



INDEPENDENT
MARKET
OPERATOR

Wholesale Electricity Market Concept Paper Proposal

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Concept proposal title:	Incentives to Improve Availability of Scheduled Generators
Market Rule(s) affected:	4.11 (and relevant Market Procedure), 4.12, 4.27, proposed new Reserve Capacity Rule

Introduction

The purpose of a Concept Paper Proposal is to foster analysis and discussion of complex issue(s) that can affect the Wholesale Electricity Market (Market), the Market Rules and the Wholesale Market Objectives.

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;
- (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.

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General Information about Concept Paper Proposals

On receipt of this Concept Paper Proposal the Independent Market Operator (IMO) will proceed following these steps:

1. Log the proposal and notify the proposer that it has been received;
 2. Assess the concept and consult with the Market Advisory Committee (MAC) for prioritisation against other Rule Participant issues registered; and
 3. Work cooperatively with the proposer to develop the full concept paper including:
 - assessment against the Market Objectives; and
 - undertaking a detailed cost benefit analysis related to the identified options.
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Concept Paper: Incentives to Improve Availability of Scheduled Generators

CP_2013_01

Date: March 2013

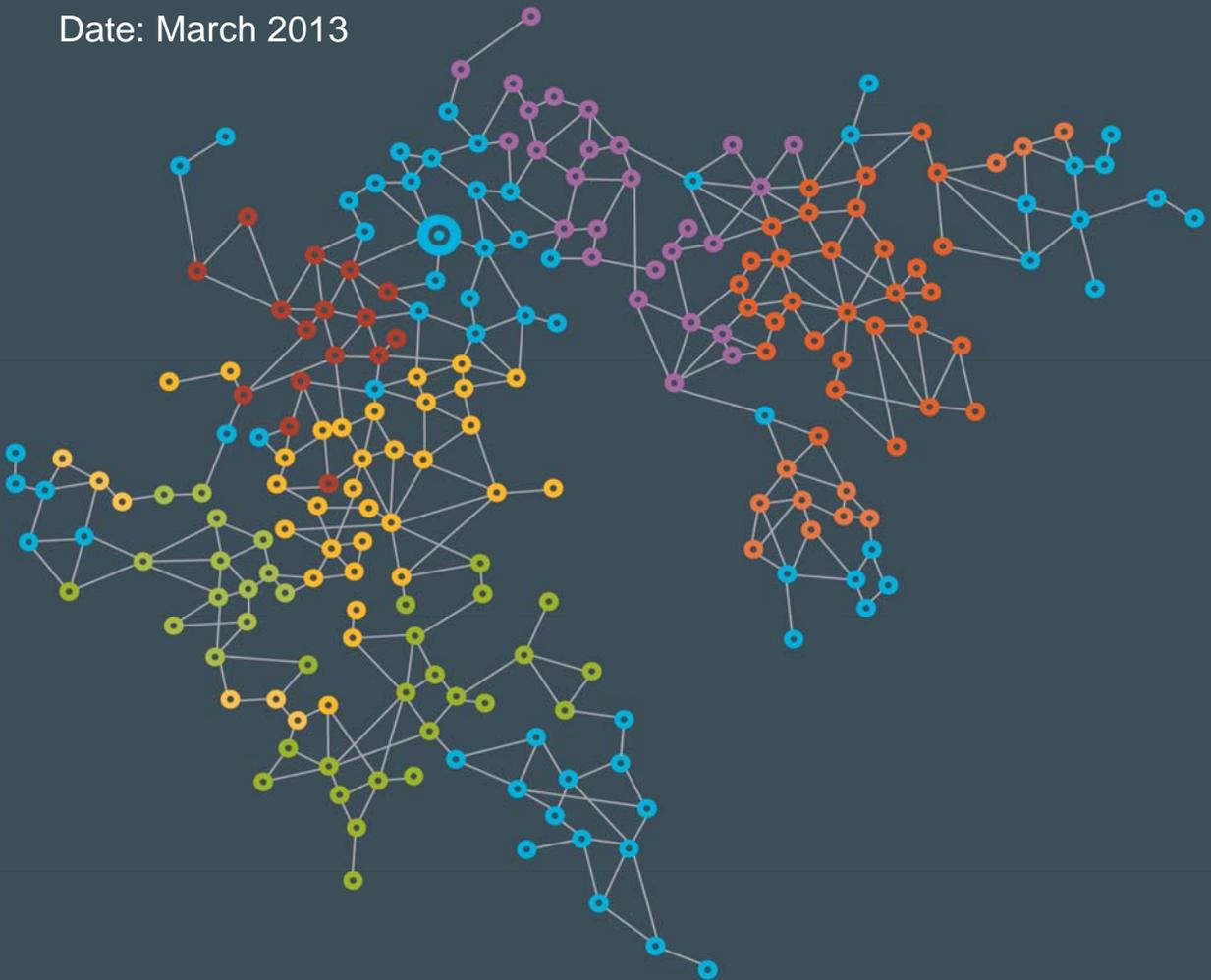


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1. INTRODUCTION

1.1 *Purpose of the Reserve Capacity Mechanism*

The Reserve Capacity Mechanism is a three-year, forward-looking procurement of access to energy capacity. It is designed to provide an incentive for the provision and maintenance of electricity generation resources necessary to meet the State's requirements for reliability and security of electricity supply in the South West Interconnected System (SWIS). A capacity market is a more stable solution to the revenue adequacy problem in a peaky energy market like WA than the scarcity pricing and volatility of an energy-only market.

However, while the Reserve Capacity Target is based on the forecast peak demand of a one-in-ten year load plus a Reserve Margin, capacity payments to generators are not intended to reserve access to that energy capacity for only a few peak hours of the year.

Capacity payments not only ensure security of supply. Procuring capacity from multiple providers strengthens competition and diversity in energy markets, so that the most economically efficient electricity supply option can be dispatched at all times. A solid buffer of available capacity means that an unforeseen supply interruption is less likely to result in a price spike. For these objectives to be met, it is essential that Scheduled Generators maximise the availability of their capacity to the market in return for receiving capacity payments.

In off-peak periods of the year, when much of the conventional generation fleet may be on Planned Outages scheduled well in advance, it is essential that the remaining Scheduled Generators are reliably available. The reduction in available capacity due to inefficiently managed planned outages, even if the probability of dispatch of that individual Facility may be low, increases the risk of a price spike should an unexpected generation failure occur.

Scheduled Generators sell their capacity for a full year; customers pay for that capacity for a full year; the Maximum Reserve Capacity Price is calculated for a full year and Scheduled Generators have an obligation to be available for a full year other than forced outages and essential planned outages.

The incentives for Scheduled Generators to maximise their availability should be no less for a capacity + energy market than for an energy-only market.

1.2 *Scheduled Generator availability*

Several large Scheduled Generators have demonstrated unacceptably low and deteriorating availability levels in recent years due to excessive Planned Outages. Despite high levels of Planned Outages over multiple years, these Facilities continue to perform poorly.

The existing Market Rules do not provide for sanctions against Scheduled Generators with chronically excessive Planned Outage rates, other than complete exclusion from the Reserve Capacity Mechanism at the IMO's discretion under clause 4.11.1(h) of the Market Rules. If the IMO chooses not to exercise this option, the Facility is entitled to its full allocation of Capacity Credits regardless of the number of Trading Intervals that the capacity is made available to the market.

The implications of this situation are:

- Poor value for money – the market is paying a significant amount for Scheduled Generation Reserve Capacity for which the probability of availability is relatively low;
- Inefficiency – the unavailability of large Scheduled Generators due to excessive Planned Outages reduces competitive pressure in the STEM and Balancing Market, resulting in higher-than-necessary average energy prices;
- Higher price risk – when significant amounts of capacity are unavailable due to excessive Planned Outages by some Scheduled Generators, the risk increases that a generator failure will result in a price spike;
- Higher supply security risk – excessive short-notice Planned Outages reduce the Reserve Capacity buffer when other Facilities are on programmed Planned Outages in accordance with recommended maintenance schedules.
- Inequity within Facility Class – Scheduled Generators that are available for, in some cases, barely 50% of Trading Intervals are rewarded at the same level as Scheduled Generators that are available for more than 95% of Trading Intervals, creating a cross subsidy between Market Participants;
- Risk of providing incentives to retain inefficient and unreliable generating plant – payment of full capacity revenue to plant with low availability mutes the normal commercial incentives for retirement of high-maintenance or obsolete generation facilities, and
- New investment may be discouraged – the assignment of full Capacity Credits to frequently unavailable Scheduled Generators exaggerates the apparent system reserve margin.

The situation is inconsistent with the Market Objectives of economically efficient, safe and reliable supply of electricity, encouraging competition, and minimising the long-term cost of electricity.

In its 2011 Wholesale Electricity Market Report to the Minister for Energy, the Economic Regulation Authority (ERA) drew attention to poor Scheduled Generator availability resulting from high Planned Outage rates. The ERA reiterated its concern in the Discussion Paper for the 2012 Report. The ERA has queried whether the existing Market Rules provide an effective mechanism for ensuring the economically efficient provision of generation capacity to the SWIS.

A number of industry submissions to the ERA's discussion paper expressed similar concerns about the negative impacts of encouraging the retention of unreliable Scheduled Generators in a market currently experiencing significant excess capacity.

