

**Wholesale Electricity Market
Rule Change Proposal Submission Form**

**RC_2010_25 Calculation of the Capacity Value of Intermittent
Generation - Methodology 1 (IMO)**

**RC_2010_37 Calculation of the Capacity Value of Intermittent
Generation - Methodology 2 (Griffin Energy)**

Submitted by

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Submission

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

Background

The penetration of renewable generation in the South West Interconnected System (SWIS) has increased significantly over the past few years, with most of the new capacity being in the form of wind farms. With the addition of Collgar Wind Farm there would have been close to 400MW of wind farm generation capacity added to the SWIS since 2005 (the other two being the Alinta Windfarm and the Emu Downs Windfarm). This is significant in the context of a system with peak demand around 3,500MW.

The Mandatory Renewable Energy Target (MRET) legislation has recently undergone major changes, including an increase of the target to achieve 20% renewable in Australia's energy mix by 2020. Other policy initiatives linked to climate change are also still being considered and may add further incentives to invest in renewable energy solutions.

Intermittent renewable technologies, including wind farms, present particular challenges when it comes to planning and operating power systems. The intermittency of the output in particular leads to an increased reliance on scheduled generators to provide balancing services by rapidly increasing output to compensate for loss of output from intermittent generators in low wind conditions and decrease output to allow for increased wind farm output during periods with good wind conditions. Not being able to guarantee a minimum level of output “at the flick of a switch” presents System Management with a dilemma in planning for peak conditions on the system.

Both the planning and operational issues outlined above have implications for system security as well as economic efficiency. It is important that these issues are considered carefully in the ongoing development of the Wholesale Electricity Market (WEM) to ensure that the challenge of achieving renewable energy targets is done in an economically efficient manner whilst at the same time not compromising system security or reliability.

The Market Advisory Committee (MAC) established the Renewable Energy Generation Working Group (REGWG) in early 2008. The REGWG was tasked with exploring the issues relating to the further uptake of renewable generation technologies. It was also specifically asked to look into a perceived negative bias in the calculation of capacity credit values for solar based technologies.

The REGWG undertook a considerable amount of work and also commissioned McLennan Magasanik Associates (MMA) to provide an expert view in relation to calculation of capacity values for intermittent technologies.

The REGWG could not come to a consensus view. In relation to the calculation of capacity values for intermittent technologies competing views were advanced. Two of those competing views resulted in the current two change proposals RC_2010_25 (the IMO proposal) and RC_2010_37 (the Griffin proposal).

Perth Energy provides its views on both proposals below.

Original Change Proposals

On 29 and 30 November the IMO and Griffin Energy each submitted separate change proposals in relation to the methodology for calculating capacity credit values for intermittent generators.

IMO proposal

The IMO proposal is based on assessing the performance of intermittent generators during those times when the demands on scheduled generators are the greatest. The concept of Load for Scheduled Generation (LSG) plays a central role in this proposal. LSG is defined as total system load less output by intermittent generators.

Although the IMO proposal has a detailed step by step description of the proposed calculation method it can at a high level be described as:

1. calculate the average performance (output) of the SWIS intermittent generation fleet during the 12 highest LSG intervals over the past eight years,

2. allocate a pool of capacity credits to intermittent generators corresponding to the value that is equivalent to the 95% probability level of exceeding the average historic performance, and
3. allocate the pool of capacity credits to individual intermittent facilities based on their relative performance during the past three years peak LSG intervals.

The IMO proposal corresponds to alternative 1 in the final report from the REGWG¹. It is Perth Energy's understanding, based on information in the final REGWG report, that the IMO proposal would result in capacity factors (for the purpose of assigning capacity credits) for wind farms around or below 20%, representing about a 50% reduction compared to the outcome under the current version of the Market Rules. Solar based technologies are expected to achieve significant improvements in capacity factors compared to the status quo.

Griffin proposal

The Griffin proposal also makes use of the LSG concept. Griffin proposes to set the capacity credit level for each individual intermittent generation facility equal to the facility's average MW output during the 2,250 trading intervals corresponding to the 750 highest LSG intervals in each of the previous 3 years.

