

**Call for Further Submissions:
Administrative Improvements to the Outage
Process (RC_2014_03)
Standard Rule Change Process**

6 January 2020

Contents

- 1. **Background**3
- 2. **Call for Further Submissions**3
- 3. **Overview of Proposed Changes**.....4
- 4. **Issues Requiring Additional Consultation**.....4
 - 4.1 Logging Forced and Consequential Outages in Advance5
 - 4.2 Outage Quantity Reporting and Capacity-Adjusted Outage Quantity Calculation..... 15
 - 4.3 Use of Outage Quantities in the Market Rules25
 - 4.4 Outage Rates27
 - 4.5 Consequential Outages Caused by Non-Equipment List Network Equipment28
 - 4.6 Reporting Forced Outages in SMMITS29
 - 4.7 Requesting Consequential Outages in SMMITS33
 - 4.8 Transitional Requirements36
- 5. **Proposed Amending Rules**.....36

List of Appendices

- Appendix A. Capacity-Adjusted Outage Quantities**.....45
- Appendix B. Use of Outage Quantity Types in the Market Rules**46
- Appendix C. Calculation of Outage Rates**54

1. Background

On 24 November 2014, the Independent Market Operator (**IMO**) submitted a Rule Change Proposal titled “Administrative Improvements to the Outage Process” (RC_2014_03). The Rule Change Proposal sought to implement changes to:

- increase the efficiency of processes used to report and manage Forced Outages and Consequential Outages in the Wholesale Electricity Market (**WEM**); and
- clarify processes relating to the determination and use of outage quantities.

The Rule Change Proposal is being processed using the Standard Rule Change Process, described in section 2.7 of the Market Rules.

The first submission period was held between 28 November 2014 and 30 January 2015. The IMO received submissions from Community Electricity, Perth Energy and System Management.

The timeframe for the publication of the Draft Rule Change Report was extended by the IMO on several occasions under clause 2.5.10; and has been further extended by the Rule Change Panel under clauses 1.18.3(b) and 2.5.10.

All documents related to this Rule Change Proposal can be found on the Rule Change Panel’s website at https://www.erawa.com.au/rule-change-panel/market-rule-changes/rule-change-rc_2014_03.

2. Call for Further Submissions

The Rule Change Panel invites interested stakeholders to make further submissions on this Rule Change Proposal, on the basis that:

- a significant period has passed since the IMO consulted on the Rule Change Proposal, during which the Market Rules have undergone numerous changes; and
- stakeholders should be given an opportunity to provide feedback on some additional issues identified by the Rule Change Panel that affect the Rule Change Proposal before the development of the Draft Rule Change Report.

While the Rule Change Panel seeks submissions on all aspects of the Rule Change Proposal, it seeks stakeholders’ views on the questions raised in section 4 of this paper in particular.

The further submission period is 14 Business Days from the publication of this notice. Submissions must be delivered to the Rule Change Panel by **5:00 PM on Friday 24 January 2020**.

The Rule Change Panel prefers to receive submissions by email, using the submission form available at <https://www.erawa.com.au/rule-change-panel/make-a-rule-change-submission> sent to Support@rcpwa.com.au.

Submissions may also be sent to the Rule Change Panel by post, addressed to:

Rule Change Panel
Attn: Executive Officer
C/o Economic Regulation Authority
PO Box 8469
PERTH BC WA 6849

3. Overview of Proposed Changes

In this Rule Change Proposal, the IMO sought to:

- remove the requirement for a Market Participant to provide a notice signed by an Authorised Officer to seek approval for a Consequential Outage;
- introduce the ability for Rule Participants to log a Forced Outage or Consequential Outage in advance of the outage occurring;
- amend clause 3.21.6 to make the calculation rules for capacity-adjusted outage quantities¹ consistent with current practice, including:
 - using the MW equivalent of the Capacity Credits assigned to a Scheduled Generator instead of its Reserve Capacity Obligation Quantity (**RCOQ**) in the calculations; and
 - requiring Market Generators to enter outage quantities into the System Management Market Information Technology System (**SMMITS**) on an as generated basis instead of a sent out basis;
- restrict the application of clause 3.21.6 to Scheduled Generators, and amend clause 3.21.5 to clarify how outage quantities should be calculated for Non-Scheduled Generators;
- require System Management to provide the IMO with outage quantities for each Scheduled Generator and Non-Scheduled Generator for each Trading Interval on a sent out basis at 15 degrees Celsius, in addition to the temperature-adjusted values provided for Scheduled Generators;
- clarify that the obligation for Rule Participants to provide “full and final details” of an Outage “no later than 15 calendar days following the Trading Day” applies separately to each Trading Day of the outage period; and
- make several minor grammatical and formatting amendments to improve the integrity of the Market Rules.

Full details relating to the Rule Change Proposal are available on the Rule Change Panel’s website. The following discussion assumes that the reader is familiar with the contents of the Rule Change Proposal.

4. Issues Requiring Additional Consultation

The Rule Change Panel has assessed the changes proposed in the Rule Change Proposal against the changes that have been made to the Market Rules since the Rule Change Proposal was submitted. The Rule Change Panel considers that the changes proposed in the Rule Change Proposal, if amended to reflect the current Market Rules, are still valid to be considered via the rule change process.

However, the Rule Change Panel has identified several issues that warrant additional consultation. A discussion of these issues, including specific matters on which the Rule Change Panel is seeking stakeholder input, is provided in sections 4.1 to 4.8 of this call for further submissions.

¹ In this call for further submissions a ‘capacity-adjusted outage quantity’ is an outage quantity for a Scheduled Generator or non-intermittent Non-Scheduled Generator that is adjusted to exclude capacity that is not assigned Capacity Credits. Capacity-adjusted outage quantities are used for several purposes under the Market Rules, including the calculation of Capacity Cost Refunds.

The following factors have contributed to the identification of these issues.

Consultation on Rule Change Proposal: Outage Planning Phase 2 – Outage Process Refinements (RC_2013_15):

RC_2013_15 was submitted by the IMO to implement a number of reforms to the WEM outage planning processes to improve their transparency, flexibility, consistency and efficiency. The Final Rule Change Report for RC_2013_15 was published on 26 August 2019 and the Amending Rules will commence on 1 February 2020.

Consultation on RC_2013_15 raised several issues, such as the impact of late changes to network Planned Outages on Balancing Facilities, that fall within the scope of this Rule Change Proposal and have therefore been considered by the Rule Change Panel in the development of this call for further submissions.

Market Advisory Committee (MAC) Market Rules Issues List:

The MAC Market Rules Issues List includes two issues relating to the reporting of Forced Outages that fall within the scope of this Rule Change Proposal and have therefore been considered by the Rule Change Panel in the development of this call for further submissions.²

MAC Meetings and Workshops:

The issues identified by the Rule Change Panel were discussed with stakeholders:

- during updates on the Rule Change Proposal at the MAC meetings held on 13 September 2017, 13 December 2017, 14 February 2018 and 8 August 2018; and
- at two MAC workshops held on 17 January 2018 and 25 October 2019 to discuss specific aspects of the Rule Change Proposal.³

The feedback received in these meetings and workshops was taken into account in the development of this call for further submissions.

Energy Transformation Strategy (ETS):

The Rule Change Panel also considered the work of the Energy Transformation Implementation Units (**ETIU**) as part of the ETS in the development of this call for further submissions. ETIU is proposing material changes to the WEM outage and network constraint management processes as part of its Foundation Regulatory Frameworks work stream. The changes, which are proposed to be implemented in October 2022, are likely to include the removal of Consequential Outages, the replacement of SMMITS, and various changes that should greatly increase the visibility of network outages to Market Participants.

While the Foundation Regulatory Frameworks changes do not alter the issues under consideration in this Rule Change Proposal, they reduce the available payback period for solutions that require IT expenditure and are likely to be superseded in 2022, creating a preference for simple, low-cost interim solutions wherever possible.

4.1 Logging Forced and Consequential Outages in Advance

The Market Rules do not currently allow a Rule Participant to log a Forced Outage or Consequential Outage before the start of that outage. This Rule Change Proposal proposes

² See section 4.6 of this report for further details.

³ Workshop papers and minutes for the two workshops are available at https://www.erawa.com.au/rule-change-panel/market-rule-changes/rule-change-rc_2014_03.

changes to enable, but not require, a Rule Participant to log a Consequential Outage as soon as it receives notification of an outage that will de-rate its Facility. The proposed amendments will also allow, but not require, System Management to approve a Consequential Outage request in advance, based on its own determination that the Consequential Outage will occur.

The IMO considered that the ability for Market Participants to log Forced Outages and Consequential Outages in advance would improve the transparency of Facility availability and thereby improve the price signals to other Market Participants.

The Rule Change Proposal also proposes changes to:

- amend the notification requirements for a Rule Participant that is subject to a Forced Outage or Consequential Outage to include any other information System Management requests to enable it to verify the details of the outage;
- ensure that a Facility is exempted from a Reserve Capacity Test in a Trading Interval if the Market Participant has notified System Management of a likely Forced Outage or Consequential Outage occurring in that Trading Interval; and
- ensure that a Market Participant who has notified System Management of a likely Forced Outage or Consequential Outage is not required to comply with the most recently issued Dispatch Instruction, Operating Instruction or Dispatch Order under clause 7.10.1.

The remainder of this section 4.1 discusses issues that the Rule Change Panel has identified with the proposed changes to support ex-ante Forced Outages and Consequential Outages, and the additional changes that the Rule Change Panel is considering to address those issues.

In this call for further submissions, the term ‘triggering outage’ means a network outage that will (if it proceeds) affect the available capacity of a Scheduled Generator or Non-Scheduled Generator by a specific quantity for a specific period.

4.1.1 Certainty and Transparency of Network Outages

Issue:

The Rule Change Panel has the following concerns with the proposed changes to allow ex-ante Consequential Outage requests:

- The proposed arrangements:
 - do not require System Management to approve a Consequential Outage request or undertake any assessment of the triggering outage until after the end of the outage;⁴ and
 - do not include processes to manage the effects of late changes to triggering outages.

A Market Generator who submits an ex-ante Consequential Outage request and makes its capacity unavailable in the Balancing Market could be exposed to a Forced Outage if System Management assesses the request after the event and finds that it is inconsistent with the final details of the triggering outage. This creates a risk for Market Generators that is likely to outweigh the benefits of ex-ante submission.

⁴ During a discussion of this Rule Change Proposal at the 13 September 2017 MAC meeting, Mr Dean Sharafi advised that AEMO did not intend to assess or approve any Consequential Outages until after the event, because the timing and impact of the triggering network outage is uncertain until it happens.

- The proposed arrangements provide only limited transparency benefits to other Market Participants, because:
 - Market Participants would only have visibility of an upcoming Consequential Outage if the affected Market Generator submitted an ex-ante Consequential Outage request (which is not mandatory); and
 - even where an ex-ante Consequential Outage request was submitted, no robust process would exist to notify Market Participants about the effects any late changes to that triggering outage (e.g. the early return of a Facility to the Balancing Market).

RCP Support has considered whether additional changes to require early approval of ex-ante Consequential Outage requests would provide greater certainty for Market Generators about their Consequential Outages. However, the need to resubmit and reapprove requests in response to late changes to triggering outages would increase administrative burden and likely require costly IT changes that are likely to be superseded in 2022 by the ETS reforms. Further, such changes would not necessarily improve the transparency of triggering outages for other Market Participants.

AEMO has advised RCP Support that it expects to process no more than 70 ‘planned’ triggering outages per year.

Potential changes to the proposed Amending Rules:

Given the low volume of triggering outages and the expected ETS reforms, the Rule Change Panel is considering a simple, low-cost option to address the identified issues. The option uses the existing Dispatch Advisory mechanism to issue notifications (**triggering outage notifications**) that provide explicit details about the expected reduction in available capacity of a Scheduled Generator or Non-Scheduled Generator for a period due to a triggering outage (**foreseeable constraint**).

The purpose of triggering outage notifications is to provide greater certainty to Market Generators affected by a foreseeable constraint and improve transparency about the effects of triggering outages for all Market Participants.

