the proposal, including any objections or suggested revisions.**

System Management is pleased to make this submission on the

Rule Change Notice Title: Calculation of the Capacity Value of Intermittent Generation - Methodology 1 (IMO)  
Standard Rule Change Process  
Dated 6 December 2010

Globally, System Operators have been concerned for many year about the impact that increasing levels of non-firm output, such as that from windfarms, during periods of peak demand has on their ability to operate electricity networks securely and reliably.

System Management's view is that over allocation of capacity credit to intermittent generation 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.

As noted in the Renewable Energy Working Group, System Management believes that the proposal to determine the capacity credit payments for windfarms 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 windfarm fleet at times of peak system load. System Management analysis has shown a correlation between the time of day, the season and the windfarm output. The averaging methodology introduces additional and unacceptable risk to Power System security

and reliability. MMA's analysis for the REG WG has shown that on average 40% 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.

A number of jurisdictions allow capacity credits of less than 10%. In July 2010 System Management performed an alternative analysis which is based on AEMO methodology which is the reliable output at the 95<sup>th</sup> percentile<sup>1</sup>. The approach taken in the NEM is summarised as follows:

While wind has the possibility of making a significant contribution during peak demand periods, the Planning Council considers that a level of dependability at least as good as that from other forms of generation is appropriate. A 5% level of unavailability as a result of forced outages would be considered at the low end of acceptable performance by industry standards. It is therefore reasonable to use this as the assessment criteria for the contribution of wind power during peak periods.

The results for NEM are shown in the table below:

	Summer	Winter
Queensland	0.000	0.000
New South Wales	0.050	0.050
Victoria	0.080	0.055
South Australia	0.030	0.150
Tasmania	0.000	0.000

Based on this methodology, the 95<sup>th</sup> percentile POE of total windfarm output for intervals from 15:30 to 17:30 for summer period were compared it to 95<sup>th</sup> percentile for total windfarm output the whole year. The detailed results of the analysis for SWIS are summarised below:

The 95<sup>th</sup> percentile POE total windfarm output was higher in summer than the 95<sup>th</sup> percentile POE total windfarm output for the whole year. The 95<sup>th</sup> percentile POE value for the summer afternoon peak intervals for total windfarm output ranged between 15% and 25% over the three year period, with an average of 18.4%. The range varied depending on the commencement time used for the summer afternoon peak period.

In November 2010 System Management provided information in response to a November 2010 MAC action item indicating that for the SWIS there have been a number of intervals over summer peak load intervals since 2007 during which the contribution of the windfarm fleet has been 20% or less (down to a minimum of around 2%). Other analyses prepared for the IMO have indicated lower capacity factor for windfarms than System Management's analysis above.

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 windfarm 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 windfarms (e.g. from averaging windfarm outputs for a higher number of intervals) the higher the risk that there would be insufficient available capacity to meet the peak loads.

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1 For details of the results see AEMO "ELECTRICITY STATEMENT

OF OPPORTUNITIES" Table 6.6, available at: <http://www.aemo.com.au/planning/0410-0015.pdf>

As windfarm capacity on the SWIS is expected to more than double within the next 12 months or so, the degree of risk resulting from over allocation of windfarm capacity credits is likely to double. This risk would be expected to continue to increase further as the capacity of windfarms on the SWIS increases.

To date, given the scarcity of data, all 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 windfarm output contributions at peak periods should be continuously monitored and where appropriate the capacity credits should be revised.

In its report of 29 October 2010 the REG WG provided a summary of 4 methodologies and analysis by MMA indicating the windfarm contributions for each methodology. Methodology 1, which forms the basis of this Rule change proposal, was accepted by System Management on the basis that the windfarm capacity credit agreed fairly well with System Management's findings.

In view of the above System Management strongly supports the changes proposed by IMO as they recognise more accurately the contribution intermittent generators make to system reliability at time of system peak compared to the existing rules.

On a separate matter associated with this Rule Change Proposal System Management does have concerns in regard to the obligations placed on it and the timing of those obligations.

#### Concern 1: Calculation of Non-Scheduled Generator Curtailment Energy

The proposed rule change is

"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:  
~~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;"

Together with Market Rule 13.1(eB) given below creates an obligation on System Management to estimate the decrease in windfarm energy and send it to the IMO by the next business day.

"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 7.7.5A, where this is to be used in settlement as the quantity described in clause 6.17.6(c)(i)."

System Management believe that this obligation should not exist if the Non Scheduled Generator has not provided it with the necessary information. Whilst it understands the Non Scheduled Generator is obliged to provide this data by modification to clause 7.7.5B, System

Management believes the first part of 7.7.5A should remain in order not to create an obligation that it can not fulfil. That is, the words

“where System Management has been provided with information in accordance with clause 7.7.5B,”

should remain.

System Management also points out that estimation of the output curtailed for some technologies is problematic, for example biomass, geothermal or tidal facilities.

#### Concern 2: Transfer of Non Scheduled Generator Data used to Calculate Curtailment Energy

The proposed rule change is

“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

(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.”

The data used to calculate curtailment is only used for the Certification of the Reserve Capacity which is normally an annual event. System Management does not believe that sending this information on a daily basis is warranted as the System Management and IMO IT systems would require modifications and its inclusion would be costly.

System Management believes the proposed obligations given above should be placed in section 4 and should be sent 10 business days after a request of the IMO.

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**2. Please provide an assessment whether the change will better facilitate the achievement of the Market Objectives.**

System Management believes the proposed changes, with the suggestions from System Management, particularly impact the following market objectives:

Market Objective	Impact
a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West Interconnected System;	By reducing the capacity factors to intermittent generators this improves the reliability of the power system during peak periods.
c) to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;	Capacity credits allocated to all generation types based on their ability to produce during peak periods.

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**3. Please indicate if the proposed change will have any implications for your organisation (for example changes to your IT or business systems) and any costs involved in implementing these changes.**

This Rule Change Proposal will involve changes to System Management's IT systems to accept the new transfer of information.

Costs involved in progressing IT changes to implement this Rule Change Proposal have not yet been evaluated by System Management, as there is no IMO Interface Specification to cost to. It is expected that IT interface modifications to reflect changes highlighted in the Rule Change Proposal may be significant.

System Management would be happy to work with IMO to determine the extent of IT changes required.

This Rule Change Proposal will involve changes to the Power System Operating Procedure (PSOP) as given in 7.7.5C.

"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:"

In the past changes to PSOP have proven not to be at minimal costs. System Management will be happy to work with IMO to determine any costs associated with PSOP changes.

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**4. Please indicate the time required for your organisation to implement the change, should it be accepted as proposed.**

The expected implementation date of this Rule Change Proposal has not been estimated as there is no IMO Interface Specification to cost to.

System Management would be happy to work with IMO to determine the implementation schedule of the required IT changes.

The need to change the PSOP at the same time as this rule change will provide a risk to completion prior to the commencement date which will need to be managed.