The Griffin proposal corresponds to alternative 2B in the final report from the REGWG. Alternative 2B was a simplification of alternative 2A which was developed and recommended by MMA. It is Perth Energy's understanding that the Griffin proposal would result in a more modest decrease in capacity factors for wind farms compared to the IMO proposal. Solar based technologies are also expected to experience significantly improved capacity factors under the Griffin proposal.

Amended IMO Proposal

The first round of consultation closed on 4 February 2011. The deadline for publishing the Draft Rule Change Report was extended a number of times to allow the IMO to properly consider the views and issues raised in the initial consultation period. In addition, the IMO commissioned the Sapere Research Group to provide further analysis of the two competing Rule Change Proposals.

The Sapere Research Group presented its findings in a report dated 18 August 2011. The main findings were that:

1. Both proposals suffered from data clustering issues in selecting the LSG intervals,
2. The Griffin proposal suffered from having no adjustment to reflect variability in output and the IMO proposal suffered from having an adjustment based on the standard deviation which was deemed to be less accurate than an adjustment based on the variance of the output.

¹See http://www.imowa.com.au/f3086,903646/REGWG_Final_Report_to_MAC_v1.pdf

The Sapere Research Group identified that the IMO proposal could be improved by addressing the two main issues referred to above and came up with proposed amendments to the IMO Proposal (the “Amended IMO Proposal”). The Amended IMO Proposal can at a high level be described as:

1. Identify the 12 highest LSG intervals in each of the previous five years, where each of the intervals must be on separate Trading Days,
2. Calculate the average output and the variance of that output (in MW) of the Intermittent Facility during the 60 Trading Intervals described above,
3. Award Capacity Credits to the Intermittent Facility as being equal to the average output less the variance times “G”, where G is an adjustment factor.
4. G is calculated as being $K + U / \text{Average Output}$.

The values for K and U would be as follows:

Capacity Year	K	U
2014/15	0.001	0.211
2015/16	0.002	0.422
2016/17	0.003	0.635

For Capacity Year 2017/18 onwards the values of K and U (and therefore G) would be assessed and determined by the IMO.

The values of K and U in year 2016/17 are representative of the current best estimate for the ultimate value of these parameters. The lesser values for these parameters in the first two years represent a glide path approach to implementing the Amended IMO Proposal.

Perth Energy’s Views

As highlighted in Perth Energy’s response to the initial consultation on these proposals the IMO is faced with an extremely difficult, but also at the same time very important decision. The IMO’s decision is likely to influence the path for the future development of the WEM both for scheduled and intermittent generators. The inability of the REGWG to reach a consensus view after about two years’ work illustrates how divisive the issues raised in the proposals are in the industry.

It will be important to continue to develop the WEM in accordance with the Market Objectives². This means ensuring that the market continues to strive for economic efficiency

² The objectives of the market are:

- (a) to promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system;
- (b) to encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors;

whilst accommodating renewable technologies and at the same time without compromising system security. It will be necessary to review all aspects of the capacity market and also the wider market to ensure that the right incentives are in place to entice the right combination of generation technologies in the market. For example, it may be necessary to incentivise a higher proportion of flexible, fast-response units to ensure that a further penetration of renewable options does not compromise system security objectives. Perth Energy also refers to its comments around these issues presented in its response to the initial consultation. Those comments apply equally to the change proposals in their current form.

Perth Energy continues to be concerned with the potential impact on sovereign risk perception in the Wholesale Electricity Market (WEM) flowing from these proposed changes as both the Griffin and the Amended IMO Proposals would significantly impact on the value of existing Intermittent Facilities. An increased perception of sovereign risk in the WEM will also have negative flow-on effects for other projects, including “conventional” generation projects.