The main features of the proposed approach are as follows:

- System Management would be required to issue a triggering outage notification in respect of a Planned Outage that was a triggering outage:
 - at the time of acceptance, approval or rejection of a triggering outage request (because System Management effectively controls the timing of these events); and
 - as soon as practicable after the withdrawal of a triggering outage request or a notification of changes to the triggering outage that affect the associated foreseeable constraints (to allow System Management time to respond, because these events are initiated by the Network Operator).
- The triggering outage notifications would need to contain enough detail to allow Market Generators to form their Balancing Submissions and manage their Consequential Outage requests, e.g. the initial notification of a foreseeable constraint would include:
 - a reference id for the triggering outage;
 - the date/time that the triggering outage was accepted/approved;
 - the date/time that the triggering outage notification was issued;
 - the identity of the Facility affected by the foreseeable constraint;

- the start and end date/times of the foreseeable constraint;⁵ and
- the MW limit on the output of the Facility during the period of the foreseeable constraint (e.g. 0 MW if the Facility will be disconnected from the network during the period).
- Market Generators would be obliged to reflect the information provided in triggering outage notifications in their Balancing Submissions, subject to other restrictions (e.g. gate closure limits).
- Market Generators would not be at risk of a Forced Outage due to a triggering outage change if they have acted consistently with their triggering outage notifications (e.g. System Management must approve a Consequential Outage request that aligns with the foreseeable constraint information that was provided in triggering outage notifications).
- Consequential Outage requests that relate to a foreseeable constraint would be required to include the reference id provided in the relevant triggering outage notification(s).
- Being Dispatch Advisories, the triggering outage notifications would also be published on the Market Web Site, providing an audit trail that can be used by the ERA for compliance monitoring.

The implementation of triggering outage notifications would not affect the existing obligations of Network Operators to notify affected Market Participants about upcoming Planned Outages of network equipment.

The Rule Change Panel acknowledges that a bespoke mechanism for triggering outage notifications might provide additional benefits (e.g. the ability to maintain a dedicated distribution list for triggering outage notifications, or to provide summary reports on current and upcoming foreseeable constraints). However, the Rule Change Panel does not consider the additional benefits of a bespoke mechanism would justify the additional cost for what is expected to be a short-term interim solution.

The Rule Change Panel seeks feedback from stakeholders on:

1. Any concerns or suggestions regarding the proposed use of triggering outage notifications to provide Market Participants with greater certainty and transparency about the effects of triggering outages.

4.1.2 Late Changes to Triggering Outages

Background:

Under the current Market Rules:

- a Rule Participant is not permitted to start a Planned Outage before the approved start time; and
- an Outage Facility that fails to return to service by the end of its approved Planned Outage period is deemed to be subject to a Forced Outage.

⁵ As discussed in section 4.1.4 of this call for further submissions, a Consequential Outage may extend beyond this period for several reasons (e.g. to allow for start-up time).

Additionally, the Amending Rules for RC_2013_15 include changes to prevent the submission of a revised outage request that:

- shifts the outage period beyond its previous boundaries (i.e. so that the outage either starts earlier or ends later); or
- increases the quantity of de-rating.⁶

The Rule Change Panel is also considering changes to the proposed Amending Rules to clarify that a Rule Participant cannot make retrospective changes to a Planned Outage (e.g. to notify System Management of a delay to the start of a Planned Outage after the approved start time has passed).

Collectively these provisions limit the types of changes that can be made to a triggering outage period and when those changes are able to be made.

Issue:

At any time before the start of the first affected Trading Interval, a Network Operator may notify System Management of:

- a delay to the start of a triggering outage;
- the late cancellation of a triggering outage; and
- the early return to service from a triggering outage.

Assuming the implementation of triggering outage notifications, System Management would be required to issue a triggering outage notification that updates the foreseeable constraint details 'as soon as practicable'. However, the market may not have enough time to respond efficiently if the triggering outage notification is issued too late.

For example, if a triggering outage notification that indicates a delay to the start of a Scheduled Generator's foreseeable constraint is issued after Balancing Gate Closure for the first Trading Interval in the original period, then for at least that Trading Interval the Market Generator will not have time to modify its Balancing Submissions to make the Scheduled Generator's capacity available. Additional Trading Intervals may also be affected, depending on the Scheduled Generator's Equipment Limits (e.g. start-up time) and current operational state.

Similarly, if a Market Generator is notified that a foreseeable constraint will end earlier than expected, it may be prevented by either gate closure restrictions or the Facility's Equipment Limits from making a corresponding early return to the Balancing Market.

In general, there seems little point in issuing a triggering outage notification to remove Trading Intervals from a foreseeable constraint for which Balancing Gate Closure has already passed (or is just about to pass), because the affected Market Generator will not have time to make the relevant capacity available for dispatch in those Trading Intervals.

An additional concern exists for Non-Scheduled Generators. Market Generators cannot declare the capacity of a Non-Scheduled Generator as unavailable in a Balancing Submission,⁷ and do not appear to bid Non-Scheduled Generators in and out of the Balancing Market at the start and end of a Consequential Outage in the same way as

⁶ In effect, a Rule Participant that wishes to make such changes must submit a new outage request that is subject to the normal submission deadlines.

⁷ While Market Generators usually specify Balancing Submission quantities that match the triggering outage information provided by the Network Operator, these quantities are not actually used in the real-time dispatch process.

Scheduled Generators (i.e. by offering their capacity at the Maximum STEM Price to ensure that they are dispatched off).

Instead, System Management has advised that it usually enters a constraint into its System Operating Command and Control Centre User Interface that will cause the Real Time Dispatch Engine to dispatch the Non-Scheduled Generator down out of merit in the Trading Interval(s) prior to the start of the triggering outage. If the triggering outage is delayed, then System Management will delay the ramp down of the Non-Scheduled Generator accordingly. When the triggering outage ends (including if it ends early), System Management releases the constraints on the Non-Scheduled Generator and returns it to normal operation.

In some cases, where the unrestricted ramping of the Non-Scheduled Generator would create an excessive LFAS burden, System Management issues Dispatch Instructions that limit the Facility's ramp rate or target output to reduce the ramping impact.

While the current approach maximises the operation of Non-Scheduled Generators, it also produces unexpected generation that is inconsistent with the Forecast BMO and Balancing Forecast, and can increase the need for System Management to dispatch Non-Scheduled Generators out of merit to reduce the impact on LFAS. The effects can be material for larger Non-Scheduled Generators, and are expected to increase with the commissioning of two large wind farms in 2020. The Rule Change Panel notes that the reasons for imposing gate closure restrictions on Scheduled Generators that return early from an outage are equally applicable to Non-Scheduled Generators.

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering whether to prevent changes to a foreseeable constraint that would affect a Trading Interval unless it is at least 30 minutes before Balancing Gate Closure for that Trading Interval. For example, consider a triggering outage that is scheduled to start at 9:00 AM on a Trading Day and end at 5:00 PM on the same Trading Day, resulting in a foreseeable constraint for one generator:

- The foreseeable constraint could not be updated to start later if it was less than 30 minutes before Balancing Gate Closure for the first Trading Interval in the current constraint period (e.g. the 9:00 AM start time of the foreseeable constraint could not be set to a later time after 6:30 AM).
- The foreseeable constraint could not be updated to remove a Trading Interval from the end of the constraint period if it was less than 30 minutes before Balancing Gate Closure for that Trading Interval (e.g. the foreseeable constraint could not be changed from 5:00 PM to 4:30 PM after 2:00 PM).
- If the triggering outage was cancelled, then if it was at least 30 minutes before Balancing Gate Closure for the first Trading Interval in the constraint period (i.e. before 6:30 AM) the foreseeable constraint would be cancelled; otherwise the foreseeable constraint would be modified to remove the Trading Intervals for which Balancing Gate Closure was at least 30 minutes away (e.g. if the triggering outage notification was issued at 8:15 AM then the updated foreseeable constraint would run from 9:00 AM to 11:00 AM).

The Rule Change Panel is also considering whether System Management should be required to ensure that its dispatch of Non-Scheduled Generators is consistent with the

foreseeable constraint information it has provided in triggering outage notifications.⁸ For example, if:

- System Management issued a triggering outage notification stating that a Non-Scheduled Generator will be constrained to 0 MW until 4:00 PM; and
- the triggering outage ended early at 3:30 PM but System Management was unable to issue a revised triggering outage notification by the relevant deadline (2.5 hours before 3:30 PM),

then the foreseeable constraint would remain unchanged and System Management would not dispatch the Non-Scheduled Generator to a non-zero target before 4:00 PM. The Rule Change Panel considers that this may improve the reliability of the Forecast BMO and Balancing Forecasts, and ensure equitable treatment of Scheduled Generators and Non-Scheduled Generators with respect to their gate closure obligations.

RCP Support intends to schedule a discussion at the 11 February 2020 MAC meeting about:

- how Non-Scheduled Generator capacity is removed from service at the start of a Consequential Outage and returned to service at the end of any type of outage; and
- the implications in terms of Consequential Outages, constraint payments and the estimation of output for certification.

The Rule Change Panel will consider the outcomes of that discussion in the preparation of the Draft Rule Change Report for this Rule Change Proposal.

The Rule Change Panel seeks feedback from stakeholders on:

2. Any concerns or suggestions regarding the proposed restrictions on late changes to foreseeable constraints.
3. Whether System Management should be required to ensure that the dispatch of Non-Scheduled Generators is consistent with their foreseeable constraints.
4. How Non-Scheduled Generator capacity should be removed from service before a Consequential Outage and returned to service after a Consequential Outage.
5. Whether a Network Operator should be able to reduce the period of a triggering outage (for the purposes of its performance statistics) if it notifies System Management too late for System Management to update the associated foreseeable constraints.

4.1.3 Ex-Ante Forced Outages

Background:

The proposed Amending Rules enable, but do not require, a Rule Participant to notify System Management if, in the Rule Participant's opinion, its Outage Facility is likely to be de-rated as a result of a Forced Outage.

⁸ Unless System Management needs to dispatch the Non-Scheduled Generator differently to prevent or return from a High Risk Operating State or Emergency Operating State.

Issue:

The Rule Change Panel notes that in some cases a Rule Participant may be fully aware that its Outage Facility is about to suffer a Forced Outage. For example:

- a Rule Participant is not ready to return its Outage Facility to service at the end of a Planned Outage and cannot obtain an extension outage; or
- a Rule Participant needs to undertake urgent maintenance on an Outage Facility but is unable to obtain approval for a Planned Outage to undertake the work.

While Market Generators are obliged to update their Balancing Submissions to reflect the imminent Forced Outages of their Balancing Facilities, Network Operators are not explicitly obliged to notify System Management in these situations. Even if the Network Operator notifies System Management, the full details are not necessarily shared with Market Participants in a timely manner.

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering whether a Rule Participant should be obliged to notify System Management as soon as it becomes aware of an upcoming Forced Outage of its Outage Facility.

The Rule Change Panel is also considering whether the use of triggering outage notifications and foreseeable constraints should be extended to cover Forced Outages that directly affect a Scheduled Generator or Non-Scheduled Generator. This would allow (or require) System Management to issue a triggering outage notification if it becomes aware of an upcoming or current Forced Outage that is a triggering outage.

Two options are under consideration:

- to give System Management the option to issue a triggering outage notification if it considers that the triggering outage might have a material impact on market outcomes; or
- to require System Management to issue a triggering outage notification if the triggering outage meets certain criteria (e.g. if it will cause a reduction in available generator capacity in excess of some MW threshold and/or is expected to continue for some threshold period into the future).

Under either option, System Management would need to estimate the end time of any foreseeable constraints in its initial notification, and to issue update notifications as soon as practicable when more accurate information about the triggering outage becomes available. Market Generators would be subject to similar obligations in respect of their Balancing Submissions to those proposed for triggering outage notifications for network Planned Outages.

The Rule Change Panel seeks feedback from stakeholders on:

6. Whether a Rule Participant should be obliged to notify System Management if it is aware that its Outage Facility will suffer a Forced Outage in the near future.
7. Whether triggering outage notifications for network Forced Outages that are triggering outages should be optional or mandatory, and if mandatory, what materiality thresholds should apply (if any).

4.1.4 Consequential Outage Periods that Exceed the Foreseeable Constraint Period

Background:

A triggering outage can affect the availability of a Scheduled Generator or Non-Scheduled Generator in Trading Intervals that fall outside the triggering outage period. For example:

- as discussed in section 4.1.2, a Market Generator could receive notice of a reduction in the period of a triggering outage too late to return the relevant capacity to the Balancing Market; and
- a Scheduled Generator may have start-up requirements or other Equipment Limits that prevent it from returning to the Balancing Market for a period after the end of a triggering outage, even if the Market Generator knows the end time of the triggering outage well in advance.

Proposed clause 3.21.2(c)⁹ allows an outage that has not commenced, and which has not been determined by System Management to be a Consequential Outage, to be deemed a Consequential Outage if the affected Rule Participant could reasonably expect, based on the information that was available to it 30 minutes before Balancing Gate Closure, that its Facility would be de-rated by a Consequential Outage. The intent of the proposed clause is to prevent a Rule Participant from being subject to a Forced Outage if the Consequential Outage does not occur, provided that the Rule Participant's expectation that a Consequential Outage would occur was considered reasonable by System Management.