1.3 Comparative performance of WA generation sector

Figures 1 - 3¹ show the average availability and outage performance indicators for WA conventional generating plant on the SWIS in the last ten years compared with the performance of the generation sector in other States, and how the ratio of Planned Outage Factors and Forced Outage Factors has changed.

¹ Source: Data from ESAA *Electricity Gas Australia* reports, as cited by the Office of the Tasmanian Economic Regulator in its *2011-12 Energy in Tasmania Performance Report*.

The term 'Availability Factor' is not used in the Market Rules, but is the percentage of the total hours in a period when the Facility is not affected by planned or unplanned outages. 'Equivalent Availability Factor' is adjusted for de-ratings.

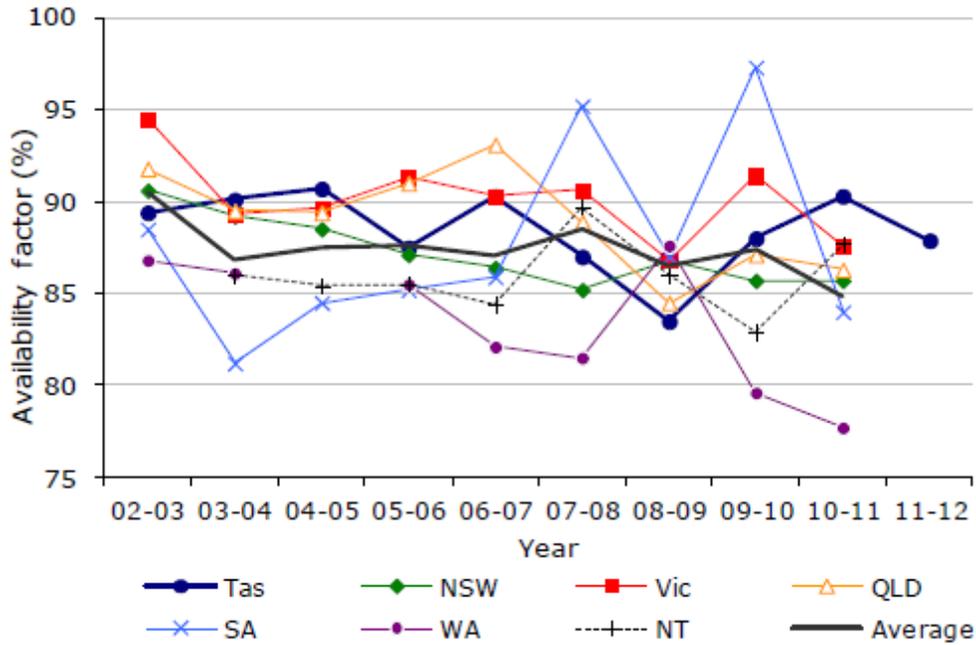


Figure 1 Australian generation plant average Availability Factors by State 2002 – 2011.

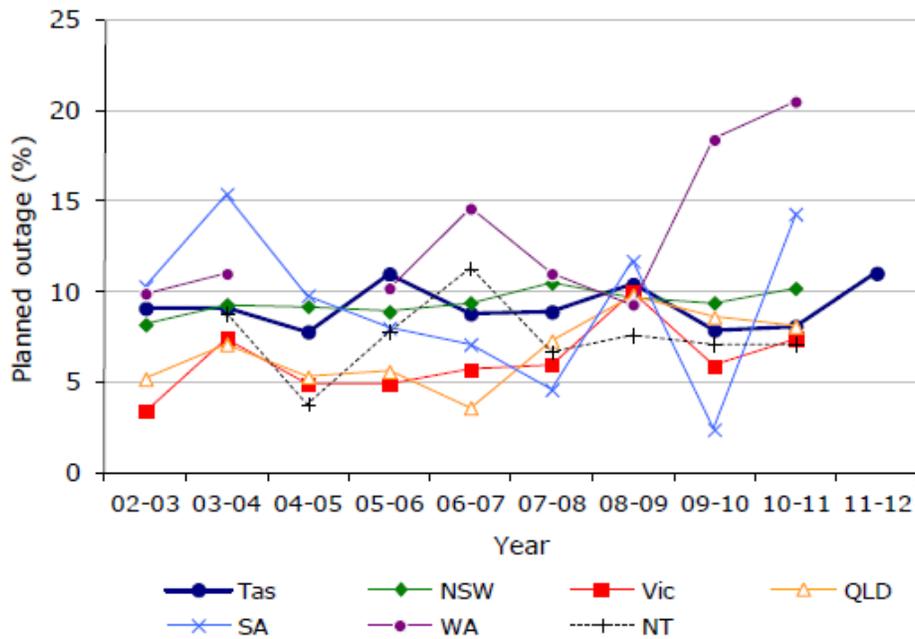


Figure 2 Australian generation plant average Planned Outage Factors by State 2002–2011.

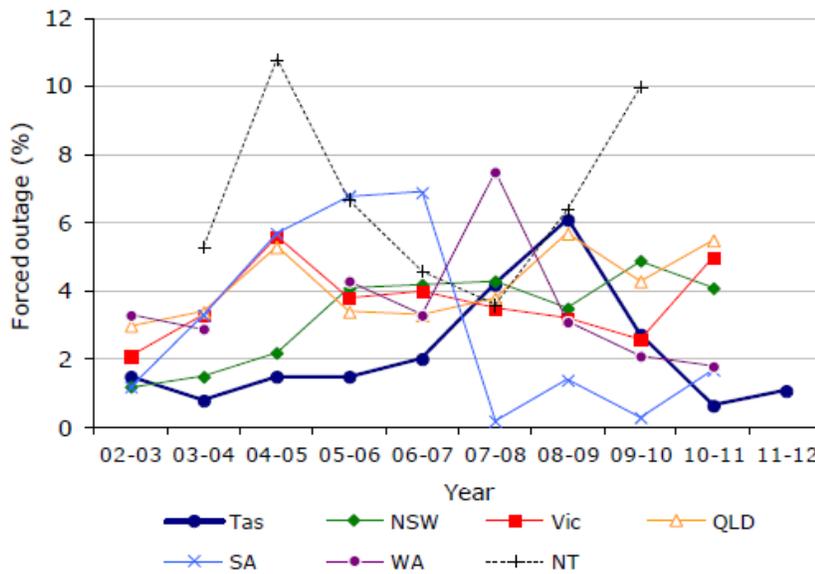


Figure 3 Australian generation plant average Forced Outage Factors by State 2002–2011

While the WA Forced Outage Factor appears relatively low, it should also be noted that WA does not use standard definitions for Forced Outages, which means that some outages that would be reported as forced outages under international standard definitions are classified as planned outages under the Market Rules. However, this does not affect Availability Factors, which are calculated using total outages.

Further analysis indicates that the average Equivalent Availability Factor for the WA conventional generation sector is attributable to the poor performance of relatively few large Facilities (Figure 4)².

For comparison, Figure 4 also shows the Equivalent Availability Factor representing the criteria in clause 4.11.1(h) of the Market Rules and average Equivalent Availability Factors from the North American Electric Reliability Corporation 2012 Generating Availability Report (NERC-GAR) for fossil-fuelled steam generating plant and open cycle gas turbines.

Figure 5 shows the availability performance of WA steam generators (excluding Combined Cycle) compared with the distribution of 1465 steam generators in the US and Canadian markets. Four of the WA Facilities are in the lowest performing decile and a further two are below the median.

² Note that the IMO is aware that the Alcoa WGP Facility has experienced reporting system anomalies which suggest that its outage rate has been over-stated.

