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

#### Summary

Alinta estimates that RC\_2010\_25 would **reduce** existing intermittent wind generators' **annual revenue by around \$16 million (or around 17 per cent)**.

Because the reduction in Capacity Credits assigned to intermittent wind generators would be offset by an increase in either Capacity Credits provided by other facilities and/or the Reserve Capacity Price, **the overall cost of capacity** incurred by Market Customers following RC\_2010\_25 **would not change**.

While future developers of intermittent wind generation projects would be able to account for any reduction in revenue from Capacity Credits by increasing contract and/or energy prices in power purchase agreements, RC\_2010\_25 will potentially result in existing Market Participants **writing down the value of wind generation assets by around \$160 million**.

Although the availability of **any** individual Facility when required to provide energy during periods of peak system demand is somewhat uncertain, Alinta accepts that the contribution that may be expected to be available from Intermittent Facilities during these periods is likely to be least certain and hence should be discounted - as occurs in the current Market Rules.

However, for the following reasons, Alinta does not support the amendments to the Market Rules contemplated by RC\_2010\_25.

- 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 wind generators **overstates** the energy that can be expected to be available from these facilities during periods of peak system demand.
- MMA also concluded that the **methodology proposed by the IMO** in RC\_2010\_25 for determining the Relevant Level for Intermittent Generators **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 intermittent wind generators during periods of peak system demand.
- **No evidence** has been provided by the IMO in its Rule Change Proposal to support its assertion that the methodology proposed by it in **RC\_2010\_25** for determining the Relevant Level for an Intermittent Generator **will better achieve the Market Objectives**.

While the available empirical 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 the methodology proposed by the IMO in RC\_2010\_25 for those facilities would be unlikely to be the methodology that best achieves the Market Objectives.

Finally, although the financial effects of RC\_2010\_25 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.

Although the Commonwealth Government's Mandatory Renewable Energy Target (MRET) is expected to drive continued investment in intermittent wind generation, 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.

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 by the Economic Regulation Authority that consideration be given to a clear transition regime to manage changes in the treatment of intermittent generation.

## Background

Clauses 4.11.1(d) and (e) and 4.11.3A of the Market Rules require that, in assigning a quantity of Certified Reserve Capacity, which is not to exceed the Relevant Level of an Intermittent Generator for a Reserve Capacity Cycle, the IMO must apply the following 'principles' in setting the Relevant Level.

- (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 during these Trading Intervals.
- (c) If the Facility 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.

This methodology results in the Relevant Level, and therefore the quantity of Certified Reserve Capacity that may be assigned to an intermittent wind generator by the IMO, generally being around 40 per cent of a Facility's nameplate capacity.

## Issue

In its Rule Change Proposal, the IMO argues the following issues arise as a result of the current methodology for establishing the Relevant Demand for Intermittent Generators in the Market Rules.

- The methodology used to establish the Relevant Level for Scheduled Generators is based on the amount of energy that is (technically) able to be made available at an ambient temperature of 41°C. It is implicitly assumed that higher temperatures will coincide with periods of peak system demand.

In contrast, the methodology used to establish the Relevant Level for Intermittent Generators is based on their actual (or forecast) **average** energy output over a three year period.

Because this methodology does not explicitly consider the amount of energy that may be available from Intermittent Generators during either periods when the ambient temperature is 41°C and/or periods of peak system demand, there is a view amongst certain parties, including System Management and the IMO, that when the current methodology is used to establish the Relevant Level for intermittent wind generators, it will **overstate** the amount of energy that can be expected to be available from intermittent wind generators during periods of peak system demand.

That is, those parties consider that setting the Relevant Level for an intermittent wind generator, and hence assigning a quantity of Certified Reserve Capacity, equivalent to around 40 per cent of the Facility's nameplate capacity too high.

- As the energy output of solar thermal and photovoltaic facilities is also intermittent (i.e. is unable to be scheduled), the Relevant Level for these Facilities is also established based on their actual (or forecast) average energy output over a three year period.

However, as the current methodology includes periods that are generally outside periods of peak system demand (i.e. overnight and winter), the general consensus is that when the current methodology is used to establish the Relevant Level for intermittent solar thermal and photovoltaic generators, it will **understate** the amount of energy that may be available from these generators during periods of peak system demand.