Issue:

The exception specified in proposed clause 3.21.2(c) does not cover all the situations in which a Market Generator could be left exposed to a Forced Outage due to a late change to a triggering outage, e.g. the clause does not account for the longer gate closure of Balancing Portfolio Facilities, or for triggering outages that have commenced but are ending earlier than expected. The proposed Amending Rules are also silent about the treatment of start-up times in Consequential Outages.

The concerns are addressed to some extent by the Amending Rules for RC_2013_15. New clauses 7A.2A.1 and 7A.2A.2 require Market Generators to notify System Management of a Forced Outage or Consequential Outage for any capacity subject to Capacity Credits that is declared unavailable in a Balancing Submission and not otherwise accounted for. New clause 7A.2A.4 provides an exemption from clauses 7A.2A.1 and 7A.2A.2 in respect of a Trading Interval if:

- the relevant capacity was previously subject to an approved Consequential Outage; and
- System Management notified the Market Generator that the capacity was no longer subject to a Consequential Outage less than 30 minutes before the applicable gate closure for the Facility and/or too late for Facility to resynchronise by the start of the Trading Interval.

However, new clause 7A.2A.4 has the following limitations:

- the clause only applies to Consequential Outages that have been approved by System Management;

⁹ In this call for further submissions, 'proposed clause' means the clause as proposed in the Rule Change Proposal.

- the clause only deals with late changes (e.g. it would not cover the need for start-up time unless it was associated with a late change); and
- while the clause exempts a Market Generator from having to report a Forced Outage or Consequential Outage, it does not ensure that the Facility is eligible for a Consequential Outage in the relevant Trading Interval.

Additionally, the new clauses do not relate to Non-Scheduled Generators, because Non-Scheduled Generator Balancing Submissions do not include any declarations of unavailable capacity. The main concern for a Market Generator with a Non-Scheduled Generator is that, if the Facility's output is restricted in a Trading Interval because of a triggering outage, its output will be appropriately estimated for the purpose of determining its Relevant Level in subsequent Reserve Capacity Cycles. This will not occur if the Facility is ineligible for a Consequential Outage in that Trading Interval (unless it is issued a Dispatch Instruction to decrease its output 'out of merit').

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering additional changes to the proposed Amending Rules to:

- remove proposed clause 3.21.2(c);
- modify new clause 7A.2A.4 to make it apply to changes to foreseeable constraints rather than approved Consequential Outages; and
- clarify the definition of a Consequential Outage to ensure that it covers:
 - the period of the foreseeable constraint (which may differ from the period of the triggering outage due to the late notification of changes to the latter);
 - any additional period following the end of a triggering outage that a generator is unavailable due to its Equipment Limits; and
 - any delay in returning the capacity of a Balancing Portfolio Facility to the Balancing Market due to gate closure restrictions after a late change to a foreseeable constraint.

The Rule Change Panel seeks feedback from stakeholders on:

8. Any additional reasons why a Consequential Outage associated with a triggering outage might need to extend outside the period of the foreseeable constraint.

4.1.5 Ex-Ante Outages and Reserve Capacity Tests

Background:

This Rule Change Proposal proposes changes to clause 4.25.3A(b) to prevent the IMO from subjecting a Facility to a Reserve Capacity Test if the relevant Market Participant has advised System Management of a likely Forced Outage or Consequential Outage under proposed clause 3.21.4A.

Issue:

The Rule Change Panel questions whether the notification of an Outage that is only 'likely' to occur should be enough to prevent the scheduling of a Reserve Capacity Test.

On the other hand, the Rule Change Panel considers that the results of a Reserve Capacity Test should be discarded if a Facility does suffer a Consequential Outage during the relevant Trading Intervals.

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering additional changes to the proposed Amending Rules to:

- make the exemption from a Reserve Capacity Test apply to situations where:
 - System Management has notified a Market Participant of a foreseeable constraint on its Facility; or
 - the Market Participant has notified System Management that its Facility will be subject to a Forced Outage in the relevant period; and
- require the results of a Reserve Capacity Test to be discarded if the Facility is subject to a Consequential Outage in the relevant Trading Intervals.

The Rule Change Panel seeks feedback from stakeholders on:

9. Any concerns about restricting the proposed exemption from a Reserve Capacity Test to situations where System Management has notified a Market Participant of a foreseeable constraint on its Facility, or where the Market Participant has notified System Management that its Facility will be subject to a Forced Outage in the relevant period.

4.2 Outage Quantity Reporting and Capacity-Adjusted Outage Quantity Calculation

This Rule Change Proposal includes changes to address three issues identified by the IMO around the determination of outage quantities for Scheduled Generators and Non-Scheduled Generators:

- that the outage quantity calculation rules in clauses 3.21.5 and 3.21.6 are inappropriate for Non-Scheduled Generator outages;
- that the steps used in SMMITS to determine outage quantities for Scheduled Generators are inconsistent with the process prescribed in clause 3.21.6; and
- that the use of RCOQ in the capacity-adjusted outage quantity calculations in clause 3.21.6 is impractical and inconsistent with actual practice.

The Rule Change Proposal also sought changes to clarify the obligations of Market Generators with respect to the actual quantity of outage that is required to be logged.

The Rule Change Panel has some concerns with the proposed changes relating to the determination of outage quantities, and is considering further changes to the proposed Amending Rules to address these concerns. The remainder of this section 4.2:

- discusses the concerns identified by the Rule Change Panel (sections 4.2.1 to 4.2.4);
- describes the potential additional changes to the proposed Amending Rules to address these concerns (section 4.2.5); and
- presents three examples to demonstrate the effect of the potential additional changes on the determination of outage quantities for Scheduled Generators (section 4.2.6).

4.2.1 Calculation of Outage Quantities for Non-Scheduled Generators

Background:

In this Rule Change Proposal, the IMO discussed why the outage quantity calculation rules for generating systems in clauses 3.21.5 and 3.21.6 are inappropriate for Non-Scheduled Generator outages. For example:

- the calculations use the Standing Data value specified in Appendix 1(b)(iv)¹⁰, which is only defined for Scheduled Generators; and
- more critically, the calculations use the outage quantities reported by a Market Generator (**unadjusted outage quantities**) to determine the reduction in capacity from the Facility's RCOQ. The resulting outage quantities (**capacity-adjusted outage quantities**) are used for various purposes throughout the Market Rules, such as the calculation of Capacity Cost Refunds. However, for a Non-Scheduled Generator with a zero RCOQ the calculation will always produce an outage quantity of zero, a result that fails to reflect the actual reduction in available capacity and leads to perverse outcomes, such as the use of spurious Planned Outage rates and Forced Outage rates for Reserve Capacity certification.

The IMO proposed to calculate capacity-adjusted outage quantities for Scheduled Generators only, and use unadjusted outage quantities for Non-Scheduled Generators.

Issue:

While capacity-adjusted outage quantities are inappropriate for an Intermittent Generator, the Market Rules allow for a small, non-intermittent generating system to be registered as a Non-Scheduled Generator and assigned Capacity Credits.¹¹ Such a Facility would have a non-zero RCOQ and so would also require the calculation of capacity-adjusted outage quantities for various purposes under the Market Rules.¹²

4.2.2 Calculation of Outage Quantities for Scheduled Generators

Background:

The steps used in SMMITS to determine outage quantities for Scheduled Generators are inconsistent with the process prescribed in clause 3.21.6. For example, a Market Generator is currently required to enter outage quantities into SMMITS on an as generated basis, not a sent out basis as specified in clause 3.21.6(a).

While the IMO did not explicitly articulate the discrepancies between clause 3.21.6 and the current process in the Rule Change Proposal, it proposed to amend the Market Rules to align them with the current SMMITS process.

¹⁰ Appendix 1(b)(iv) requires, for a Scheduled Generator, "the dependence of capacity on temperature at the location of the facility".

¹¹ A non-intermittent generating system with a rated capacity between 0.2 MW and 10 MW may be registered as a Non-Scheduled Generator, while a non-intermittent generating system with a rated capacity less than 0.2 MW can only be registered as a Non-Scheduled Generator.

¹² To date no non-intermittent generating systems have been registered as Non-Scheduled Generators, and ETIU has not yet indicated whether non-intermittent generating systems will be able to register as Non-Scheduled Generators and receive Capacity Credits under the proposed new market arrangements.

The SMMITS process, as set out in the proposed Amending Rules, comprises the following steps:

1. The Market Generator enters the quantity of de-rating on an “as generated basis at 15 degrees Celsius”.¹³
2. SMMITS multiplies the “as generated, 15 degrees” outage quantity by a Facility-specific value (**Coefficient 1**) to produce a “sent out, 15 degrees” outage quantity. The proposed Amending Rules do not specify how this conversion occurs or how Coefficient 1 is determined for each Scheduled Generator.
3. SMMITS converts the “sent out, 15 degrees” outage quantity to a “sent out, 41 degrees” outage quantity by multiplying the former quantity by another Facility-specific value (**Coefficient 2**), defined in the proposed Amending Rules as “the ratio of Sent Out Capacity at 41 degrees to the Sent Out Capacity at 15 degrees for the Facility, as found in the Standing Data file for temperature dependence provided under Appendix 1(b)(iv) for that Facility”.
4. SMMITS applies the calculations in clauses 3.21.6(b), 3.21.6(c) and 3.21.6(d) to determine the Forced Outage, Planned Outage and Consequential Outage capacity-adjusted outage quantities for the Trading Interval. The calculations use the MW equivalent of the number of Capacity Credits assigned to the Facility wherever the current Market Rules prescribe the use of the Facility’s RCOQ.

Issues:

The Rule Change Panel has identified several concerns with the process for determining outage quantities set out in the proposed Amending Rules:

- The proposed calculations refer to the “Sent Out Capacity” of a Scheduled Generator at various temperatures, in conflict with the meaning of that defined term. Sent Out Capacity represents the maximum quantity that can be offered in a Balancing Submission for a Balancing Facility (including the Balancing Portfolio, for which a single Sent Out Capacity value is defined). As such, it does not make sense to refer to the Sent Out Capacity of a Scheduled Generator “at 41 degrees”, or the Sent Out Capacity of a Facility that is part of the Balancing Portfolio.
- The calculations in SMMITS assume that the Standing Data value specified in Appendix 1(b)(iii)¹⁴ for a Scheduled Generator is the maximum sent out capacity of the Scheduled Generator at 15 degrees. However, the Appendix 1(b)(iii) values are used to determine Sent Out Capacity values. Tying the definition to a specific temperature can place a perverse limit on the quantity that a Market Generator can offer into the Balancing Market, if its Scheduled Generator is able to generate higher quantities at other temperatures.
- Coefficient 2 is defined as the ratio of the Sent Out Capacity at 41 degrees to the Sent Out Capacity at 15 degrees for the Facility, “as found in the Standing Data file for temperature dependence provided under Appendix 1(b)(iv)”. However, the temperature dependence file specified in Appendix 1(b)(iv) is based on as generated output values, not sent out. The ratio of as generated maximum quantities at 41 degrees and 15 degrees could vary materially from the ratio of the corresponding sent out quantities

¹³ Note that all temperature references in this call for further submissions are specified in degrees Celsius.

¹⁴ Appendix 1(b)(iii) requires, for a Scheduled Generator, “the sent out capacity of the generator, expressed in MW”.

because of auxiliary loads, and therefore should not be used to temperature-adjust sent out outage quantities.

- The requirement to report “as generated” outage quantities, which are then converted to sent out quantities using an undefined parameter (Coefficient 1) adds unwarranted complexity and potential for error to the outage reporting process.
- More generally, there appears to be no practical reason to require outage quantities to be reported on a temperature-specific basis.

If a Scheduled Generator experiences a partial outage, then the critical question is what capacity the Facility was or will be able to provide over the duration of the outage.¹⁵

For a partial Planned Outage, a Market Generator will typically submit an outage quantity that reflects the Market Generator’s expectation of the capacity it can provide throughout the duration of the outage, which will depend (at least in part) on its expectation of the maximum site temperature during the period. For example, if a Market Generator reasonably expects that the site temperature will not exceed 25 degrees during the outage, it is extremely unlikely to submit an outage quantity that reflects some additional amount by which the Facility’s capacity would be reduced if the temperature did exceed 25 degrees.¹⁶

Similarly, for a Forced Outage the relevant quantity is what the Scheduled Generator was actually able to provide, not a theoretical quantity that it may have been able to provide if the temperature had been higher.

As discussed in further detail in section 4.2.3, capacity-adjusted outage quantities are likely to be lower when the maximum daily site temperature exceeds 41 degrees, reflecting the reduction of the Facility’s RCOQ under clause 4.12.4(b)(i) in these circumstances. However, the site temperature should not affect the basis on which a Market Generator should record outage quantities in SMMITS, i.e. to reflect the actual quantities that the Facility was or will be able to provide over the outage period.