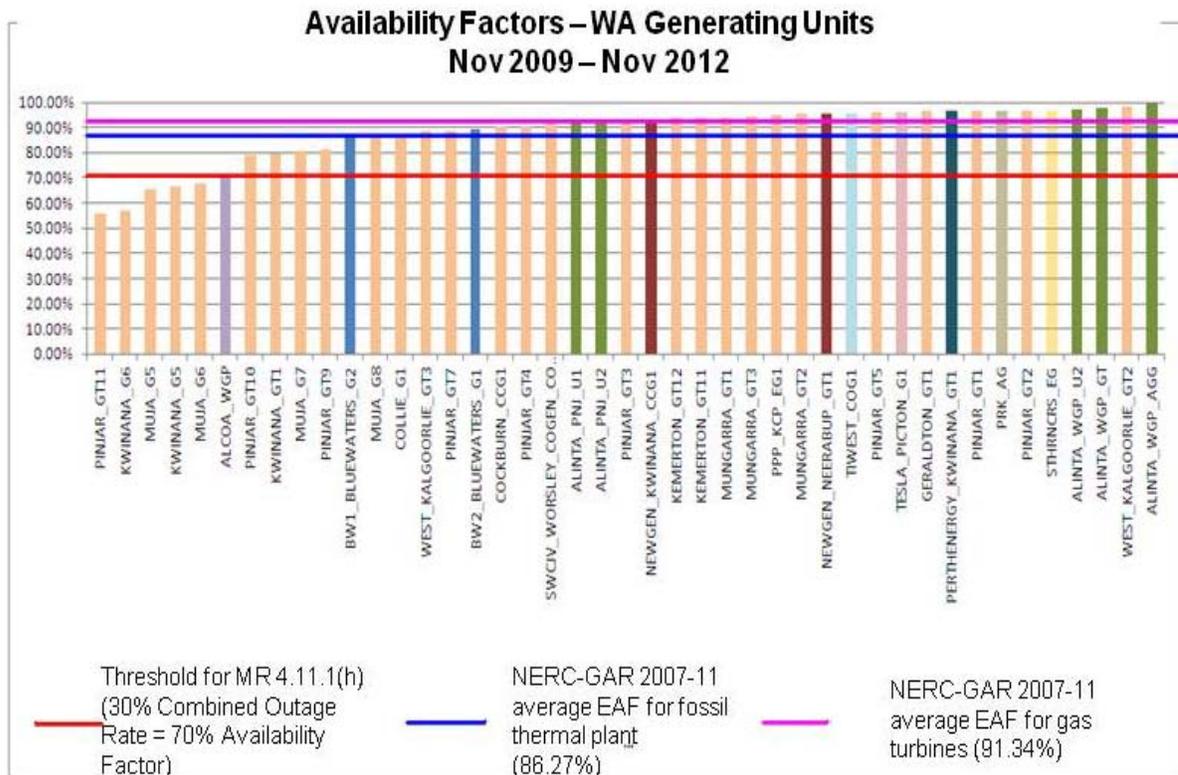
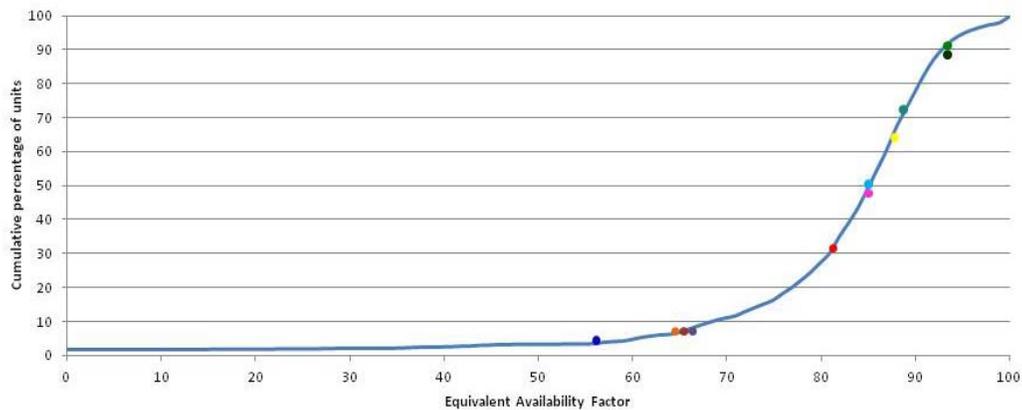


Figure 4 Average Equivalent Availability Factors Nov 2009 – Nov 2012 for active WA Scheduled Generators holding Capacity Credits at February 2013 (source: IMO records).

Availability Factors - fossil-fuelled (steam) generating units 2007-11
(NERC-GAR: N = 1465 units)



Dots represent Availability Factors for WA fossil-fuelled steam generating Facilities Nov 2009 – Nov 2012

Figure 6 Three-year availability performance of WA steam generating units by comparison with five-year performance of North American plant (NERC-GAR 2012).

It should also be noted that there is currently excess base load generation capacity in the market, dating back to 2008/09 (Figure 6). Four of the Scheduled Generators with the lowest capacity availability are Kwinana units 5 and 6 and Muja units 5 and 6, which are historically base load and low mid-merit plant. However, the frequent unavailability of this capacity impacts on the efficiency of the energy markets.

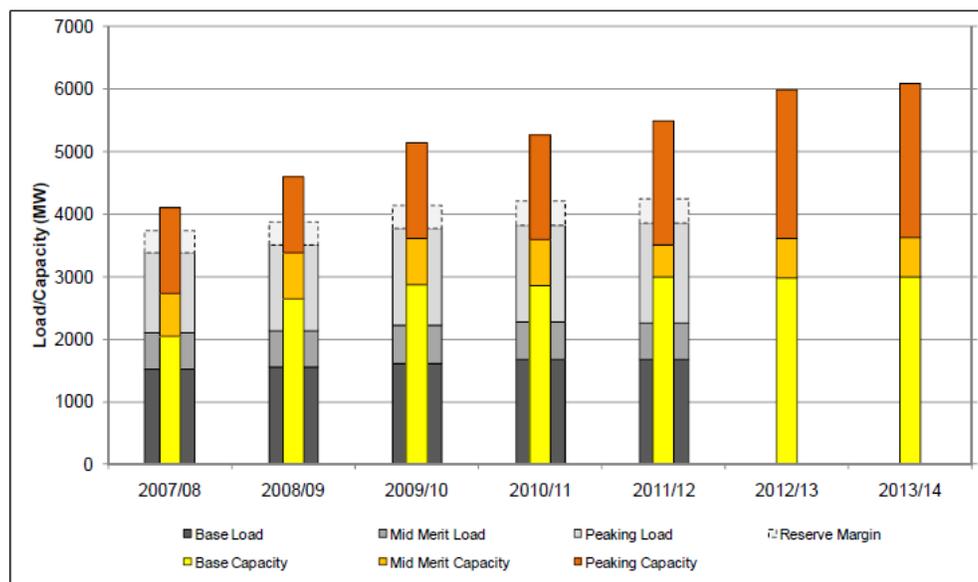


Figure 6 SWIS load characteristics and capacity mix (source: IMO 2012 Statement of Opportunities Report)

1.4 Recent decisions by the IMO Board

At the time applications were considered for the 2014/15 Capacity Year, five Scheduled Generators breached the criterion of 30% combined Planned and Forced Outage Rates over 36 months specified in clause 4.11.1(h). The IMO was therefore required to decide whether to not assign Certified Reserve Capacity to these Facilities for the 2014/15 Capacity Year.

The Board considered a range of information, including:

- an independent report commissioned by the IMO into the high outage rates of the identified Scheduled Generators in recent years;
- the ERA's findings from an investigation of planned outage impact on STEM prices in the period June-August 2011;
- the applicant's response to specific questions from the IMO concerning the outage rates;
- advice from System Management; and
- legal advice on the interpretation of clause 4.11.1(h).

The Board took into account:

- the amount of alternative Reserve Capacity available, which would allow the Reserve Capacity Target in 2014/15 to be met even if no Capacity Credits were allocated to the five Scheduled Generators;
- the potential financial impact on the applicant if no Capacity Credits were allocated to the five Scheduled Generators;
- the potential impact on third parties that may have contracted for the Capacity Credits from those Facilities for 2014/15, and
- the significant proportion of the total outages taken by the Facilities over the three year assessment period that were Planned Outages requested by the Market Participant;
- the comparatively low Forced Outage Rate applying to four of the Facilities;
- the summer outage rates of the five Scheduled Generators, which were lower than their rolling 36 month averages;
- System Management's approval of the Planned Outages and assurance that it was aware of 'no adverse security aspects' resulting from the high Planned Outage Rates,

The Board noted that little guidance is provided regarding the factors to be considered by the IMO in interpreting and applying clause 4.11.1(h).

The Board concluded in August 2012 that the information available to it concerning the past performance of the five Scheduled Generators meeting the criteria in clause 4.11.1(h)(i) was inadequate for a '*confident prediction of future unavailability in the medium term sufficient to justify not allocating Certified Reserve Capacity to any of these Facilities*' in 2014/15.

The Board expressed concern that the Market a *planned outage philosophy practised by* (the Market Participant) *and approved by System Management may be inconsistent with one or more of the purpose of the Reserve Capacity Mechanism, the Market Rules, and the Market Objectives relating to '.. promoting the economically efficient... supply of electricity' and 'minimising the long term cost of electricity supplied'.*

The Board determined that closer monitoring of the planning and execution of Planned Outages of the Facilities would be warranted, and also decided to undertake a review of clauses 4.11.1(h) and 4.27 of the Market Rules to improve their effectiveness.

2. OBJECTIVES OF THIS PROPOSAL

The objectives of the proposals set out in this Concept Paper are to ensure that:

- The Market Rules deliver effective incentives to Market Participants to maintain the availability of their Scheduled Generators above a specified threshold;
- Scheduled Generators with low availability due to excessive Planned Outage Rates are not subsidised by other Market Participants or Market Customers.

- The IMO has the discretion to order a Market Participant to submit to additional scrutiny, at the Market Participant's expense, of individual Scheduled Generators that exceed a defined threshold level of Planned Outages over a 12 month period.
 - Market Participants receive appropriate price signals to encourage them to retire Scheduled Generators, or at least withdraw them from the capacity market, when they can no longer meet a sustained minimum availability standard.
 - The Market Rules contain a mechanism to facilitate the progressive improvement of the overall availability of the WA generation fleet to a level consistent with good industry practice.
 - The market has more transparency with respect to the availability and outage performance of WA Scheduled Generators, benchmarked against generating plant in other markets.
-

3. PROPOSED OPTIONS TO ACHIEVE THE OBJECTIVES:

Several stakeholders, in responding to the ERA's discussion paper for its 2012 Wholesale Electricity Market Report to the Minister for Energy have supported the ERA's concerns with the Planned Outage rates of some Scheduled Generators, and indicated support for providing incentives to encourage high availability and the retirement of unreliable Scheduled Generating Facilities.