Perth Energy welcomes the proposed inclusion of a three year glide path introduction of the Amended IMO Proposal and believes this would go some way towards addressing the sovereign risk issues. However, Perth Energy still considers there may be merit in considering a longer period of grandfathering current rules for those projects where financial commitments have already been made to minimise sovereign risk arising from these change proposals. Grandfathering existing arrangements for a defined period is a tried and trusted method used in markets around the world to minimise sovereign risk issues whilst at the same time ensuring that market rules are updated to so that new projects that are not yet past the financial investment decision (FID) stage are exposed to the most cost reflective and correct economic signals possible.

With regard to the adjustment mechanism under the Amended IMO Proposal Perth Energy agrees with the principle that Facilities with large variances in their LSG output should have a deduction against their assessed capacity credit level compared to similar Facilities with a more stable LSG output. Perth Energy therefore agrees that an adjustment related to the variability in the output would be appropriate. It is difficult for Perth Energy to pass comment on the level of the parameters “K” and “U” which together determine the level of reduction in Capacity Credits flowing from variability in output. Perth Energy would welcome further transparency as to the setting of these parameters to make the methodology less of a “black box”.

With regard to the selection of the 60 LSG intervals under the Amended IMO Proposal Perth Energy queries whether this was intended to be influenced by the output of all Intermittent Facilities that will be available in the Capacity Year in question, including all the Intermittent Facilities with no historic metering output at all. With this approach, the selection of LSG

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- (c) to avoid discrimination in that market against particular energy options and technologies, including sustainable energy options and technologies such as those that make use of renewable resources or that reduce overall greenhouse gas emissions;
 - (d) to minimise the long-term cost of electricity supplied to customers from the South West interconnected system; and
 - (e) to encourage the taking of measures to manage the amount of electricity used and when it is used.

intervals for the entire fleet of intermittent generators could be significantly influenced by non real life data points as the estimated output in the expert report would be utilised. This could have particularly severe consequences when large facilities enter the system.

Perth Energy notes that the proposed legal text to implement the Amended IMO Proposal specifically allows for substituting metering data with estimated output data in the event of Consequential Outages only. Perth Energy considers that this option should also be available for all scenarios where the Facility has followed an instruction from System Management that has led to less output from the Facility than otherwise would have been the case. If the proposed new arrangements for balancing and ancillary services are introduced there may be other scenarios where actual metering data should be replaced by estimates for the purposes of calculating an Intermittent Facility's output during the LSG intervals.

The reason for selecting the 12 peak LSG intervals from each year from separate Trading Days was to overcome the clustering problem that was identified in the data. Perth Energy notes that the mechanism for calculating the Individual Reserve Capacity Requirement (IRCR) for loads is centred around the 12 peak system load intervals each year, being the three peak Trading Intervals on four separate Trading Days. Perth Energy considers this apparent inconsistency should be investigated and assessed further in a review of the entire capacity market.

On balance, Perth Energy supports the implementation of the Amended IMO Proposal but urges the IMO to carefully consider whether the proposed glide path introduction would sufficiently address sovereign risk issues.

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

Perth Energy considers the most significant impacts of both proposals to be on Market Objectives (a) and (d).

Reducing the number of capacity credits awarded to intermittent facilities (which is a result of both original proposals and the Amended IMO Proposal) should have a positive impact on the facilitation of Market Objective (a) as it would increase system security and improve economic efficiency. However, the validity of this depends on the analysis underpinning System Management's view that no more than a 20% capacity factor should be awarded to intermittent facilities.

The sovereign risk issue is likely to negatively impact on the facilitation of Market Objective (d) as the long term cost of providing electricity will increase with increased perception of sovereign risk along with an increase in the cost of obtaining funding for new projects. Perth Energy is against any Rule change that has the effect of moving the goal posts after long term investment decisions have been made by participants.

In this instance, however, Perth Energy accepts System Management's express concerns of the system security risk associated with the absence of correct pricing signals for investment decisions on intermittent generator entry, and accepts that significant effort has been made

by the IMO and participants in investigating and devising change proposals that would be fair and reasonable in pursuing the Market Objectives.

- 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.**

Perth Energy sees no problems in this regard.

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

Perth Energy does not require any lead time to implement either of the changes.