4.2.3 Use of RCOQ in Capacity-Adjusted Outage Quantity Calculations

Background:

As mentioned above, clause 3.21.6 requires the calculation of outage quantities as reductions from the Facility’s RCOQ. At the time the Rule Change Proposal was submitted, clause 3.21.6(e) required the IMO to provide System Management with the RCOQ for each Facility “as currently applicable”.

However, the IMO noted in the Rule Change Proposal that it was unable to determine each Facility’s RCOQ in advance of a Trading Interval. RCOQ is a variable quantity that may be affected by several factors, including staffing levels, outage quantities and daily site temperatures, some of which are impractical or impossible to determine in advance.

The IMO noted that in practice it provided System Management with the MW equivalent of the Capacity Credits held by each Facility, and System Management used those values instead of RCOQ in the clause 3.21.6 calculations. The IMO proposed to amend clause 3.21.6 to align it with current practice by replacing RCOQ with the MW equivalent of the

¹⁵ Note that the Available Capacity of a Scheduled Generator or Non-Scheduled Generator in a Trading Interval is that part of the maximum sent out capacity of the Facility that is not subject to an Outage in that Trading Interval.

¹⁶ Obviously in this situation the Market Generator bears the risk that the temperature will exceed 25 degrees during the period and Facility will be unable to meet its dispatch targets.

Facility's Capacity Credits. The IMO did not consider that the difference between the two values would result in significantly different outcomes for the purpose of calculating a Scheduled Generator's outage quantities or its Certified Reserve Capacity.

Issue:

While it might be impractical to use RCOQ in capacity-adjusted outage calculations, the Rule Change Panel has identified two scenarios in which the use of Capacity Credits rather than RCOQ could produce inappropriate capacity-adjusted outage quantities that do not reflect a Facility's underlying Reserve Capacity Obligations.¹⁷

The first scenario is where a Scheduled Generator experiences an outage on a Trading Day when the maximum daily temperature at the site of the Facility exceeds 41 degrees. On such Trading Days the Scheduled Generator's RCOQ is limited to its default value "adjusted to an ambient temperature of 45 degrees". It would be inappropriate for the Scheduled Generator's capacity-adjusted outage quantities to exceed the reduced RCOQ value on such Trading Days, in particular in the event of a Forced Outage where Capacity Cost Refunds would be payable.

The second scenario is where a Scheduled Generator is subject to an approved Commissioning Test Plan during a Trading Interval. Under the current Market Rules, any capacity-adjusted outage quantities are set to zero in this situation, because the RCOQ of the Facility is reduced to zero under clause 4.12.6(c). However, this would no longer be the case if RCOQ was replaced by Capacity Credits in the capacity-adjusted outage quantity calculation.

Given that including an explicit adjustment for approved Commissioning Tests in the capacity-adjusted outage quantity calculation is likely to increase implementation costs, the Rule Change Panel has considered the following effects of omitting this adjustment:

- If a Commissioning Test occurs during a Planned Outage, then the relevant Trading Intervals would contribute to the Scheduled Generator's Planned Outage rates and Refund Exempt Planned Outage Count. This does not appear to be a problem, because there is no obvious reason why the relevant Trading Intervals should be excluded from the Scheduled Generator's Planned Outage rates and Refund Exempt Planned Outage Count just because the Facility was undertaking a Commissioning Test.
- If a Commissioning Test occurs during an existing Forced Outage (e.g. where the Market Generator needs to run the Scheduled Generator before it can complete a major repair) then the Facility would no longer be exempt from Capacity Cost Refunds during the relevant Trading Intervals. This also appears to be an appropriate outcome because there is no obvious reason why the Scheduled Generator should be exempt from Capacity Cost Refunds in this situation.
- However, a Scheduled Generator would also incur Capacity Cost Refunds if it failed to meet its dispatch targets during a Commissioning Test and the Market Generator was obliged to report a Forced Outage. The Rule Change Panel considers this may not be an appropriate outcome, because such failures are a normal and accepted part of Commissioning Tests, and the imposition of Capacity Cost Refunds would be unreasonable and in conflict with the intent of clause 4.12.6(c).

¹⁷ Based on advice provided by AEMO, the Rule Change Panel has concluded that the possibility of a Facility's RCOQ being affected by the factors listed in clauses 4.12.4(b)(ii) (where the Market Generator offers short-term overload capacity in its certification application) or 4.12.4(b)(iii) (adjustments to account for "staffing and other restrictions") is too remote to warrant further consideration.

The Rule Change Panel notes that several stakeholders have raised concerns with RCP Support about the obligation to report Forced Outages for failures that occur during Commissioning Tests. RCP Support has discussed the obligation with AEMO and the ERA who have both advised that they have no need for such outages to be reported.

The advice provided by AEMO and the ERA, and the current exemption of Forced Outages during Commissioning Tests from Capacity Cost Refunds, suggests that the obligation to report a Forced Outage for a failure that occurs during an approved Commissioning Test is an unnecessary administrative burden on Market Generators that should be removed.

4.2.4 Clarification of Outage Quantity Measurement Requirements

Background:

The IMO proposed changes to clause 3.21.5 to clarify that the outage quantity to be reported for a Scheduled Generator or Non-Scheduled Generator was the “average reduction in capacity over the Trading Interval”. The IMO considered that while this was not a new requirement, its explicit inclusion in the Market Rules would avoid any potential confusion and ensure that all Market Generators provide consistent outage quantities.

Issue:

While the Rule Change Panel supports the intent of the Rule Change Proposal to provide greater clarity about how outage quantities should be measured, it considers that further changes may be necessary to clarify how outage quantities should be determined for a Scheduled Generator that fails to comply with the instructions it receives from System Management (e.g. trips off mid-Trading Interval, fails to synchronise when expected, or fails to ramp fast enough to maintain its expected output level).

4.2.5 Summary of Potential Changes to the Proposed Amending Rules

The Rule Change Panel is considering further changes to the proposed Amending Rules to address the issues discussed in sections 4.2.1 to 4.2.4. A summary of the main features of the amended proposal is provided below.

Definition of maximum sent out capacity in Standing Data:

The Rule Change Panel is considering changes to clarify the definition of the Standing Data items used to record the maximum sent out capacity of a Scheduled Generator (Appendix 1(b)(iii)) and a Non-Scheduled Generator (Appendix 1(e)(iiiA)). The proposed definition is:

“the maximum MW quantity that can be sent out by the Facility on a sustainable basis under optimal conditions, taking into account the physical limits of the network connection”.

The proposed definition is not associated with any specific temperature, as it is expected that different Facilities are likely to achieve their maximum sent out levels at different temperatures. For Non-Scheduled Generators, the optimal conditions would include the ideal levels of wind, temperature and/or irradiance, as applicable.

The Rule Change Panel proposes to refer to these Standing Data items directly (e.g. by reference to Appendix 1(b)(iii)) rather than introduce a new defined term. The existing defined term Sent Out Capacity would retain its current meaning.

The exclusion of ‘overload capacity’ from the proposed definition prevents this capacity from being included in a Balancing Submission or dispatched through the normal automated

dispatch process. However, AEMO has advised the Rule Change Panel that overload capacity is used very rarely and does not need to be dispatched through the normal Balancing Market process.

The Rule Change Panel seeks feedback from stakeholders on:

10. Any concerns or suggestions regarding the proposed definition for the maximum sent out capacity Standing Data items in Appendix 1(b)(iii) and Appendix 1(e)(iiiA).

Unadjusted Outage Quantities and Available Capacity – Scheduled Generators:

Under the revised approach that the Rule Change Panel is considering:

- unadjusted outage quantities for Scheduled Generators would be entered as MW reductions from the maximum sent out capacity of the Facility (i.e. the quantity specified for the Facility under Appendix 1(b)(iii));
- the Available Capacity of a Scheduled Generator in a Trading Interval would be defined as the maximum sent out capacity of the Facility less the sum of the unadjusted outage quantities of any Outages affecting the Facility in that Trading Interval;
- unadjusted outage quantities would be entered on the basis that the Available Capacity of the Scheduled Generator was or will be (as applicable) available for service for the duration of the outage; and
- unadjusted outage quantities would not be entered on a temperature-specific basis, although a Market Generator's expectations of the site temperatures over an outage period may affect the outage quantity reported (especially for Planned Outages).¹⁸

The Rule Change Panel notes that ETIU has indicated that in the future, outage quantities may be captured by reporting the remaining available capacity of the Facility rather than the quantity of de-rating. However, the Rule Change Panel considers that the two methods produce the same outcomes and the cost of changing to an 'available capacity' reporting approach would be difficult to justify at this time.

The Rule Change Panel seeks feedback from stakeholders on:

11. Any concerns about the proposed changes to the method used for capturing unadjusted outage quantities for Scheduled Generators in SMMITS.

Forced Outage quantities for Scheduled Generators:

The additional changes would also clarify that when a Market Generator reports a Forced Outage because its Scheduled Generator has failed to comply with an instruction from System Management (e.g. where a Scheduled Generator trips off during a Trading Interval, fails to synchronise when expected or fails to achieve the output levels specified in its Dispatch Instructions), the Available Capacity of the Scheduled Generator in that Trading Interval is deemed to be its average MW output over the Trading Interval. In other words, the total unadjusted outage quantity for the Trading Interval would need to equal:

maximum sent out capacity – (Sent Out Metered Schedule x 2).

¹⁸ Note that temperature adjustments will still be required for Reserve Capacity Tests.

While some stakeholders have raised concerns about this requirement, to date no party has suggested a viable alternative, which would need to be:

- easily auditable (e.g. by the ERA for compliance monitoring purposes);
- able to provide appropriate Available Capacity values for use in Minimum Theoretical Energy Schedule calculations;
- reasonably inexpensive to implement and operate; and
- suitable for both Synergy and Independent Power Producer Facilities.

The Rule Change Panel seeks feedback from stakeholders on:

12. Viable alternatives to the Rule Change Panel's proposed approach for reporting unadjusted outage quantities for Scheduled Generators that have failed to comply with an instruction from System Management (e.g. where a Scheduled Generator trips off during a Trading Interval, fails to synchronise when expected or fails to achieve the output levels specified in its Dispatch Instructions).

Unadjusted Outage Quantities and Available Capacity – Non-Scheduled Generators:

Under the proposed approach, unadjusted outage quantities for Non-Scheduled Generators would be reported in the same way as for Scheduled Generators, i.e. as non-temperature specific reductions from the maximum sent out capacity of the Facility (i.e. the quantity specified for the Facility under Appendix 1(e)(iiiA)). Outage quantities would reflect the average reduction in capacity over each Trading Interval.

As for Scheduled Generators, the Available Capacity of the Facility would be the maximum sent out capacity of the Facility less the sum of the unadjusted outage quantities of any Outages affecting the Facility in that Trading Interval. Outage quantities and Available Capacities would be unaffected by the availability of the Non-Scheduled Generator's 'fuel' (e.g. wind or sunshine).

The Rule Change Panel notes that some hybrid Non-Scheduled Generators can have total nameplate capacities that exceed their maximum sent out capacities (e.g. a Facility with 150 MW of wind turbines, 50 MW of solar panels and a maximum sent out capacity that is limited by its Declared Sent Out Capacity to 150 MW). Such a Facility may experience a partial outage that still leaves enough capacity available for service to meet or exceed its maximum sent out capacity.

In these situations, the Market Generator would be required to report an outage with an unadjusted outage quantity of 0 MW. It is anticipated that System Management will require the Market Generator to describe the extent of the outage in its outage submission.

The Rule Change Panel seeks feedback from stakeholders on:

13. Any concerns about the proposed changes to the method used for capturing unadjusted outage quantities for Non-Scheduled Generators in SMMITS.

Unadjusted outage quantities by Trading Interval:

Under the proposed approach, for each Scheduled Generator or Non-Scheduled Generator, for each Trading Interval:

- the Unadjusted Forced Outage Quantity is the total unadjusted outage quantity recorded for Forced Outages for the Facility and Trading Interval;

- the Unadjusted Planned Outage Quantity is the total unadjusted outage quantity recorded for Planned Outages for the Facility and Trading Interval;
- the Unadjusted Consequential Outage Quantity is the total unadjusted outage quantity recorded for (approved) Consequential Outages for the Facility and Trading Interval; and
- the Available Capacity is the maximum sent out capacity of the Facility specified under Appendix 1(b)(iii) or Appendix 1(e)(iiiA) (as applicable), less the sum of the Unadjusted Forced Outage Quantity, Unadjusted Planned Outage Quantity and Unadjusted Consequential Outage Quantity for the Facility and Trading Interval.