Stakeholder suggestions in their submissions to the ERA included:

- amending clause 4.11.1(h) of the Market Rules to allow the IMO more flexibility to relate the quantity of assigned Certified Reserve Capacity to Scheduled Generator availability;
- adopting international best practice as the threshold for clause 4.11.1(h);
- reducing the quantity of Capacity Credits offered to Scheduled Generators with a record of frequent or long duration outages;
- ensuring effective price signals to encourage the retirement of poor-performing plant, such as through the introduction of financial penalties, market refunds or other compensatory mechanisms to apply to Scheduled Generators with high Planned Outage Rates;
- reducing the criterion referring to system capacity availability for mandatory reporting in clause 4.27.3;
- rigorous performance monitoring by the IMO and questioning of Planned and Forced Outages to identify where Planned Outages are excessive;
- annual reporting by IMO about the prevalence and extent of prolonged outages and comparison with industry best practice, and
- applying a discretionary limit to the amount of Planned Outages allowable for a Scheduled Generator.

The options explored in this section include a combination of more timely financial incentives and a mandate for the IMO to more closely monitor of the performance of low-availability

Scheduled Generators. The options aim to address the issues described in section 1, achieve the objectives listed in section 2, and consider the suggestions made by stakeholders in response to the ERA's 2012 Discussion Paper, as summarised above.

Note that unless otherwise specified, all references to a Facility in options below apply to Facilities of the Scheduled Generator class as defined under clause 2.29.

3.1 IMO's proposed measures to address the issue

The IMO Board has considered a number of options to improve incentives for Scheduled Generators to maintain availability levels consistent with good industry practice. It proposes a suite of measures to:

- Provide for more flexibility for the IMO in applying clause 4.11.1((h) to low-availability Scheduled Generators, which currently requires an 'all or nothing' decision on the assignment of Certified Reserve Capacity (**amendment to clause 4.11.1(h)**);
- Clarify the factors to be considered by the IMO in interpreting and applying clause 4.11.1(h), in the context of the value to the energy market of the applicant's capacity as well as system security (**new clause 4.11.1(hA)**);
- Progressively tighten the outage thresholds that will trigger the application of clause 4.11.1(h) and the Reserve Capacity Performance Adjustment (**new clause 4.11.1(hB)**);
- Strengthen the IMO's ability to more closely monitor individual Scheduled Generators displaying unacceptably low availability, by decoupling the performance monitoring power in clause 4.27 from overall system availability impairment and providing for the imposition of performance monitoring regimes overseen by independent auditors (**new clauses 4.27.3A and 4.27.7A and amendment to clause 4.27.2**);
- Establish a Reserve Capacity Performance Adjustment to rectify the current lack of incentives in the Market Rules for poorly performing Scheduled Generators to improve availability levels (**new clause 4.27A**);

The Market Procedure for Certifying Reserve Capacity will need to be amended to support changes to clause 4.11.1.

Consequential amendments will be identified during the Rule Change Proposal process.

An additional option would be to amend clause 4.12.6(b) which currently provides a strong perverse incentive to Market Participants to use excessive Planned Outages, with no Reserve Capacity consequences, to mitigate the risk of Forced Outages that incur Reserve Capacity Deficit Refunds.

3.2 Proposed changes to clause 4.11.1 of the Market Rules

Clause 4.11.1(h)

(h) *the IMO may decide not to assign Certified Reserve Capacity to a Facility if:*

- i. *the Facility has operated for at least 36 months and has had a Forced Outage rate of greater than 15% or a combined Planned Outage rate and Forced Outage rate of greater than 30% over the preceding 36 months; or*
- ii. *the Facility has operated for less than 36 months, or is yet to commence operation, and the IMO has cause to believe that over a period of 36 months the Facility is likely to have a Forced Outage rate of greater than 15% or a combined Planned Outage rate and Forced Outage rate of greater than 30%,*

where the Planned Outage rate and the Forced Outage rate for a Facility for a period will be calculated in accordance with the Power System Operation Procedure. The IMO may consult with System Management in deciding whether or not to refuse to grant Certified Reserve Capacity under this clause 4.11.1(h);

Decisions made under clause 4.11.1(h) are not Reviewable Decisions under clause 2.17.1.

To support the IMO in making a decision under clause 4.11.1(h), it may use information provided by the applicant under clause 4.10.1 including expected (clause 4.10.1(e)(vi)) and actual (clause 4.10.1(e)(vii)) forced and unforced outage rates.

The Market Procedure for Certifying Reserve Capacity allows for the IMO to seek additional information from the applicant, including the causes of the past outages, the steps being taken by the applicant to reduce the outage rates, and the applicant's expectation of the level of future outages. The IMO may assess the likelihood that the applicant's actions will reduce the outage rates and consider whether the expected outages are likely to compromise the security and reliability of the SWIS. It may consult with System Management in making its decision.

3.2.1 Proposal 1 – Greater flexibility for the IMO in applying clause 4.11.1(h)

Clause 4.11.1(h) of the Market Rules is a 'go/no go' filter. The IMO has the option to not assign ANY Certified Reserve Capacity to a Scheduled Generator that breaches the outage rate threshold. However, if it does not exercise this option, it has no discretion to adjust the quantity of Capacity Credits to be assigned.

The current Market Rules do not have a mechanism for the IMO to consider the likely unavailability of the Scheduled Generator due to outages when determining the level of Certified Reserve Capacity to be allocated to the Facility.

Clause 4.11.1(a) refers to the 'IMO's reasonable expectation of the amount of capacity likely to be available...for Peak Trading Intervals on Business Days' between 1 October in Year 3 of the Reserve Capacity Cycle and 31 July in Year 4. Neither this nor any other clause specifies a minimum proportion of those Peak Trading Intervals during which the IMO should be able to reasonably expect that the capacity will be available.

Clauses 4.11.1(a), (b) and (g) place upper limits on the level of Reserve Capacity that the IMO may certify for a Facility, implying that a lower level may be assigned. However, other parts of the Market Rules including Appendix 3, and the Market Procedure for Certifying Reserve Capacity, imply a default level for Scheduled Generators that is the maximum sent-out capacity for the Facility within stated technical constraints and specific availability constraints (excluding outages) as identified by the applicant.

Under clause 4.12.3, the IMO must use the information described in clauses 4.10.1 and 4.25.12 to set the Reserve Capacity Obligation Quantity to apply to a Facility in each Trading Interval. The Reserve Capacity Obligation Quantity to apply to a Facility may differ between Trading Intervals. The information that must be provided by the applicant under clause 4.10.1 of the Market Rules includes previous and expected outage rates for the Facility as well as other restrictions on availability.

In effect, the existing Market Rules require the IMO to consider the availability of a Scheduled Generator in assessing how many Capacity Credits the Facility will be obliged to provide, but do not permit the IMO to consider availability when assessing the number for which it will be paid.

The proposed change to clause 4.11.1(h) would provide the IMO with three options in assessing applications for Certified Reserve Capacity for Facilities meeting the criteria in clause 4.11.1(h):

- assign no Certified Reserve Capacity to the Scheduled Generator;
- assign the full quantity of Certified Reserve Capacity to the Scheduled Generator under clause 4.11.1(a), subject to the other conditions of clause 4.11 being met; or
- assign a specified quantity of Certified Reserve Capacity to the Scheduled Generator that is greater than zero but less than the quantity that would be assigned if clause 4.11.1(h) did not apply.

Implementation: This measure could be implemented immediately.

3.2.2 Proposal 2 – Clarify the factors to be considered by the IMO in applying clause 4.11.1(h)

The Market Rules do not specify the purpose of clause 4.11.1(h) and do not provide guidance to the IMO in identifying and weighting the factors to be considered in the exercise of its discretion under this clause.

The proposed change to clause 4.11.1(h) of the Market Rules will specify, at a high level, the factors the IMO is to consider in deciding whether to exercise its discretion to not assign Certified Reserve Capacity to a Scheduled Generator with an excessive level of unavailability, or to assign a specified reduced quantity. It will also clarify the additional sources of information that the IMO may consult in obtaining the information necessary for its decision. These matters will be expanded in changes to the Market Procedure for certifying Reserve Capacity.

The IMO must be satisfied that its decision would not be contrary to the public interest having regard to the Market Objectives. Factors to be considered by the IMO in making its decision will include, but not be limited to:

- (a) the extent to which the Reserve Capacity that can be provided by the Facility is necessary to meet the Reserve Capacity Target;
- (b) whether the Reserve Capacity provided by the Facility is of critical importance to the SWIS, having regard to:
 - i. the size of the Facility;
 - ii. the operational characteristics of the Facility;

- iii. the extent to which the Facility contributes to the security of the system through fuel diversity;
- iv. the reliability trends of the Facility;
- (c) whether a refusal to assign Certified Reserve Capacity to the Facility is likely to result in a material decrease in competition in at least one market;
- (d) the extent of the net public benefit associated with assigning Certified Reserve Capacity to the Facility, in the context of the probable availability of its capacity to the energy market and the quantity of alternative Reserve Capacity likely to be available from Facilities to which the criteria in clause 4.11.1(h) do not apply;
- (e) assurances and evidence provided by the applicant concerning the effectiveness of its strategy to maximise the availability of the Facility in the relevant Capacity Cycle consistent with good industry practice; and
- (f) other relevant matters at its discretion.