### Rule change proposal

RC\_2010\_25 would amend the Market Rules so that in determining the Relevant Level for an Intermittent Generator, which then acts as a limit on the quantity of Certified Reserve Capacity that may be assigned to that Facility by the IMO, the IMO would apply the following methodology.

1. Identify in each of the eight 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 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 probability of exceedence (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 using the following formula.

$$\text{Relevant Level} = (\text{Facility Performance Level}) / (\text{Fleet Performance Level}) \times \text{Fleet Capacity Value}$$

Neither the IMO's Rule Change Proposal nor its Rule Change Notice indicates that 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.

As a consequence, the estimated effect of RC\_2010\_25 is to **reduce revenue** from Capacity Credits **by around \$16 million** in the 2012/13 Capacity Year for Market Participants associated with intermittent wind generators.

- For the period from 1 October 2012 to 1 October 2013, 171.554MW of Capacity Credits have been assigned to intermittent wind generators. This represents less than three per cent of the 5,995.613 MW of Capacity Credits that were approved and assigned to 26 generation and demand side management providers.
- The Reserve Capacity Price for that Capacity Year is \$186,001.04.

If RC\_2010\_25 were implemented, it would likely **reduce overall annual revenue** earned by intermittent wind generators **by around 17 per cent** assuming an average energy price of \$40 MWh. Given these investments are essentially 'sunk', RC\_2010\_25 has the potential to result in the **write down in asset values of some \$160 million**.

## Alinta's views

### Overview

Firstly, Alinta notes that 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 Wholesale Electricity Market (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 or Power System Reliability.

In contrast, a presentation prepared by the IMO for its Board indicates that the current Market Rules have contributed to the creation of a highly reliable and secure power system.

- The overall amount of capacity available to System Management has far exceeded recent yearly peak demand periods.
- The entry of large amounts of DSM and peaking facilities will double the amount of peaking capacity available to System Management from 2008/09 to 2012/13.
- Since mid-2008, liquid fuelled generation has rarely been called on by System Management.
- A simulation by the IMO of a 'Varanus Island-type outage' during summer indicated that available capacity exceeded operational load at all times, meaning there was no risk of involuntary load shedding.

While the availability of any individual Facility when required to provide energy during periods of peak system demand is somewhat uncertain, Alinta accepts that the contribution that may reliably be expected to be available from Intermittent Facilities during these periods is likely to be least certain and hence should be discounted, as occurs in the current Market Rules.



However, Alinta does not support the amendments to the Market Rules contemplated by RC\_2010\_25 as submitted by the IMO for the following reasons.

- 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 wind generators **overstates** the energy that can be expected to be available from these facilities during periods of peak system demand.
- MMA also concluded that the **methodology proposed by the IMO** in RC\_2010\_25 for determining the Relevant Level for Intermittent Generators **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 intermittent wind generators during periods of peak system demand.
- **No evidence** has been provided by the IMO in its Rule Change Proposal to support its assertion that the methodology proposed by it in **RC\_2010\_25** for determining the Relevant Level for an Intermittent Generator **will better achieve the Market Objectives**.

#### Available evidence

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 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

As part of the Renewable Energy Generation Working group process, the IMO engaged MMA to review whether capacity based on average output provided a reasonable approximation of the capacity value of intermittent generation sources and, if not, to identify and review other available measures that:

- reflected the impact on system reliability;
- were robust with acceptable volatility of measure; and
- were easy to understand and apply without detailed system modelling.

Following its analysis, MMA's Initial Draft Report (29 January 2010) drew the following conclusions based on **available data on performance and system load**.

1. A 'reliability equalisation method' was, in principle, the most accurate method of estimating the contribution of individual intermittent facilities to meeting energy demand in periods of peak system demand, but:
  - a. the contribution of the entire fleet of intermittent wind generators to meeting energy demand in periods of peak system demand would exceed that the sum of all individual intermittent wind generators due to diversity in output; and

- b. around 500 simulations would be required to ensure the results were reasonably accurate.
2. The 'average power method' (i.e. the current methodology in the Market Rules) is a good approximation of the values that would be derived from the reliability equalisation method' for the contribution made by intermittent wind generators to meeting energy demand in periods of peak system demand.
3. The current methodology in the Market Rules is not suitable for establishing the contribution that could be expected to be made by the solar thermal or photovoltaic facilities to meeting energy demand in periods of peak system demand.

Alinta notes that MMA's Initial Draft Report was made available by the IMO to the Office of Energy, Verve Energy, System Management and persons engaged by the Minister for Energy to review Verve Energy's financial situation and outlook ("the Oates Review").