Capacity-adjusted outage quantity calculation

Under the proposed approach:

- capacity-adjusted outage quantities would be calculated for all Scheduled Generators and non-intermittent Non-Scheduled Generators (**Non-Intermittent Generators**);
- capacity-adjusted outage quantities would be clearly distinguished from unadjusted outage quantities throughout the Market Rules;
- where maximum daily ambient site temperatures for the relevant Trading Day are not yet available to AEMO, including for the outage schedule prepared by System Management on the Scheduling Day under clause 7.3.4, RCOQ would be replaced in the capacity-adjusted outage quantity calculations with the number of Capacity Credits held by the Facility for the Trading Interval;
- where the temperatures are available to AEMO, the value used in place of RCOQ in capacity-adjusted outage quantity calculations would depend on the maximum daily ambient site temperature for the Facility for the relevant Trading Day:
 - for temperatures up to and including 41 degrees, the number of Capacity Credits held by the Facility for the Trading Interval would be used; and
 - for temperatures above 41 degrees, the number of Capacity Credits multiplied by (SOC_{45} / SOC_{41}) would be used, where SOC_{45} and SOC_{41} are the sent out capacities of the Facility at 45 degrees and 41 degrees respectively, as specified in the information provided by the Market Generator for the relevant Reserve Capacity Cycle under clause 4.10.1(e)(i); and
- the existing requirement for a Market Generator to report a Forced Outage because of a failure to comply with instructions during an approved Commissioning Test would be removed.

The capacity-adjusted outage quantity calculations for a Non-Intermittent Generator are set out in Appendix A of this call for further submissions.

The Rule Change Panel seeks feedback from stakeholders on:

14. Any suggestions or concerns about the proposed changes relating to the calculation of capacity-adjusted outage quantities.
15. Any concerns about the proposed removal of the requirement to report a Forced Outage because of a failure to comply with instructions during an approved Commissioning Test.

4.2.6 Examples of Proposed Approach

The following examples all relate to a single Scheduled Generator with:

- a nameplate capacity of 120 MW;
- a maximum sent out capacity (**MSOC**) of 110 MW, which occurs at 10 degrees;
- a sent out capacity of 100 MW at 41 degrees;
- a sent out capacity of 97 degrees at 45 degrees; and
- 90 Capacity Credits.

In Trading Intervals where it is not subject to an Outage or an approved Commissioning Test, the Scheduled Generator has an RCOQ of:

- 90 MW if the maximum daily ambient site temperature is less than or equal to 41 degrees; and
- $90 \times 97 / 100 = 87.3$ MW if the maximum daily ambient site temperature exceeds 41 degrees.

Example 1 – Partial Planned Outage:

In this example, the Market Generator requests a partial Planned Outage for the Scheduled Generator. During the outage period the Facility is not subject to any other Outages and the site temperature never exceeds 25 degrees.

The Market Generator determines that the Facility will still be able to provide 60 MW of sent out capacity over the duration of the outage, based on the maintenance work to be undertaken and the Market Generator's assumptions about maximum site temperatures over the outage period.

The Market Generator uses this information to calculate the unadjusted outage quantity for the Planned Outage:

$$\begin{aligned} \text{unadjusted outage quantity (UOQ)} \\ &= \text{MSOC} - \text{remaining available capacity} \\ &= 110 - 60 \\ &= 50 \text{ MW} \end{aligned}$$

For the outage schedules prepared under clause 7.3.4 for each Scheduling Day, AEMO calculates the capacity-adjusted outage quantity for this outage as:

$$\begin{aligned} \text{capacity-adjusted outage quantity} \\ &= \max(0, \text{UOQ} - \max(0, \text{MSOC} - \text{CC}_{41})) \\ &= \max(0, 50 - \max(0, 110 - 90)) \\ &= 30 \text{ MW} \end{aligned}$$

As the site temperature never exceeds 25 degrees, the final capacity-adjusted outage quantity for this Planned Outage will remain 30 MW for each Trading Interval in the outage period.

Example 2 – Forced Outage (25 degrees):

In this example, the Scheduled Generator trips during a Trading Interval. The maximum daily ambient site temperature for the relevant Trading Day is 25 degrees and the Facility is not subject to any other Outages.

The interval readings for the Scheduled Generator show that it sent out 30 MWh during the Trading Interval.

The Market Generator calculates the remaining available capacity of the Scheduled Generator in the Trading Interval based on the actual average sent out MW over that Trading Interval:

$$\begin{aligned} \text{remaining available capacity} \\ &= 30 \text{ MWh} \times 2 \\ &= 60 \text{ MW} \end{aligned}$$

The Market Generator then determines the unadjusted outage quantity for entry into SMMITS:

$$\begin{aligned} \text{unadjusted outage quantity} \\ &= \text{MSOC} - \text{remaining available capacity} \\ &= 110 - 60 \\ &= 50 \text{ MW} \end{aligned}$$

AEMO calculates the capacity-adjusted outage quantity for the Trading Interval as:

$$\begin{aligned} \text{capacity-adjusted outage quantity} \\ &= \max(0, \text{UOQ} - \max(0, \text{MSOC} - \text{CC}_{41})) \\ &= \max(0, 50 - \max(0, 110 - 90)) \\ &= 30 \text{ MW} \end{aligned}$$

Example 3 – Forced Outage (43 degrees):

This example is the same as example 2, except that the maximum daily ambient site temperature is 43 degrees.

The Market Generator calculates the remaining available capacity and unadjusted outage quantity the same way as for example 2, entering an unadjusted outage quantity of 50 MW into SMMITS.

However, because the maximum daily ambient site temperature for the Scheduled Generator exceeded 41 degrees, AEMO's capacity-adjusted outage quantity calculation for the Trading Interval reflects the reduced Reserve Capacity Obligations of the Scheduled Generator in these circumstances:

$$\begin{aligned} \text{capacity-adjusted outage quantity} \\ &= \max(0, \text{UOQ} - \max(0, \text{MSOC} - \text{CC}_{45})) \\ &= \max(0, 50 - \max(0, 110 - 87.3)) \\ &= 27.3 \text{ MW} \end{aligned}$$

4.3 Use of Outage Quantities in the Market Rules

As noted in section 4.2.5, the Rule Change Panel is considering additional changes to the proposed Amending Rules to clarify the distinction between unadjusted outage quantities and capacity-adjusted outage quantities. The intention is to clearly indicate throughout the Market Rules the outage quantity type to be used for each function.

Currently the outage quantities specified in the Market Rules include:

- the outage quantities by Trading Interval in the outage schedules for each Trading Day prepared by System Management under clause 7.3.4 on the Scheduling Day (**ex-ante outage schedules**);

- the capacity-adjusted outage quantities by Trading Interval in the outage schedules for each Trading Day prepared by System Management under clause 7.13.1A(b) 15 Business Days after the Trading Day (**ex-post outage schedules**); and
- the unadjusted outage quantities by outage recorded by System Management under clauses 7.13.1D to 7.13.1G and published by AEMO under clause 10.5.3 on the Market Web Site in near real time (**real-time outage details**).

The Rule Change Panel proposes to retain the requirement for ex-ante outage schedules, because a snapshot of approved Non-Intermittent Generator outages for a Trading Day, taken at the start of the Scheduling Day, will still be required to determine RCOQs and calculate Net STEM Shortfall values. However, the Rule Change Panel proposes to clarify that these schedules record capacity-adjusted outage quantities for Non-Intermittent Generators by Trading Interval.¹⁹

The ex-post outage schedules prepared under clause 7.13.1A(b) contain capacity-adjusted outage quantities, but are used for several purposes for which unadjusted outage quantities would be more appropriate. Additionally, the concept of a one-off ex-post outage schedule for a Trading Day that is prepared 15 Business Days after the Trading Day is problematic because:

- the information for a Business Day is likely to be useful before the 15 Business Day deadline (e.g. to support more a more accurate Outstanding Amount calculation); and
- as discussed in section 4.6 of this call for further submissions, the Rule Change Panel is considering changes to allow Rule Participants to update their outage submissions after the 15 Business Day deadline.

The Rule Change Panel is therefore considering changes to replace the current requirement under clause 7.13.1A(b) for ex-post outage schedules with provisions that:

- define the unadjusted and capacity-adjusted outage quantity calculations for a Facility and Trading Interval;
- clarify where unadjusted versus capacity-adjusted outage quantities should be used; and
- require AEMO to use the most up to date outage information available at the time for its calculations.

The Rule Change Panel does not propose any changes to the requirements under clauses 7.13.1D to 7.13.1G and 10.5.3 to publish real-time outage details for Scheduled Generators and Non-Scheduled Generators, except to clarify that the outage quantities are unadjusted outage quantities.

Appendix B lists the provisions of the Market Rules that refer to outage quantities and the specific type of outage quantity (e.g. ex-ante or ex-post, unadjusted or capacity-adjusted) proposed to be used for each provision.

It should be noted that Rule Change Panel proposes to continue using capacity-adjusted outage quantities in some situations where it might be theoretically correct to use unadjusted outage quantities, because it considers that the costs of changing to unadjusted outage quantities would outweigh the benefits of the more accurate calculation. These exceptions are flagged as such in Appendix B of this call for further submissions.

¹⁹ The Rule Change Panel has not yet identified a need for an ex-ante schedule of unadjusted outage quantities.

The Rule Change Panel seeks feedback from stakeholders on:

16. Any concerns or suggestions regarding the proposed allocation of outage quantity types to provisions of the Market Rules.

4.4 Outage Rates

The PSOP: Facility Outages includes the methodology for calculating the Forced Outage Rate, Planned Outage Rate, Planned Outage Hours and Equivalent Planned Derated Hours of a Facility for a given period. The values are used for Reserve Capacity certification and performance monitoring as follows:

- Clause 4.11.1(h) allows AEMO to assign a reduced level of Certified Reserve Capacity to a Facility if its Planned Outage Rate and/or Forced Outage Rate over the preceding 36 months exceeds the limits specified under clause 4.11.1D.
- Under section 4.27, AEMO is required to monitor the number of Equivalent Planned Outage Hours taken by each Scheduled Generator and Non-Scheduled Generator assigned Capacity Credits for the current Capacity Year; and may impose a performance monitoring regime on a Market Generator if the number of Equivalent Planned Outage Hours taken by a Facility in the preceding 12 months exceeds 1750 hours. Equivalent Planned Outage Hours is defined as the sum of Planned Outage Hours and Equivalent Planned Derated Hours.

The Rule Change Panel has two main concerns with the current arrangements:

- the methodology specified in the PSOP: Facility Outages:
 - uses capacity-adjusted outage quantities and is therefore unsuitable for Intermittent Generators;
 - does not account for Facilities that are not assigned Capacity Credits for a Trading Interval; and
 - could produce unintended results for Facilities that are not in Commercial Operation for the full calculation period; and
- the calculations are not performed by System Management and are used for Reserve Capacity certification and performance monitoring rather than power system operation, so their definition in a PSOP seems inappropriate.

To address these concerns, the Rule Change Panel is considering changes to:

- relocate the Planned Outage Rate, Forced Outage Rate and Equivalent Planned Outage Hours calculations to an appendix of the Market Rules;
- update the calculation specifications to use:
 - unadjusted outage quantities as a proportion of maximum sent out capacity for Intermittent Generators; and
 - capacity-adjusted outage quantities as a proportion of Capacity Credits for Non-Intermittent Generators;
- set Equivalent Planned Outage Hours for a Trading Interval to zero if the Facility is not in Commercial Operation or is not assigned Capacity Credits in that Trading Interval;

- for the Planned Outage Rate and Forced Outage Rate calculations:
 - only include Trading Intervals in which the Facility was in Commercial Operation and assigned Capacity Credits; and
 - set Planned Outage Rate and Forced Outage Rate to zero if there are no Trading Intervals in the calculation period in which the Facility was in Commercial Operation and assigned Capacity Credits.

Details of the proposed outage rate calculations are provided in Appendix C of this call for further submissions.

The Rule Change Panel seeks feedback from stakeholders on:

17. Any concerns or suggestions regarding the proposed Planned Outage Rate, Forced Outage Rate and Equivalent Planned Outage Hours calculations.

4.5 Consequential Outages Caused by Non-Equipment List Network Equipment

Background:

Clause 3.21.2 sets out the definition of a Consequential Outage:

3.21.2. *A Consequential Outage is an outage of either a Facility or item of equipment on the list described in clause 3.18.2 or a facility or generation system to which clause 3.18.2A relates for which no approval was received from System Management, but which System Management determines:*

- (a) *was caused by a Forced Outage to another Rule Participant's equipment and would not have occurred if the other Rule Participant's equipment did not suffer a Forced Outage; or*
- (b) *was caused by a Planned Outage to a Network Operator's equipment and would not have occurred if the Network Operator's equipment did not undertake the Planned Outage,*

but excludes any outage deemed not to be a Consequential Outage in accordance with clause 3.21.10.