The IMO will be able to take into account a range of information to assist it in assessing the factors above and making its decision, including:

- (a) the extent to which the outage rates of the Facility exceed the thresholds set out in clause 4.11.1(h) and the total period over which they have been exceeded;
- (b) relevant and accessible indicators of the reliability and availability of the Facility, including but not limited to the Equivalent Demand Forced Outage Rate (EFORd)³;
- (c) the causes of the outages in the previous 36 months, and whether the Planned Outages taken have demonstrably improved the availability trend of the Facility;
- (d) the proportion of Planned Outages classified as Opportunistic Maintenance and the number of Planned Outages that were taken at short notice;
- (e) the measures that the Market Participant has taken, is taking and proposes to take to improve the availability of the Facility, and the demonstrated or probable effectiveness of those remedial measures in reducing the level of outages in the Facility;
- (f) the accuracy of any previous predictions made by the applicant concerning the availability performance of the Facility;
- (g) the findings of an independent auditor as reported to the IMO under the proposed performance monitoring provisions in clause 4.27;

³ This is not a generation performance indicator currently used in the WEM, but is becoming one of the major international performance indicators, particularly in deregulated markets. It is a measure of the probability that a generating unit will not be available due to forced outages or forced de-ratings when there is demand on the unit to generate. (Note the term 'forced outage' here is used according to the standard IEEE definition and refers to any condition requiring removal or partial removal of the unit from service that cannot be deferred beyond the end of the following weekend.)

- (h) the applicant's documented maintenance schedule for the Facility, its monthly Planned Outage program for the next 36 months, and the extent to which this varies from the expected outage rates of the Facility based on manufacturer data;
- (i) the expected number of days of Planned Outages to be taken by the Facility in the period 1 October of Year 3 and 31 July of Year 4 of the relevant Capacity Cycle, and the reasons for them;
- (j) whether or not the outages of the Facility are compromising, or are likely to compromise, the ability of the Facility to contribute to the security and reliability of the SWIS; and
- (k) whether or not the outages of the Facility appear to be reducing the level of competition or to be correlated with price spikes in the energy markets.

In making its decision, the IMO may consult on any relevant matter with System Management, an independent auditor commissioned in relation to a performance monitoring regime established under proposed changes to clause 4.27, and/or may seek the advice of an appropriately qualified independent expert, acceptable to the applicant and at the applicant's expense. The IMO will be required to document and publish the reasons for its decision.

Implementation: This measure could be implemented immediately.

3.2.3 Proposal 3 – Tighten the outage rate thresholds under clause 4.11.1(h)

The threshold outage criteria in clause 4.11.1(h) were set at a time when the average Forced Outage Factor of SWIS-connected conventional generation was around 4% and the Planned Outage Factor was approximately 10% (equating to an Availability Factor of 86%). At that time, Availability Factors for conventional generation plant in WA had been mostly in the range 85-92% for the previous decade.

A total outage factor of >30% was (and still is) indicative of the worst-performing decile of thermal generating plant by comparison with international benchmarks. It is likely that the original designers of this clause considered it improbable that the threshold would be breached by a Scheduled Generator in normal commercial operation.

This proposal will add a provision to clause 4.11.1 to progressively tighten the combined outage rate threshold in clause 4.11.1(h) from 30% to 20% over five years, with a corresponding change in the Forced Outage rate threshold.

The following glide path is proposed:

Year of glide path	Forced Outage rate greater than	Combined Planned Outage rate and Forced Outage rate greater than
0	15%	30%
1	14%	28%
2	13%	26%
3	12%	24%

4	11%	22%
5	10%	20%
Thereafter	subject to review	subject to review

The IMO will undertake a review, to be completed by 31 December of year 4, of the operation of clause 4.11.1(h) and the merits of further amending the outage thresholds in clause 4.11.1(h). The review will consider:

- the availability performance of the WA generation sector compared with generating plant in other markets, using IEEE Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability, and Productivity (IEEE 762) or an appropriate equivalent;
- the number of Scheduled Generators in the SWIS to which the criteria in clause 4.11.1(h) have applied in each of the previous five years;
- the number of times in the previous five years that the IMO has exercised its discretion under clause 4.11.1(h) to assign no Certified Reserve Capacity or a reduced level of Certified Reserve Capacity to Scheduled Generators to which the criteria in clause 4.11.1(h) have applied;
- the number of Scheduled Generators to which a Reserve Capacity Performance Adjustment has been applied in each of the previous five years, and the number that have been liable for Reserve Capacity Performance Adjustments in successive years, and
- such other relevant matters as the IMO Board agrees

Implementation: This measure will require some notice to Market Participants. The Capacity Year of 2015/16 is proposed as Year 0.

3.2.4 What these proposals aim to do

- Replace the current all-or-nothing approach of clause 4.11.1(h) of the Market Rules with more flexibility for the IMO, allowing the IMO to acknowledge the contribution to the Reserve Capacity Target made by Scheduled Generators with poor availability, while reflecting the lower value of this contribution to the energy market and system security compared with more reliable Facilities in the same class;
- Provide parameters that allow the IMO to take into account the importance of the Scheduled Generator to the system, the probable reliability of the Facility, the value of its availability in the market and the potential impact on competition and energy markets of not allocating Certified Reserve Capacity to the Facility;
- Specify that the IMO may seek information from a variety of sources as necessary in making its decision under clause 4.11.1(h);
- Broaden the focus of the Reserve Capacity Mechanism beyond system security to include energy market efficiency;
- Provide an incentive to the worst-performing Scheduled Generators to raise their standards of availability;
- Reduce the incentives for Market Participants to retain unreliable and inefficient generation assets, and

- Reverse the downward trend in average WA generation availability (see Figure 1 in this paper) by progressively raising standards.

3.2.5 Impact and effectiveness of the measure

Affected Market Participants will see a reduction in revenue associated with a lower level of Capacity Credits being allocated to the low-availability Scheduled Generators they control. This should provide a greater incentive to maximise availability.

Net financial impact on the market –

- **Downward competitive pressure on energy prices if previously unavailable capacity is bid into the market as a result of the incentive.**
- **Potential reduction of the risk of price spikes resulting from a supply security event.**
- **Short Run Marginal Cost of older generators may increase to meet new availability standards, with a reflection in energy prices.**

Net economic impact on the market –

- **Potentially positive as a result of reduction of cross subsidies between Market Participants and improvement of availability due to the incentive.**
- **Potentially greater value for money if Reserve Capacity allocation better aligned with capacity availability.**
- **Potentially positive as an incentive to have efficient and reliable generation facilities.**

3.2.6 Challenges, risks and mitigation

Potential Risks and Challenges:

- Past performance may not be an accurate predictor of future performance.
- Allocation of a level of Certified Reserve Capacity may be seen as arbitrary.
- A Facility's three-year average may be affected by a single large outage event.
- The effectiveness of the measures will depend on Market Participants' expectations of the IMO's interpretation and application of clause 4.11.1(h).
- The loss of capacity revenue may affect the viability of the Market Participant.
- The incentive may be inadequate to improve the performance or bring forward the retirement of old Scheduled Generators with low fixed costs.
- Reserve Capacity may fall to unacceptable levels due to retirement of old Scheduled Generators without replacement.
- Overly stringent availability criteria may not be cost effective or economically efficient.

Mitigation Measures

- The IMO may seek additional information from the applicant, including the applicant's own expectations of the Scheduled Generator's outage performance, consult System

Management and independent expertise, and consider a variety of factors in making its decision under clause 4.11.1(h).

- Closer monitoring of an individual Scheduled Generator's performance by the IMO (see proposal 4 of this paper) would provide additional supporting evidence for its decisions.
- Past outage performance becomes more accurate as a predictor of future performance when trends over multiple years are considered, because the impact of single events is reduced. Outage rates over a 36 month period that are well in excess of standard industry practice indicate a chronic deficiency in reliability and ineffective remediation measures.
- A strong evidentiary base backed with broader information sources, transparent methodology and clear criteria will guide the IMO in its decisions under clause 4.11.1(h).
- The IMO will document and publish its reasons for its decision.
- The IMO will have discretion to take into account atypical events that could not reasonably have been foreseen by a competent Facility operator acting in accordance with good industry practice.
- The financial impact of the IMO's Reserve Capacity allocation decision under clause 4.11.1(h) is not experienced by the Market Participant until more than two years later, allowing time to adjust budgets, contracts and business plans.
- A reduction in a Market Participant's Certified Reserve Capacity in one Capacity Cycle could be reversed in the next Capacity Cycle if the Scheduled Generator's availability improved sufficiently to raise the 36 month average above the threshold in clause 4.11.1(h).
- If capacity revenue appears to operate as an incentive to retain Scheduled Generators with substandard availability despite the tightening outage criteria, the IMO may need to consider establishing a performance floor as a future option. This would require a change to clause 4.8.1 to ensure that Market Participants may not apply for Certified Reserve Capacity for Scheduled Generators with a five-year Equivalent Availability Factor (by industry standard definition) of less than a specified minimum.
- The inbuilt incentives in the Reserve Capacity Mechanism should operate to entice additional generation investment when needed if high-maintenance Facilities are retired, although a decision to retire without replacement tends to be a last resort for generating businesses. Some coal-fired generators in the NEM experienced very low capacity factors in 2012 without triggering retirement, although some have instituted seasonal shut-downs.
- Regular benchmarking of WA generation against industry standards should ensure that the criteria remain realistic and justifiable. Most existing Facilities in the SWIS have combined outage rates well below the 20% glide path end-point and would not be affected.

3.2.7 Assumptions

The quantity of Capacity Credits held by a Scheduled Generator should reflect its ability and willingness to make that capacity available to the energy market and contribute to efficient market outcomes.