MMA provided detailed comments in response to the issues raised by these parties in its Supplementary Analysis Report (12 April 2010), and in a later report (2 August 2010) reconfirmed its conclusions that:

*"[i]n respect of wind farms the current method [in the Market Rules] gives a good approximation [of the contribution made to system reliability with respect to unserved energy] in the current circumstances but it may not remain accurate if there is a much higher penetration of wind power or if other renewable energy sources are added such as those based on solar thermal or photovoltaic technologies. (p.1)*

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 intermittent wind generators during periods of peak system demand.

#### *Options analysis*

After the IMO made MMA's Initial Draft Report available to the Office of Energy, Verve Energy, System Management and the Oates Review, the Office of Energy and System Management each proposed an alternative methodology to setting the Relevant Level for intermittent Generators. The IMO also proposed a variant of the methodology proposed by the Office of Energy.

MMA then assessed the following resulting alternative methodologies for establishing the Relevant Demand for Intermittent Generators in its August Report (2 August 2010).

- Option 1 (IMO)
- Option 1A (Office of Energy)
- Option 2A (Recommended MMA)
- Option 2B (Alternative MMA)

- Option 3 (System Management)

In its August 2010 report, MMA undertook a comparative assessment of the five alternative methodologies and provided the following summary.

	1	2A	2B	3
<b>Basis</b>	Fleet POE for 12 TI, shared on last three years 250 TI	750 TI for selected high demand years scaled to forecast	750 TI based on last three years	Fleet POE on 175 TI, shared on 250 TI over last three years
<b>Transparency</b>	Moderate – complex interactions but based on history	Moderate – some interactions and forecasting uncertainty	High – based on history	Moderate – some interactions
<b>Simplicity</b>	Moderate	Moderate	High	Moderate
<b>Accuracy and Robustness</b>	Low (Conservative)	High – best represents reliability impact	Moderate (Conservative)	Low (Conservative)
<b>Continuity of valuation</b>	Low due to significant interactions among resources	High – changes infrequently, but then substantially	Moderate due to year to year variations	Moderate with significant interactions among resources
<b>Overall assessment</b>	Too conservative	Best fit to criteria	Very conservative for solar and inaccurate	Very conservative and inaccurate

As illustrated, MMA concluded that the methodology proposed by the IMO in RC\_2010\_25 for determining the Relevant Level for Intermittent Generators (i.e. Option 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 intermittent wind generators during periods of peak system demand.

Given it could not reach a consensus decision, and that it was not prepared to adopt a compromise as proposed by the Chair, Alinta agrees that the REGWG entrusted the IMO with proposing a methodology for determining the Relevant Level for Intermittent Generators to the MAC.

However, 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 Option 1 would result in outcome that is more consistent with the Market Objectives, when the independent consultant it engaged to advise it, consistently recommended an alternative approach.



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

Market Rule 2.4.2 states 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. The Wholesale Market Objectives are as follows.

- (a) To promote the economically efficient, safe and reliable production and supply of electricity and electricity related services in the South West interconnected system.
- (b) To encourage competition among generators and retailers in the South West interconnected system, including by facilitating efficient entry of new competitors.
- (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.
- (e) To encourage the taking of measures to manage the amount of electricity used and when it is used.

Alinta considers that the IMO cannot be generally satisfied that the change to the methodology used to establish the Relevant Level for intermittent wind generators proposed by RC\_2010\_25 is consistent with the Wholesale Market Objectives, and in any event 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.

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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.**

The changes to the Market Rules contemplated by RC\_2010\_25 would not require Alinta to change its IT or business systems, and hence there are no IT or business costs associated with the rule change proposal.

However, Alinta estimates that RC\_2010\_25 would reduce its annual revenue by around \$3.6 million, although this may be partially offset by an increase in revenue to the extent that the reduction in Capacity Credits assigned to intermittent wind generators results in an increase in the Reserve Capacity Price.

While future developers of intermittent wind generation projects would be able to account for any reduction in revenue from Capacity Credits by increasing contract and/or energy prices in power purchase agreements, RC\_2010\_25 will reduce Alinta's EBITDA by up to \$3.6 million.

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

The changes to the Market Rules contemplated by RC\_2010\_25 would not require Alinta to change its IT or business systems, and hence there is no specific period of time that would be required to implement the changes arising from the rule change proposal.