While this Rule Change Proposal includes several proposed changes to clause 3.21.2, it retains the criterion that the outage is caused by “a Forced Outage to another Rule Participant's equipment or a Planned Outage to a Network Operator's equipment”.

Issue:

During consultation on this Rule Change Proposal and RC_2013_15, several stakeholders raised concerns that the wording of this criterion excludes Market Participant outages caused by outages of Western Power network equipment that is not included on the Equipment List. This is because:

- a Planned Outage is defined as an outage that is approved by System Management, and System Management only approves Planned Outages for Outage Facilities (i.e. Equipment List Facilities and Self-Scheduling Outage Facilities); and
- a Forced Outage is defined as an outage of “either a Facility or item of equipment on the list described in clause 3.18.2 or a Facility or item or generation system to which clause 3.18.2A relates” (i.e. an Equipment List Facility or Self-Scheduling Outage Facility).

The main concern relates to outages of distribution-connected Scheduled Generators and Non-Scheduled Generators. These generators can suffer an outage due to an outage of equipment that is part of Western Power's distribution system but not required to be included on the Equipment List.

Additionally, some concerns have been raised about outages of transmission-connected generators caused by 'secondary' network systems (e.g. protection systems or communication systems) that are not currently included on the Equipment List.

The Amending Rules for RC_2013_15, which will commence on 1 February 2020, will require the Equipment List to include:

- any part of a transmission system (however defined by System Management) that could limit the output of a generation system that System Management has included on the Equipment List (clause 3.18.2(c)(i)); and
- any other equipment that System Management determines must be subject to outage scheduling to maintain Power System Security and Power System Reliability (clause 3.18.2(c)(vi)).

The Rule Change Panel decided to restrict clause 3.18.2(c)(i) to transmission system equipment in the Amending Rules for RC_2013_15 due to the high implementation costs of extending the requirement to cover distribution system equipment. However, it does not make sense for distribution-connected generators to be ineligible for Consequential Outages, so the requirement for a triggering outage to be an outage of an Equipment List Facility appears to be a manifest error in the Market Rules.²⁰

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering an additional change to the proposed Amending Rules to extend the criteria for a Consequential Outage to include triggering outages of any item of equipment that is part of a Network, not just those items that are included on the Equipment List.

The main effect of the change would be to ensure that distribution-connected generation systems are eligible for Consequential Outages, since most transmission-connected generation systems are included on the Equipment List and so the relevant transmission system equipment will also be included on the Equipment List.

The Rule Change Panel seeks feedback from stakeholders on:

18. Whether clause 3.21.2 should be amended to extend the criteria for a Consequential Outage to include triggering outages of any item of equipment that is part of a Network, not just those items that are included on the Equipment List.

4.6 Reporting Forced Outages in SMMITS

Background:

Currently clause 3.21.4 requires a Rule Participant whose Outage Facility suffers a Forced Outage to inform System Management of the outage "as soon as practicable". Clause 3.21.7 states that, notwithstanding the requirements of clause 3.21.4, the Rule Participant must

²⁰ In practice, System Management has approved Consequential Outages of distribution-connected Scheduled Generators and Non-Scheduled Generators since market start.

provide full and final details of the relevant Forced Outage to System Management no later than 15 calendar days following the Trading Day.²¹

The PSOP: Facility Outages requires the information specified under clause 3.21.4 to be provided by telephone as soon as practicable in the first instance, and then “confirmed via AEMO’s IT system” (i.e. SMMITS), also as soon as practicable.

Rule Participants cannot modify their outage details for a Trading Day in SMMITS after the 15-day deadline, and no mechanism exists to update the schedules of capacity-adjusted outage quantities for a Trading Day used for settlement once they have been created by System Management under clause 7.13.1A(b) on the fifteenth Business Day following the day on which the Trading Day ends.

Issues:

The Rule Change Panel has identified the following issues with the current arrangements for reporting Forced Outages:

- **Delays in reporting Forced Outages in SMMITS:**

While Rule Participants usually notify System Management of a Forced Outage by telephone as soon as they become aware of the outage, there is no explicit requirement to update SMMITS before the 15-day deadline. The Rule Change Panel considers that the prompt entry of Forced Outage details into SMMITS would provide material benefits in two cases:

- if a Scheduled Generator or Non-Scheduled Generator experiences an extended Forced Outage, the prompt reporting of the Forced Outage in SMMITS (with an estimated end time if necessary) would provide visibility of the outage to the market; and
- timely reporting of Forced Outages for Scheduled Generators with Capacity Credits could improve the accuracy of AEMO’s Outstanding Amount calculations by including a more accurate estimate of the Capacity Cost Refunds incurred for each Facility.

To date the Rule Change Panel has not identified any material benefits from the earlier entry of other types of Forced Outage.

- **MAC Market Rules Issues List Issues:**

MAC members nominated two relevant issues for inclusion on the initial MAC Market Rules Issues List:

- Issue 33: ERM Power noted that SMMITS does not allow Forced Outages to be amended after their initial entry. ERM Power considered that this can have the distortionary effect of a Market Generator not logging a Forced Outage in SMMITS until it has absolute certainty that the details are correct, in some cases delaying entry up to the 15-day deadline.

ERM Power considered that if a Market Generator could cancel or amend its Forced Outage information, it will likely provide more accurate and transparent signals to

²¹ This Rule Change Proposal includes changes to specify that the reference to “full and final details” in clause 3.21.7 relates to each Trading Day on which the outage occurred or continued to occur, to clarify the requirement in relation to Forced Outages that extend for more than 15 days.

the market of what capacity is really available to the system and assist System Management in its generation planning.

- Issue 17: Bluewaters Power noted that a Market Generator is not allowed to retrospectively log a Forced Outage in SMMITS after the 15-day deadline, even if the Market Generator is subsequently found to be in breach of the Market Rules for not logging the Forced Outage in time. This can result in under-reporting of Forced Outages and the use of incorrect information for settlement.

Bluewaters Power recommended a rule change to enable Market Generators to retrospectively log a Forced Outage after the 15-day deadline. Further, if a Market Participant is found to be in breach of the Market Rules by not logging the Forced Outage by the deadline, it should be required to log the outage.

The Rule Change Panel notes that other changes are also required to ensure that a late-reported Forced Outage is processed appropriately (e.g. to recover any spurious constrained off payments and correctly calculate Capacity Cost Refunds).

- **Clarification of “as soon as practicable”:**

In its submission on RC_2013_15, Collgar requested a definition of “as soon as practicable” in relation to the requirement (in new clause 7A.2A.1) to ensure that a Market Generator has notified System Management of a Forced Outage or Consequential Outage for capacity declared unavailable in a Balancing Submission.

The Rule Change Panel notes that proposed clause 7A.2A.2 imposes similar obligations on Synergy with respect to the Balancing Portfolio.

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering the following additional changes to the proposed Amending Rules to address the Forced Outage reporting issues it has identified.

Original notification timing: The Rule Change Panel is considering changes that would:

- require a Market Generator whose Scheduled Generator or Non-Scheduled Generator suffers a Forced Outage that lasts for 24 hours or more to report the Forced Outage in System Management’s outage management system within 24 hours of its commencement;
- require a Market Generator to report a Forced Outage of a Non-Intermittent Generator with Capacity Credits in System Management’s outage management system (in respect of a Trading Day):
 - by the end of the third Business Day after the day on which the Trading Day ends, if the Market Generator does not require access to its Meter Data Submissions to determine the quantity of de-rating; and
 - otherwise, by the earlier of the current 15-day deadline and the end of the third Business Day after the day on which it receives the required Meter Data Submissions;
- for other Forced Outages, retain the requirement to provide full and final details for each Trading Day by the 15-day deadline; and
- for all Forced Outages, retain the requirement to provide the initial notification to System Management as soon as practicable and as specified in the PSOP.

The proposed timing for Forced Outages of generators with Capacity Credits is intended to limit the administrative burden on Market Generators by allowing them to group most of their Forced Outage reporting into no more than two batches per week.

Updates and late submissions: The Rule Change Panel is considering changes that would:

- require a Rule Participant, if it has reported a Forced Outage in System Management's outage management system and then obtains more accurate information about the end time or outage quantity, to update System Management's outage management system to reflect the more accurate information by the end of the next Business Day;
- without limiting the obligations to report Forced Outages by the times listed above, allow a Rule Participant to report a Forced Outage up to 9 months after the Trading Day on which the Forced Outage started (for example if it determines after the 15-day deadline that it should have reported a Forced Outage);²²
- require a Rule Participant to keep records of its reasons for reporting a Forced Outage or making any changes to a Forced Outage record after the 15-day deadline, and to make those records available to AEMO or the ERA if requested;
- require the recalculation of Theoretical Energy Schedules for a Balancing Facility if there is a change to its Outage records; and
- require AEMO to use the most up to date outage information available at the time for its calculations, except where the use of ex-ante outage schedules is specified.

Clarification of new clauses 7A.2A.1 and 7A.2A.2: The Rule Change Panel is considering changes to clauses 7A.2A.1 and 7A.2A.2 to clarify that Market Generators must notify System Management of a Forced Outage or Consequential Outage under these clauses in accordance with the requirements specified in the Market Rules and the PSOP.

The Rule Change Panel seeks feedback from stakeholders on:

19. Whether the time periods in the proposed obligation to report extended Forced Outages in SMMITS (i.e. to report within 24 hours if the outage period exceeds 24 hours) is appropriate or whether different time periods should be used.
20. Whether the proposed deadlines for reporting Forced Outages for Non-Intermittent Generators with Capacity Credits provide an appropriate balance between prudential risk and administrative burden; and if not, what deadlines would provide a better balance.
21. Any concerns about the proposed requirement to update existing Forced Outage records within 1 Business Day of receiving more accurate information about the end time or outage quantity.
22. Any concerns about the proposed 9-month deadline for late changes to Forced Outage details in SMMITS.
23. Any reasons why stricter deadlines should be imposed on Outage Facilities that are not Scheduled Generators or Non-Scheduled Generators.

²² AEMO has suggested a 9-month deadline for any changes relating to Forced Outages or Consequential Outages, to ensure there is enough time for the changes to be processed and included in the final settlement adjustment run for each Trading Month.

4.7 Requesting Consequential Outages in SMMITS

Background

Currently clause 3.21.4 requires a Rule Participant whose Outage Facility suffers a Consequential Outage to inform System Management of the outage as soon as practicable. Clause 3.21.7 states that, notwithstanding the requirements of clause 3.21.4, the Rule Participant must provide full and final details of the relevant Consequential Outage to System Management no later than 15 calendar days following the Trading Day.

Additionally, clause 3.21.8 states that if a Market Participant considers that one of its Facilities has suffered a Consequential Outage it may provide System Management with a notice signed by an Authorised Officer confirming details of the Consequential Outage no later than 15 calendar days following the Trading Day on which the Consequential Outage commenced.

While the Market Rules contain no specific obligation, in practice System Management completes its assessment of Consequential Outage requests in time for the preparation of the ex-post outage schedules required under clause 7.13.1A(b). AEMO has confirmed (most recently at the 25 October 2019 MAC workshop) that it is able to meet this deadline.

The proposed Amending Rules in this Rule Change Proposal allow a Rule Participant to submit a request for a Consequential Outage before the start of the outage, and allow System Management to make its decision on a request before, during or after the outage period.

The proposed Amending Rules also allow System Management to revise an earlier Consequential Outage determination if the earlier determination was based on incorrect or superseded information.

Issues

The Rule Change Panel has identified the following issues with the current and proposed timing requirements for Consequential Outages:

- **Impact of changes to a foreseeable constraint:**

If a Consequential Outage is approved before or during the outage, then a subsequent change to the triggering outage may cause the details of the Consequential Outage to become invalid (e.g. if the details of the foreseeable constraint are altered). The proposed Amending Rules do not make clear what should happen in these situations.

- **Conversion of a Forced Outage to a Consequential Outage:**

On several occasions, most recently at the 25 October 2019 MAC workshop, Bluewaters has suggested that a Market Generator should be able to submit a Consequential Outage request after the current 15-day submission deadline. Bluewaters considers that later submissions should be allowed because a Market Generator may not have all the information it needs to support a Consequential Outage request by the 15-day deadline.

- **Updates to Consequential Outage requests:**

The Rule Change Panel considers that there may be circumstances in which a Rule Participant should be able to update a previously submitted Consequential Outage request, including after the standard 15-day deadline.