A multi-year performance trend is a reasonable indicator of future performance unless the operator of the Facility has changed its strategy or undertaken a major reliability improvement in the Facility.

Claims that a high Planned Outage Rate over 36 months has effectively improved the overall availability of the Scheduled Generator should be substantiated through observable performance trends or independent audit.

If the Facility's outage record is poor, the onus of proof should be on the Market Participant to demonstrate that the Facility can maintain an acceptable level of availability in the Capacity Year for which it is seeking Certified Reserve Capacity.

Appropriate and comparable benchmarking data is well-established internationally over the long term, although standardised performance indicators for WA generation will need to be agreed.

3.3 Changes to clause 4.27 of the Market Rules

Clause 4.27 provides the potential for greater scrutiny and intervention by the IMO regarding Scheduled Generators with excessive Planned Outage rates. The effectiveness of this clause is severely limited by being triggered only if *'the number of days in the preceding 12 months where the total available capacity in the SWIS dropped below 80% (during the Hot Season), and 70% (in either the Intermediate Season or Cold Season), of the total Capacity Credits held by Market Participants for more than six hours'* exceeds 40 days to trigger clause 4.27.3 and 80 days to trigger clause 4.27.9. If the system availability criterion is met, then clause 4.27.3 provides:

4.27.3. If the number of days determined in accordance with clause 4.27.2 exceeds 40, then the IMO must require reports to be filed by those Market Participants holding Capacity Credits for each Facility which:

- (a) has been unavailable due to Planned Outages for more than 1000 hours during the preceding 12 calendar months; and*
- (b) has not been included in such a report during the preceding 12 calendar months.*

4.27.4. The reports described in clause 4.27.3 must include:

- (a) explanations of all Planned Outages taken by the Facility in the preceding 12 calendar months;*
- (b) a statement of the expected maximum number of days of Planned Outages to be taken by the Facility in each of the next 24 months commencing from the month in which the report is requested, including adequate explanation to make clear the reason for each Planned Outage; and*
- (c) measures proposed by the Market Participant to increase the availability of the Facility.*

4.27.5. A Market Participant must provide a report described in clause 4.27.3 to the IMO in a format specified in the Reserve Capacity Procedure within 20 Business Days of being requested to do so.

Clause 4.27.7 permits the IMO, at its discretion, to limit the number of Planned Outage days that may be taken in the next 24 months if it considers that the Market Participant's proposed rate is unjustified based on good industry practice.

If the 80 day criterion is met, clause 4.27.9 requires the IMO to cease adjusting Reserve

Capacity Obligation Quantities for the Scheduled Generators meeting the criteria in clause 4.27.3 once they exceed the number of days of Planned Outage predicted by the Market Participant or determined by the IMO.

3.3.1 Proposal 4 – Provide for independent performance monitoring for Facilities taking excessive Planned Outages

The IMO does not have any discretion to apply clauses 4.27.3 – 4.27.9 unless the total system available capacity reduction threshold is met. This threshold has not been met since the commencement of the market, and the probability of it being met in the future is negligible. The current Market Rule also allows only for a one-off report not more than annually from an eligible Facility.

This level of scrutiny is inadequate for effectively monitoring the performance of individual Scheduled Generators with unacceptably high outage rates. The unavailability of these Scheduled Generators has implications for the efficiency of the energy market that is unrelated to the level of total system capacity availability as measured in clause 4.27.2.

This proposal will amend clause 4.27 to:

- Add a new clause 4.27.3A to provide the IMO with the discretion to require reports from a Market Participant holding Capacity Credits for a Scheduled Generator breaching a Planned Outage Rate threshold, proposed to be 1,750 equivalent Planned Outage hours (about 20%), regardless of the availability of total system capacity;
- Add a new sub-clause 4.27.7(b) to allow for the IMO, if it believes that the Planned Outage hours proposed by the Market Participant for the next two years to be inconsistent with good industry practice, to mandate the appointment of an independent auditor by the IMO, to undertake a performance monitoring program, at the Market Participant's expense, until the eligible Scheduled Generator's outage performance returns to acceptable levels;
- Add a new clause 4.27.7A to set out the parameters of the performance monitoring regime as described below.

If the IMO mandates an independently audited performance monitoring regime for a Scheduled Generator, then it will consult with the Market Participant holding the Capacity Credits prior to appointing a mutually acceptable independent auditor with appropriate expertise to:

- (a) Provide an initial report to the IMO within one month that includes:
 - i. A comparison of the performance of the Facility over the last three years with similar plant in other markets;
 - ii. Details of the Market Participant's long term maintenance strategy for the Facility and assessment against standard industry practice;
 - iii. Details of the 12-month maintenance plan for the Facility and commentary on its contribution to the long term maintenance strategy and improved availability of the Facility; and.
- (b) Provide a quarterly review to the IMO within one month of the end of each quarter that includes:

- i. An assessment of all outages within the quarter to:
 - Compare the outages with the long term maintenance strategy and 12 month outage plan;
 - Assess the improvement to the availability of the Facility that will result from each Planned Outage taken within the quarter;
 - Determine whether each outage was appropriately classified as a Planned or a Forced Outage consistent with industry standard definitions and the Market Objectives.
- ii. An update of the historic rolling 36-month Forced Outage rate and Planned Outage rate for the Facility;
- iii. A forecast of the expected change to the outage rate for the Facility, over the next three years, based on the outages taken during the quarter and the future maintenance plans; and
- iv. A site visit report.

The independent auditor will be required to visit the Facility at least once each quarter, with at least two visits per year to coincide with a Planned Outage. The IMO will be required to provide the Market Participant with copies of the auditor's reports, and to consider the Market Participant's response to the auditor's findings. The IMO will be required to consult with System Management on the implications of the auditor's reports and the Market Participant's response.

The performance monitoring regime would be terminated when the Scheduled Generator, in the opinion of the IMO and the independent auditor, achieved a sustained availability performance standard agreed between the IMO and the Market Participant.

Implementation: This measure could be implemented immediately.

3.3.2 What this proposal aims to do

- Decouple Scheduled Generator performance reporting from the availability of total system capacity.
- Impose a higher level of scrutiny, at the IMO's discretion, on individual Scheduled Generators undertaking a high level of Planned Outages.
- Extend the one-off report requirement currently provided for in clause 4.27.3 to allow for a regular performance monitoring regime with quarterly reports from an independent auditor until the Scheduled Generator returns to an outage rate consistent with good industry practice or achieves agreed performance standards.
- Provide additional detailed data on individual Facilities to inform the decisions of the IMO under clause 4.11.1(h) if a monitored Scheduled Generator applies for Certified Reserve Capacity.
- Enable the IMO to warn Market Participants if the Forced Outage Rate or combined outage rates of a monitored Facility approach the level that would trigger clause 4.11.1(h) in the next Reserve Capacity Cycle.

3.3.3 Impact and effectiveness of the measure

The additional information collected through the performance monitoring mechanism will greatly strengthen the evidentiary base on which the IMO will make decisions under clause 4.11.1(h) if that Scheduled Generator applies for Certified Reserve Capacity.

Net financial impact on the market –

- **Minimal because most costs will be borne by the Market Participant responsible for the Scheduled Generator concerned.**

Net economic impact on the market –

- **Positive if monitoring results in more efficient operation of the Scheduled Generator and higher availability of its capacity in the energy market.**
- **Positive through a stronger base for IMO decision making on the allocation of Certified reserve Capacity to low-availability Scheduled Generators.**

3.3.4 Challenges, risks and mitigation

Potential Risks and Challenges:

- Intensive monitoring of all Scheduled Generators taking more than 1,000 hours of Planned Outages in 12 months (clause 4.27.3 criterion) is unlikely to be cost effective.
- Market Participants will incur additional costs for performance monitoring.
- The need to assess monitoring reports will place pressure on IMO resources.
- Information provided with respect to the Facility may not be reliable.
- Commercially confidential information about a Scheduled Generator or Market Participant's business model may be disclosed.
- The costs associated with performance monitoring are unlikely to provide a strong incentive to a Market Participant to improve a Scheduled Generator's outage rates.

Mitigation Measures:

- Set the level of Planned Outages triggering the IMO's consideration of whether to require a report and potentially a performance monitoring regime at a less stringent level:
 - 30% Planned Outage Rate in the previous 12 months (2,628 equivalent hours) – five Scheduled generators currently breach this threshold; or
 - 20% Planned Outage Rate in the previous 12 months (1,750 equivalent hours), is proposed. This level is intermediate between the existing clause 4.27.3 criterion and the clause 4.11.1(h) criterion (eight Scheduled Generators currently breach this threshold).
- Exempt atypical events such as major overhauls required under manufacturers' recommended maintenance schedules from the calculation of annual Planned Outage hours.
- The first level of the IMO's discretionary response to high Planned Outage Rates would be a report from the Market Participant as described in clause 4.27.4, with the IMO having the

discretion whether to impose an independent performance monitoring regime on eligible Facilities after considering the report.

- IMO could exercise its discretion to limit intensive monitoring to those Scheduled Generators that the IMO considers have the greatest impact on the market when they are unavailable.
- Commissioning, at the Market Participant's expense, a mutually acceptable independent expert to undertake the performance monitoring should instil confidence in the reliability of the information.
- The IMO may additional opinions from System Management and other qualified experts.
- Outage rates for individual Scheduled Generators are already public information. Operational detail would be subject to the confidentiality arrangements that apply to other commercially sensitive information provided by Market Participants to the IMO.
- The reputational risk of scrutiny and of having substandard performance reported may be an incentive to Market Participants to initiate improvement.