Potential changes to the proposed Amending Rules:

The Rule Change Panel is considering the following additional changes to the proposed Amending Rules to address the identified Consequential Outage processing issues and account for the use of triggering outage notifications.

Original submission timing: The Rule Change Panel notes that triggering outage notifications provide the same transparency benefits as the early submission of Consequential Outage requests, removing that rationale for imposing stricter submission deadlines. Further, there is likely to be little benefit in a Rule Participant submitting an ex-ante Consequential Outage request that is not related to a foreseeable constraint, because System Management is unlikely to be able to assess such a request ex-ante.

However, generally the Rule Change Panel has no concerns with the ex-ante submission of Consequential Outage requests, provided they do not require material implementation costs.²³

Accordingly, the Rule Change Panel is considering making any additional changes required to the proposed Amending Rules to:

- allow a Rule Participant to submit a Consequential Outage request associated with a foreseeable constraint before the outage begins, provided it includes the reference id for the foreseeable constraint in the request;
- for Consequential Outages not associated with a foreseeable constraint, retain the requirement for the Rule Participant to provide the initial notification of the outage to System Management as soon as practicable and as specified in the PSOP; and
- retain the existing requirement for a Rule Participant seeking a Consequential Outage to submit its request in relation to each Trading Day by the 15-day deadline for that Trading Day (provided that the required supporting evidence is available by that time).

Updates and late submissions: The Rule Change Panel is considering changes that would:

- allow a Rule Participant to update a previously submitted Consequential Outage request, including a previously approved request, where it determines that the information provided in the original request is incorrect – this may occur after the 15-day deadline if the relevant information (e.g. corrected meter readings) only becomes available later, but would be subject to a final deadline of 9 months after the first Trading Day of the outage;
- allow a Rule Participant to submit a Consequential Outage request in respect of a Trading Day after the 15-day deadline (but no later than 9 months after the Trading Day) if the Rule Participant obtains evidence to support its request that was not available to the Rule Participant at the time of the deadline; and
- require a Rule Participant to keep records of its reasons for requesting a Consequential Outage or making any changes to a Consequential Outage request in respect of a Trading Day after the 15-day deadline, and to make those records available to AEMO or the ERA if requested.

²³ During the 25 October 2019 MAC workshop, AEMO confirmed that it would not incur any additional IT costs to allow ex-ante submission of Consequential Outage requests, regardless of the method chosen by AEMO for the submission of these requests.

For late Consequential Outage submissions, the Rule Change Panel is considering the following process, which was developed in consultation with stakeholders at the 25 October 2019 MAC workshop:

- If a Rule Participant cannot obtain the information it needs to support a Consequential Outage request by the 15-day deadline, then it must report a Forced Outage for the relevant period.
- If the Rule Participant subsequently obtains the required information, then it may submit a late Consequential Outage request to System Management.
- System Management must approve or reject the request as soon as practicable.
- If System Management rejects the request, or is unable to process the request by the time of the last settlement adjustment, then the Forced Outage remains in effect.
- If System Management approves the request, then the Forced Outage is deleted.

System Management processing: The Rule Change Panel is considering making any additional changes required to the proposed Amending Rules to:

- require System Management to approve or reject a Consequential Outage request, including a revised request, as soon as practicable;
- require System Management to approve a Consequential Outage request if it is related to a triggering outage and consistent with the foreseeable constraint information that has been provided by System Management in triggering outage notifications;
- for Consequential Outages not associated with a foreseeable constraint, retain the current obligation on System Management to accept the information provided by a Rule Participant in a Consequential Outage request unless the information is inconsistent with other information held by System Management;
- require System Management to reject a previously approved Consequential Outage for a foreseeable constraint if there is a change to the foreseeable constraint that causes the request to no longer be valid;
- allow System Management to reject a previously approved Consequential Outage (up to 9 months after the first Trading Day of the outage), if it considers that the original determination was based on incorrect information, or has been superseded by new or updated information; and
- require System Management to notify a Rule Participant of the rejection of a Consequential Outage request and the reason for the rejection.

The Rule Change Panel seeks feedback from stakeholders on:

24. Under what circumstances (apart from the late submission of a Consequential Outage request as suggested by Bluewaters) would a Rule Participant need to be able to update a Consequential Outage after the normal 15-day deadline.
25. Any concerns about the proposed 9-month deadline for late changes to Consequential Outage requests in SMMITS.

4.8 Transitional Requirements

This Rule Change Proposal is likely to require transitional provisions. The specific requirements are yet to be determined but are likely to include:

- provisions to manage the conversion of unadjusted and capacity-adjusted outage quantities for Scheduled Generators and Non-Scheduled Generators; and
- a clarification of the starting point for triggering outage notifications.

The Rule Change Panel seeks feedback from stakeholders on:

26. What transitional provisions would need to be included in the Amending Rules to support the implementation of this Rule Change Proposal.

5. Proposed Amending Rules

To assist stakeholders in preparing their submissions, RCP Support has prepared the following revision to the proposed Amending Rules to reflect the changes to the Market Rules since the publication of the Rule Change Proposal. Clarification of any changes made to the proposed Amending Rules has been provided in comment boxes.

Please note that these amendments are purely indicative at this time, have not been approved by the Rule Change Panel, and may be subject to change in the Draft Rule Change Report.

The changes to the proposed Amending Rules are as follows:

- the proposed change to clause 3.18.3A is no longer required as it has been superseded by the Amending Rules for RC_2013_15, which commence on 1 February 2020;
- proposed clauses 3.21.2, 3.21.2A, 3.21.2B, 3.21.4A, 3.21.9 and 7.13.1G were amended to reflect the need to renumber proposed clauses 3.21.2A and 3.21.2B (to 3.21.2B and 3.21.2C respectively) because clause 3.21.2A already exists;
- proposed clause 3.21.2(c) was amended to use the correct label formats (e.g. 'i.' rather than '(i)');
- the proposed change to clause 3.21.6(e) was removed because the clause, which required the IMO to provide Reserve Capacity Obligation Quantities to System Management, was deleted when the System Management function was transferred to AEMO;
- the proposed change to clause 3.21.12 is no longer required as it has already been made;
- the proposed change to clause 7.10.2(c)(i) was amended to use the correct clause reference (clause 3.21.4A rather than clause 4.21.4A); and
- the proposed changes to clause 7.13.1G were amended to reverse the erroneous removal of the semicolon at the end of clause 7.13.1G(b).

The revised proposed Amending Rules are presented below in their entirety, marked up against the expected Market Rules as at 1 February 2020, i.e. the Market Rules as at 1 November 2019, updated to reflect the Amending Rules for RC_2013_15 (~~deleted text~~, added text, clauses that are included for context but not amended):

Note that the proposed changes to clause 3.18.4A have been superseded by the Amending Rules for Rule Change Proposal: Outage Planning Phase 2 – Outage Process Refinements (RC_2013_15), which will commence on 1 February 2020.

3.18.4A. A proposal submitted to System Management in accordance with this section 3.18 by a Market Participant or Network Operator in which permission is sought from System Management for some or all of the capacity or capability of an Equipment List Facility to be unavailable for service for a period is a proposed outage plan (“**Outage Plan**”).

...

3.21. Forced Outages and Consequential Outages

3.21.1. A Forced Outage is any outage of either a Facility or item of equipment on the list described in clause 3.18.2 or a Facility or generation system to which clause 3.18.2A relates that has not received System Management’s approval, including:

- (a) outages or de-ratings for which no approval was received from System Management, excluding Consequential Outages;
- (aB) outages or de-ratings as a result of a direction from System Management under clause 2.28.3C;
- (b) any part of a Planned Outage that exceeds or, for the purposes of clause 3.21.2(b) and (c), a Consequential Outage which will exceed its approved duration; and
- (c) where the Market Participant or Network Operator does not follow a direction from System Management under clause 3.20.1 to return the equipment to service within the time specified in the appropriate contingency plan.

Proposed clause 3.21.2 has been amended to reflect the need to renumber proposed new clauses 3.21.2A and 3.21.2B (to 3.21.2B and 3.21.2C respectively) because clause 3.21.2A already exists; and to use the correct format for the labels of 3.21.2(c) (e.g. ‘i.’ rather than ‘(i)’).

3.21.2. A Consequential Outage is an outage of ~~either~~ a Facility or item of equipment on the list described in clause 3.18.2, or a ~~facility~~ Facility or generation system to which clause 3.18.2A relates ~~for which no approval was received from System Management, but which System Management determines, where:~~

- (a) after receiving a notification under clause 3.21.4, System Management determines (under clause 3.21.2B) that the outage was caused by a Forced Outage to another Rule Participant’s equipment or a Planned Outage to a Network Operator’s equipment, and would not have occurred if the relevant other Rule Participant’s equipment did not suffer a had not been affected by the Forced Outage or Planned Outage; or

- ~~(b) was caused by a Planned Outage to a Network Operator's equipment and would not have occurred if the Network Operator's equipment did not undertake the Planned Outage;~~
- ~~(b) after receiving a notification under clause 3.21.4A and at least 30 minutes before Balancing Gate Closure for the relevant Trading Interval or the first relevant Trading Interval, System Management determines (under clause 3.21.2B) that the outage will be caused by a Forced Outage to another Rule Participant's equipment or a Planned Outage to a Network Operator's equipment; or~~
- ~~(c) after receiving a notification under clause 3.21.4A and as at 30 minutes before Balancing Gate Closure for the relevant Trading Interval or the first relevant Trading Interval:~~
- ~~i. the outage has not commenced;~~
 - ~~ii. System Management has not determined (under clause 3.21.2B) that the outage will be caused by a Forced Outage to another Rule Participant's equipment or a Planned Outage to a Network Operator's equipment; and~~
 - ~~iii. the affected Rule Participant reasonably expected, based on information that was available to it 30 minutes before Balancing Gate Closure, that the outage would occur and would be caused by a Forced Outage to another Rule Participant's equipment or a Planned Outage to a Network Operator's equipment.~~

~~but excludes any outage deemed not to be a Consequential Outage in accordance with clause 3.21.10.~~

3.21.2A. An outage does not occur in respect of a Constrained Access Facility for the purposes of these Market Rules where the Constrained Access Facility is dispatched in accordance with a Network Control Service Contract and these Market Rules.

Proposed new clauses 3.21.2A and 3.21.2B have been renumbered to 3.21.2B and 3.21.2C respectively, because a clause 3.21.2A has been added to the Market Rules since the submission of this Rule Change Proposal. Cross-references within the clauses have been updated accordingly.

3.21.2B. System Management must determine whether an outage notified under clause 3.21.4 or 3.21.4A, is a Consequential Outage, and must inform the Market Participant or Network Operator of its determination, as soon as reasonably practicable after being notified of the outage. System Management may make its determination before, during or after the outage occurs or was reasonably expected to occur.

3.21.2C. Subject to clause 3.21.9, if System Management considers that a determination under 3.21.2B was based on incorrect information, or has been superseded by new or updated information, then System Management may change the

determination. For the avoidance of doubt, this clause 3.21.2C does not apply in respect of an outage that is a Consequential Outage under clause 3.21.2(c).

- 3.21.3. System Management must keep a record of all Forced Outages and Consequential Outages of which it ~~is~~ becomes aware.
- 3.21.4. A Market Participant or Network Operator must notify System Management as soon as practicable after ~~if~~ a Facility or item of equipment that is on the list described in clause 3.18.2, or a Facility or generation system to which clause 3.18.2A relates ~~suffers, is de-rated as a result of~~ a Forced Outage or Consequential Outage, ~~then the relevant Market Participant or Network Operator must inform System Management of the outage as soon as practicable. The notice must include the information specified in clause 3.21.4B. Information provided to System Management must include:~~
- ~~(a) the time the outage commenced;~~
 - ~~(b) an estimate of the time the outage is expected to end;~~
 - ~~(c) the cause of the outage;~~
 - ~~(d) the Facility or item of equipment or Facilities or items of equipment affected; and~~
 - ~~(e) for each affected Facility or item of equipment, the expected quantity of any de-rating by Trading Interval, where, if the Facility is a generating system, this quantity is to be submitted in accordance with clause 3.21.5.~~

Proposed new clause 3.21.4A has been amended to reflect the need to renumber proposed new clause 3.21.2A to 3.21.2B because clause 3.21.2A already exists.

3.21.4A. A Market Participant or Network Operator may notify System Management if a Facility or item of equipment that is on the list described in clause 3.18.2, or a Facility or generation system to which clause 3.18.2A relates, is (in the Market Participant's or Network Operator's opinion) likely to be is de-rated as a result of a Forced Outage or Consequential Outage, subject to System Management's determination under clause 3.21.2B. The notice must include the information specified in clause 3.21.4B.