3.3.5 Assumptions

Effective asset management strategies can be expected to already record the information required by the IMO. The additional cost to affected Market Participants would therefore be limited to the independent verification and assessment.

The current non-discretionary requirement for the IMO to take action when the system capacity availability is significantly impaired would be retained, although the probability of this criterion being met is extremely low.

3.4 *New Performance Adjustment as an incentive to maximise Scheduled Generator availability*

Under the current Market Rules, the only sanction available to the IMO to apply to a Scheduled Generator with total outage rates greater than the threshold in clause 4.11.1(h) is the potential refusal by the IMO under that clause to allocate Certified Reserve Capacity.

3.4.1 *Proposal 5 – Establish a Reserve Capacity Performance Adjustment*

This proposal will introduce an additional incentive to low-availability Scheduled Generators to improve their availability. It will apply a Reserve Capacity Performance Adjustment based on their total outage rate for the previous 36-month period, for Scheduled Generators breaching the threshold specified in clause 4.11.1(h).

It is proposed that if a Scheduled Generator meets the criteria in clause 4.11.1(h)(i) over a given 36 months, then the Market Participant holding Capacity Credits for that Facility would be required to pay a Reserve Capacity Performance Adjustment for the Facility in the following year.

The Reserve Capacity Performance Adjustment payable by a Market Participant for an eligible Facility would be calculated by multiplying:

the total number of Capacity Credits allocated to the Facility for the Capacity Year

by the combined Planned Outage rate and Forced Outage rate for the Facility for the previous three years,

then multiplying the product by the Reserve Capacity Price for the current year,

In each year that the Facility breaches the outage thresholds stated in clause 4.11.1(b):

$$\text{FRCPA}_{y4} = (\text{TCC}_{y4} \times \text{EUF}_{y1-y3} \times \text{RCP}_{y4})$$

Where:

FRCPA is the Facility Reserve Capacity Performance Adjustment for to be paid in that year by the Market Participant holding Capacity Credits for the eligible Facility;

TCC is the total Capacity Credits allocated to the Facility for that year;

EUF is the Equivalent Unavailability Factor for the eligible Facility, equal to the combined Planned Outage rate and Forced Outage rate for the Facility for the previous three years calculated in accordance with the Power System Operation Procedure;

RCP is the Reserve Capacity Price for that year calculated in accordance with clause 4.29.1(c).

The maximum Facility Reserve Capacity Performance Adjustment that can apply to an eligible Facility would be the multiple of the Capacity Credits assigned to that Facility and the Reserve Capacity Price. The funds collected from Reserve Capacity Performance Adjustments would be distributed in the same manner as Reserve Capacity Deficit Refunds.

Setting the Reserve Capacity Performance Adjustment at the actual combined outage rate of the Facility, not the amount by which it breached the threshold, will maximise the financial incentive to reduce outage rates.

- For example, a Market Participant may hold 100 MW of Capacity Credits for a Scheduled Generator with a combined Planned Outage rate and Forced Outage rate over the previous 36 months of 40%. A 40% Reserve Capacity Performance Adjustment would be applied to the Facility in the subsequent year.
- The Market Participant holding the Capacity Credits for the Facility would be required to pay a Reserve Capacity Performance Adjustment for the Facility of (100MW x 0.4 x Reserve Capacity Price for that year),.

The IMO would have discretion to waive the Reserve Capacity Performance Adjustment for an individual Facility if the Market Participant could demonstrate that its high outage rate was due to exceptional circumstances and the Performance Adjustment would unfairly disadvantage it.

The application of the Reserve Capacity Performance Adjustment would be independent of whatever decision the IMO made under clause 4.11.1(h), although the same outage rate threshold would be used to determine eligibility.

This proposal would require a new Market Rule to establish a mechanism for the Reserve Capacity Performance Adjustment.

Implementation: This measure may need a transition period to enable Market Participants to manage their potential liability for Scheduled Generators for which they hold Capacity Credits.

3.4.2 What the proposal aims to do

- Impose a Performance Adjustment to recognise that the Scheduled Generator had received Reserve Capacity revenue over a three year period for capacity that it had not made available to the market at an acceptable level. Consequential Outages would not be included.
- Send an immediate financial signal to Market Participants holding Capacity Credits for Scheduled Generators, that part of their revenue associated with Certified Reserve Capacity will be at risk if their Facility's outage rates exceed the total outage rate threshold specified in clause 4.11.1(h).
- Complement the current incentive in clause 4.11.1(h), which, at the IMO's discretion applies a consequence that lags the behaviour by more than two years, with a more immediate financial consequence for poor outage performance over multiple years.
- Provide a stronger financial incentive for Market Participants to maintain the availability of their Scheduled Generators consistent with good industry practice.
- Eliminate the current cross subsidy inherent in having Scheduled Generators entitled to the same capacity revenue regardless of how frequently they make that capacity available to the energy market.

3.4.3 Impact and effectiveness of the measure

This measure has the advantage that the consequence of poor performance is experienced in the year immediately following the performance failure.

Net financial impact on the market –

- **Neutral in that the funds collected from the Reserve Capacity Performance Adjustment would be reallocated among Market Participants.**
- **The cost of revenue retrieval from Facilities subject to Performance Adjustment would be minimal if integrated with existing refund mechanisms.**
- **Positive impact on energy prices if incentive leads to previously unavailable capacity being bid into the market.**

Net economic impact on the market –

- **Positive due to removal of cross subsidies and improvement in availability due to incentive.**

3.4.4 Challenges, risks and mitigation

Potential Risks and Challenges:

- Market Participants with poorly performing Facilities may target the achievement of a combined outage rate just below the threshold to avoid the Performance Adjustment. This would still deliver an unacceptable availability level for the market.
- Market Participants may be tempted to under-report outages.
- A Market Participant may be penalised twice for the same outages if it has already paid Reserve Capacity Deficit Refunds for the Forced Outage component of its total outages over the three years.
- A single large outage event may push the Scheduled Generator over the threshold.
- The Reserve Capacity Price applied to the Performance Adjustment calculation may vary significantly from the Reserve Capacity Price or bilateral trade price received by the Market Participant in the years in which its outage rates were high.
- The financial viability of a Market Participant may be affected by the Performance Adjustment.

Mitigation Measures:

- The proposed progressive tightening of availability performance thresholds in clause 4.11.1(h) will ensure improvement even if Market Participants target minimally complying performance.
- System Management is responsible for monitoring compliance with outage notification requirements. If breaches occur, more stringent monitoring and increased penalties may be required.
- Allowing the amount already paid on behalf of the Scheduled Generator in Facility Reserve Capacity Deficit Refunds to be offset against the Reserve Capacity Performance Adjustment liability could eliminate the risk of losing capacity revenue twice for the same outages.
- A Scheduled Generator at risk of having a Reserve Capacity Performance Adjustment imposed may already be subject to increased performance monitoring by the IMO, which will warn it about the emerging risk of a Performance Adjustment.
- Eligibility for a Reserve Capacity Performance Adjustment is based on a high outage rate over three consecutive years, reducing the impact of any single large outage event.
- The mechanism would include IMO discretion to exclude exceptional events from outage calculations for the purposes of the Performance Adjustment.
- The variation of the Reserve Capacity Price on which the Performance Adjustment is based from the price that was earned by the Scheduled Generator during the periods of unavailability may affect the Market Participant either positively or negatively
- A long lead time for the implementation of this measure will provide a transition period for potentially affected Market Participants to adjust their outage strategies and business models to mitigate the risk of having a Reserve Capacity Performance Adjustment imposed.

4 ADDITIONAL OPTIONS FOR FUTURE CONSIDERATION

4.1 Reduce the number of outages for which Reserve Capacity Obligation Quantities can be adjusted

Clause 4.12.6(b)

4.12.6 (b) *subject to clause 4.27.9, during Trading Intervals where there is a Consequential Outage or a Planned Outage for a Facility provided to the IMO by System Management in accordance with clause 7.3.4, the IMO must reduce the Reserve Capacity Obligation Quantity for that Facility, after taking into account any adjustments in accordance with paragraph (a), to reflect the amount of capacity unavailable due to that outage;*

This clause protects Market Participants holding Capacity Credits for those Scheduled Generators from the Reserve Capacity Deficit Refund which would otherwise apply under clause 4.26 to a Facility failing to deliver its Reserve Capacity Obligation Quantities in any Trading Interval.

The protection that clause 4.12.6(b) provides for unreliable Scheduled Generators is significantly increased by the very broad definition of Planned Outages, defined in clause 3.19.11 as any outage that is approved by System Management. In addition:

- Clause 3.18.5 allows Market Participants to submit an Outage Plan to System Management for approval with no more than two days' notice prior to the proposed commencement of the outage.
- Clause 3.19.2 allows Market Participants to seek System Management's approval for unscheduled Opportunistic Maintenance with as little as one hour's notice for an outage confined to a single Trading Day, for minor maintenance that does not require changes to scheduled energy or ancillary services. Opportunistic Maintenance is specifically classified as a Planned Outage under clause 3.19.11.

Clause 4.27.9 requires the IMO to limit Planned Outage rates in specific circumstances:

4.27.9. *If the number of days determined in accordance with clause 4.27.2 exceeds 80 then the IMO must:*

- notify all Market Participants that this has occurred; and*
- the 12 months commencing from the first Trading Day of the following month, cease to adjust Reserve Capacity Obligation Quantities under clause 4.12.6(b) in response to Planned Outages for Facilities:*
 - referred to in clause 4.27.3; and*

- ii. *for which the number of days of Planned Outage during that 12 month period has exceeded the total number of days of Planned Outage predicted for that 12 month period in accordance with clause 4.27.4(b), as modified by clause 4.27.8.*⁴

As with the performance monitoring provisions in the existing clause 4.27.3, clause 4.27.9 is ineffective in practice because of the negligible probability of the total system capacity availability criterion being met.

4.1.1 Proposal to limit the hours of Planned Outages that can be claimed as a reduction of Reserve Capacity Obligation Quantity

The effect of the existing clause 4.12.6(b) is to grant Scheduled Generators an unlimited entitlement to have their Reserve Capacity Obligation Quantity reduced for the Trading Intervals during which their capacity is unavailable due to Planned Outages.

This is the specific clause that provides the perverse incentive to Scheduled Generators to maximise Planned Outages (which attract no penalty) as a measure to mitigate the risk of Forced Outages, which are heavily penalised under clause 4.26. This clause is a key enabler for the low availability trends displayed by some Scheduled Generators.

Clause 4.12.6(b) does not take into account the potential significant negative impact on the efficiency of the energy market of allowing Scheduled Generators an unlimited right to withdraw their capacity from the market without risking their capacity revenue.

If the proposals described in section 3 of this paper are not sufficiently effective in reducing excessive outage rates, then a broader limitation may be needed in Clause 4.12 to place an upper limit on the number of Trading Intervals in a year for which the Reserve Capacity Obligation Quantity for a Facility may be reduced under clause 4.12.6(b) for Planned Outages.

A Scheduled Generator's Planned Outages in excess of the limit may then attract liability for Reserve Capacity Deficit Refunds under clause 4.26. Once the Planned Outage limit is exceeded by a Scheduled Generator, there will be no differentiation between Planned Outages and Forced Outages for the purposes of clause 4.26, although Consequential Outages will still be claimable as a reduction in Obligation Quantities.

The upper limit Planned Outage Rate is proposed to be set at a level unlikely to be breached by a Scheduled Generator operating in accordance with good industry practice, other than in years when an infrequent long Planned Outage may be scheduled to undertake major testing, inspection or overhauls recommended by the manufacturer as part of a formal maintenance schedule.

If this change is progressed, Market Participants would be able to seek pre-approval for exemption of major scheduled Planned Outages required to comply with manufacturers' recommended maintenance schedules for their Facilities.

⁴ Clauses 4.27.7 and 4.27.8 permit the IMO to limit the number of days of Planned Outages in each of the subsequent 24 months, that may be taken by a Scheduled Generator required to report under clause 4.27.3.

The application to the IMO to exempt a Planned Outage from the limit would need to be made well in advance of the proposed commencement of the relevant Planned Outage. The IMO would be able to request supporting information from the Market Participant, consult with System Management and seek appropriately qualified advice in considering such a request, but would not unreasonably refuse a request to exempt a qualifying outage event.

A more targeted alternative would be to amend clause 4.27.9 to make it applicable to Scheduled Generators subject to the performance monitoring provided for in the proposed new clause 4.27.3A.

4.1.2 What this proposal would aim to do

- Apply to Facilities to which Reserve Capacity Obligation Quantities have been assigned and which take Planned Outages in excess of standard industry practice.
- Expose a Market Participant under clause 4.26 to the risk of Reserve Capacity Deficit Refunds for a Scheduled Generator for Planned Outages in excess of a limit aligned to standard industry practice.
- Reduce the incentive for a Market Participant to minimise Forced Outages through excessive use of Planned Outages by applying consequences to the excess.
- Reduce the incentive to retain high-maintenance Scheduled Generators that can operate reliably only by making use of excessive Planned Outages.
- Provide an early warning to Scheduled Generators with declining availability due to excessive Planned Outages, to encourage them to take remedial action prior to breaching the outage criteria set out in clause 4.11.1(h).
- Differentially affect Scheduled Generators with inefficient Planned Outage strategies – the treatment of Forced Outages and Consequential Outages would not change.
- Allow justified exemptions from the limit for major scheduled outages such as inspections, testing and overhauls that must be undertaken to comply with a manufacturer's recommended maintenance schedule.

4.1.3 Impact and effectiveness of the measure

The immediacy of the consequence would be a key benefit of this option and would provide a strong financial incentive to Market Participants to plan outages well in advance and to use them effectively.

This option would send a weaker signal to Market Participants than the Reserve Capacity Performance Adjustment option described above, as it would apply only to Planned Outages above the defined limit, not to the total outage rate.

Combining the measures would deliver a strong incentive to reduce total outage rates, with the Performance Adjustment effectively then removing the protection provided by clause 4.12.6(b) for Planned Outages below the limit, although a mechanism may be needed to account for any amount already paid as Reserve Capacity Refunds in assessing the Reserve Capacity Performance Adjustment.

Net financial impact on the market –

- **Potentially some cost in processing an increased number of Reserve Capacity Deficit Refunds.**
- **Potentially a positive impact on energy prices and a reduced risk of price spikes if previously unavailable capacity is bid into the market.**
- **Possible short-term negative price impact if incentive leads to retirement of Scheduled Generators unable to reduce their Planned Outage Rate.**

Net economic impact on the market –

- **Positive due to removal of cross-subsidies and improvement in availability due to incentive.**

4.2 Align the generation performance indicators used in the Market Rules with international standards

The definitions of Forced Outages, Planned Outages, Forced Outage Rates and Planned Outage Rates in the Market Rules vary significantly from the generation availability performance indicators used by international benchmarking bodies and other markets. This complicates benchmarking of either generating Facilities or the generation sector of the system against broader industry standards. The outage definitions in the WEM may also reduce the effectiveness of some market incentives.

For example, the Market Rules have a simple definition that Planned Outages are any outages for which System management has given permission and Forced Outages are outages that are not approved by System Management. Industry standard definitions by contrast mostly define Forced Outages by the urgency with which a unit must be removed from service for work to be done, which is a more accurate measure of the reliability of a unit for planning purposes. In the Market Rules, Forced Outage Rates are defined in terms of period hours rather than service hours, as is the usual definition. In the Market Rules, outage rates are also defined in terms of Capacity Credits held rather than Facility capacity, which may be problematic if Certified Reserve Capacity does not equal maximum sent-out capacity.

It is recommended that consideration be given to aligning the definitions of generation availability indicators with international standards, such as the IEEE Standard Definitions for Use in Reporting Electric Generating Unit Reliability, Availability, and Productivity (IEEE 762) or equivalent appropriate derivations of these definitions used by major industry benchmarking bodies. The necessary data is already collected; only the classifications and indices would be affected.

5 CONCLUSION

The proposals described above have been considered by the IMO. The Board believes that they will introduce effective incentives to limit the number of hours that a Scheduled Generator is unavailable in the energy market, particularly when the unavailability is due to factors under

its control, such as Planned Outages.

This suite of measures re-establishes the linkage between the Reserve Capacity Mechanism and the efficiency of the energy market, and reinforces the market's expectation that the receipt of revenue from Certified Reserve Capacity carries with it an obligation to maximise the availability of the recipient's capacity to the market to the extent that it is capable, not merely to be available during times of highest annual peak demand.

Maximising the quantity of capacity that is available to the market provides a stronger buffer against the risk of price spikes should a quantity of capacity become unexpectedly unavailable and is also likely to reduce average prices through competitive pressure.

These initiatives will reduce the financial incentive for retaining high maintenance Scheduled Generators that depend on excessive Planned Outages to remain reliable when dispatched. This may encourage the retirement and replacement of inefficient, unreliable Scheduled Generators with more efficient and reliable plant, for the overall benefit of the customers who receive their electricity supply from the SWIS.

Providing for closer scrutiny of Scheduled Generators at risk of incurring outage-related sanctions will provide the IMO with more information to inform its decisions, particularly concerning applications for Certified Reserve Capacity from Scheduled Generators with poor availability performance. It will also allow the IMO to notify Market Participants of deteriorating performance prior to the application of sanctions such as loss of Certified Reserve Capacity or Reserve Capacity Performance Adjustments.

The IMO anticipates that these Market Rule changes will help to arrest the recent decline in the average availability performance of the WA generation sector, and potentially facilitate international generation performance benchmarking.

The mitigation of any increased financial risk to Market Participants with poorly performing Scheduled Generators is within the management control of those Market Participants, who will need to adjust their business models and asset management strategies to the new incentives. Lead periods for specific Market Rule changes will be considered to allow for affected Market Participants to plan for the transition.

The overall impact on the market is expected to be financially neutral to positive, and to deliver net economic benefits. Equity between competing Market Participants will be improved by the removal of cross-subsidies.

The above proposals are considered consistent with, and likely to facilitate the achievement of, the Market Objectives to *promote the economically efficient...and reliable production and supply of electricity, to encourage competition among generators....including by facilitating efficient entry, and to minimize the long-term cost of electricity supplied to customers.*

Other proposals are also provided for information and potential future consideration.