3.21.4B. The information provided to System Management under clause 3.21.4 or 3.21.4A must include:

- (a) the time the outage commenced or is expected to commence;
- (b) an estimate of the time the outage ended or is expected to end;
- (c) the cause of the outage;
- (d) each Facility, item of equipment or generation system de-rated as a result of the outage; and
- (e) for each Facility, item of equipment or generation system de-rated as a result of the outage, the expected quantity of any de-rating by Trading

Interval, where, if the Facility is a generating system, this quantity is to be submitted in accordance with clause 3.21.5; and

(f) any other information necessary for verifying the details of the outage requested by System Management.

3.21.5. The quantity of an ~~outage~~ Outage notification submitted to System Management ~~is the reduction in capacity from the relevant Facility's maximum capacity measured on a sent out basis at 41 degrees Celsius where the maximum capacity is as found in the Standing Data file for Temperature Dependence provided under Appendix 1(b) iv and converted to a sent out basis at 41 degrees Celsius. The remaining capacity, determined as the maximum capacity minus the notified outage, must be available to System Management for dispatch.;~~

(a) for a Scheduled Generator, is the reduction in capacity from the relevant Facility's Sent Out Capacity, adjusted to 41 degrees Celsius using the information provided in the Standing Data file for temperature dependence provided under Appendix 1(b)(iv), and measured as an average over the Trading Interval. The remaining capacity, determined as the Sent Out Capacity minus the notified outage, must be available to System Management for dispatch; and

(b) for a Non-Scheduled Generator, is the reduction in capacity from the relevant Facility's Sent Out Capacity, measured as an average over the Trading Interval.

3.21.6. The following will apply for a Scheduled Generator for the purposes of clauses 7.3.4 and 7.13.1A-(b):

(a) ~~outage~~ Outage data ~~will~~ must be entered by Market Participants in System Management's ~~computer interface system on a sent out~~ an as generated basis at 15 degrees Celsius. System Management will convert the Outage data entered by Market Participants in System Management's computer interface system to a sent out basis at 15 and 41 degrees Celsius. System Management will convert the ~~outage~~ Outage data from 15 degrees on a sent out basis to a sent out basis at 41 degrees Celsius by multiplying the ~~outage~~ Outage quantity at 15 degrees Celsius on a sent out basis by the ratio of the ~~maximum capacity~~ Sent Out Capacity at 41 degrees Celsius to the ~~maximum capacity~~ Sent Out Capacity at 15 degrees Celsius for the Facility, as found in the Standing Data file for temperature dependence provided under Appendix 1(b) iv 1(b)(iv) on a generated basis for that facility Facility. ~~Market Participants will submit the outage data at 41 degrees Celsius as displayed by System Management's computer interface system;~~

(b) System Management ~~will~~ must calculate the Forced Outage ~~(on a sent out basis at 41 degrees Celsius)~~ for a Facility in a Trading Interval as the greater of:

i. zero; and

- ii. the sum of all Forced Outages notified for that Facility minus the difference ~~of between~~ the Facility's Sent Out Capacity at 41 degrees Celsius and the MW quantity corresponding to the number of Capacity Credits assigned to that Facility. ~~maximum capacity and its Reserve Capacity Obligation Quantity;~~
- (c) System Management ~~will~~ must calculate the Planned Outage ~~(on a sent out basis at 41 degrees Celsius)~~ for a Facility in a Trading Interval as the greater of:
- i. zero; and
 - ii. the sum of all Planned Outages minus the greater of:
 - 1. zero; and
 - 2. the ~~maximum capacity~~ Sent Out Capacity at 41 degrees Celsius of the Facility minus ~~its Reserve Capacity Obligation Quantity~~ the MW quantity corresponding to the number of Capacity Credits assigned to that Facility minus the sum of all Forced Outages notified for the Facility before the adjustment in ~~(b) above~~ clause 3.21.6(b) is made by System Management; ~~and.~~
- (d) System Management ~~will~~ must calculate the Consequential Outage ~~(on a sent out basis at 41 degrees Celsius)~~ for a Facility in a Trading Interval as the greater of:
- i. zero; and
 - ii. the sum of all Consequential Outages minus the greater of:
 - 1. zero; and
 - 2. the ~~maximum capacity~~ Sent Out Capacity at 41 degrees Celsius of the Facility minus ~~its Reserve Capacity Obligation Quantity~~ the MW quantity corresponding to the number of Capacity Credits assigned to that Facility minus the sum of all Forced Outages and the sum of all Planned Outages notified for the Facility before the adjustments in ~~(b) and (c) above~~ clauses 3.21.6(b) and (c) are made by System Management; ~~.~~

The proposed change to clause 3.21.6(e) has been removed because the clause, which required the IMO to provide Reserve Capacity Obligation Quantities to System Management, was deleted when the System Management function was transferred to AEMO. The clause can be deleted if, as proposed, clause 3.21.6(f) is deleted.

~~(e)~~ [Blank]

~~(f)~~ the maximum capacity used in this clause is the value defined in clause 3.21.5.

- 3.21.7. Notwithstanding the requirements of clause 3.21.4 that a relevant Market Participant or Network Operator must inform System Management of a Forced Outage or Consequential Outage as soon as practicable, a Market Participant or Network Operator must provide full and final details of the relevant Planned Outage, Forced Outage or Consequential Outage to System Management no later than ~~fifteen~~ 15 calendar days following ~~the~~ each Trading Day on which the Outage occurred or continued to occur.
- 3.21.8. ~~[Blank]If a Market Participant considers that one of its Facilities has suffered a Consequential Outage then the Market Participant may provide System Management with a notice confirming details of the Consequential Outage no later than 15 calendar days following the Trading Day on which the Consequential Outage commenced. The notice must:~~
- ~~(a) be signed by an Authorised Officer of the Market Participant;~~
 - ~~(b) confirm that a Consequential Outage has occurred; and~~
 - ~~(c) provide details (to the best of its knowledge) of the events which resulted in the Consequential Outage.~~

Proposed clause 3.21.9 has been amended to reflect the need to renumber proposed new clause 3.21.2A to 3.21.2B because clause 3.21.2A already exists.

- 3.21.9. In its determination of a Consequential Outage under clause 3.21.2B, System Management must accept the information provided by a Market Participant or Network Operator under clause ~~3.21.8~~ 3.21.4 or 3.21.4A unless the information is inconsistent with other information held by System Management.
- 3.21.10. ~~[Blank]If a Market Participant informs System Management of a Consequential Outage under clause 3.21.4, but does not provide System Management with a notice in accordance with clause 3.21.8, then the outage will be deemed not to be a Consequential Outage and System Management must not include the outage as a Consequential Outage in the schedule provided to AEMO in accordance with clause 7.13.1A(b).~~
- 3.21.11. ~~[Blank]System Management must retain the notices it receives under clause 3.21.8.~~

The proposed changes to clause 3.21.12 have been superseded by the Amending Rules for Rule Change Proposal: Removal of Market Operation Market Procedures (RC_2015_01), which commenced on 1 August 2019.

- 3.21.12. System Management must document the procedure to be followed in determining and reporting Forced Outages and Consequential Outages in a Power System Operation Procedure.

...

4.25.3A. AEMO must not subject a Facility to a Reserve Capacity Test if:

- (a) that Facility is undergoing a Scheduled Outage or Opportunistic Outage which has been approved in accordance with clause 3.19, or
- (b) the relevant Market Participant has advised System Management of a Forced Outage or Consequential Outage for that Facility in accordance with clause 3.21.4 or 3.21.4A; or
- (c) that Facility is undergoing a Commissioning Test approved in accordance with clause 3.21A.

...

The proposed change to clause 7.10.2(c)(i) has been amended to use the correct clause reference (clause 3.21.4A rather than clause 4.21.4A as shown in the Rule Change Proposal).

7.10.2. A Market Participant is not required to comply with clause 7.10.1 if:

- (a) such compliance would endanger the safety of any person, damage equipment or breach any applicable law;
- (b) the Facility was physically unable to maintain the ramp rate specified in the Dispatch Instruction but:
 - i. the actual output of the Facility did not, at any time the Dispatch Instruction applied, vary from the output specified in the Dispatch Instruction by more than the applicable Tolerance Range or Facility Tolerance Range; and
 - ii. the average output over a Trading Interval of the Facility was equal to the output specified in the Dispatch Instruction;
- (c) both of the following apply:
 - i. the Market Participant has notified System Management, in accordance with clause 3.21.4 or 3.21.4A, that its Registered Facility has been affected, or will be affected, by a Forced Outage or Consequential Outage; and
 - ii. the quantity of the Forced Outage or Consequential Outage notified is consistent with the extent to which the Market Participant did not comply with the most recently issued Dispatch Instruction, Operating Instruction or Dispatch Order applicable to its Registered Facility for the Trading Interval;
- (d) a Demand Side Programme was issued a Dispatch Instruction by System Management under clause 7.6.1C and its Reserve Capacity Obligation Quantity, as determined under clause 4.12.4(c) is or becomes zero; or
- (e) clause 7.7.3C excuses compliance.

...

7.13.1A. System Management must record the following data for a Trading Day by noon on the fifteenth Business Day following the day on which the Trading Day ends:

- (a) the MWh quantity of non-compliance by Synergy by Trading Interval; and
- (b) the schedule of all Planned Outages, Forced Outages and Consequential Outages relating to each Trading Interval in the Trading Day by Market Participant and Facility as measured on a sent out basis at:-

i. 15 degrees Celsius for Scheduled Generators and Non-Scheduled Generators; and

ii. 41 degrees Celsius for Scheduled Generators.

...

The proposed changes to clause 7.13.1G have been amended to reverse the erroneous removal of the semicolon at the end of clause 7.13.1G(b) and reflect the renumbering of proposed new clause 3.21.2A to 3.21.2B.

7.13.1G. The information required to be recorded by System Management under clause 7.13.1F must include:

- (a) whether the outage is considered to be a Forced Outage or Consequential Outage;
- (b) the information provided under clauses ~~3.21.4(a)~~ 3.21.4B(a) - 3.21.4(d);
- (c) the time and date when:
 - i. the Forced Outage was first notified to System Management;
 - ii. the outage status was amended by System Management; and
 - iii. System Management recorded in its computer interface system that a Consequential Outage occurred as determined under clause 3.21.2B; and
- (d) the MW quantity of any de-rating to a Scheduled Generator or Non-Scheduled Generator, as measured on a sent out basis at 15 degrees Celsius.

...

Glossary

...

Available Capacity: Means, for a Trading Interval and for a Scheduled Generator or Non-Scheduled Generator, the ~~sent out capacity~~ Sent Out Capacity, in MW, ~~of a Scheduled Generator or a Non-Scheduled Generator that was not subject to an~~ less the quantity, in MW, of any Outage notified to AEMO under clause 7.13.1A(b)(i).

Appendix A. Capacity-Adjusted Outage Quantities

For each Non-Intermittent Generator f , for each Trading Interval t :

The Capacity-Adjusted Forced Outage Quantity is:

$$CAFO(f,t) = \max(0, UFO(f,t) - (MSOC(f,t) - ACC(f,t)))$$

The Capacity-Adjusted Planned Outage Quantity is:

$$CAPO(f,t) = \max(0, UPO(f,t) - \max(0, MSOC(f,t) - ACC(f,t) - UFO(f,t)))$$

The Capacity-Adjusted Consequential Outage Quantity is:

$$CACO(f,t) = \max(0, UCO(f,t) - \max(0, MSOC(f,t) - ACC(f,t) - UFO(f,t) - UPO(f,t)))$$

Where:

$MSOC(f,t)$ is the maximum sent out capacity of Facility f specified under Appendix 1(b)(iii) or 1(e)(iiiA) (as applicable) for Trading Interval t ;

$UFO(f,t)$ is the Unadjusted Forced Outage Quantity for Facility f in Trading Interval t ;

$UPO(f,t)$ is the Unadjusted Planned Outage Quantity for Facility f in Trading Interval t ;

$UCO(f,t)$ is the Unadjusted Consequential Outage Quantity for Facility f in Trading Interval t ;

$ACC(f,t)$ is equal to:

If the maximum daily ambient site temperature at the site of Facility f is available to System Management at the time of the calculation and exceeds 41 degrees Celsius:

$$\text{Capacity_Credits} \times \text{SOC}_{45} / \text{SOC}_{41}$$

Where

Capacity_Credits is the number of Capacity Credits held for Facility f in Trading Interval t ;

SOC_{45} is the maximum sent out capacity of Facility f at 45 degrees Celsius (determined from the information provided by the Market Participant for the relevant Reserve Capacity Cycle under clause 4.10.1(e)(i)); and

SOC_{41} is the maximum sent out capacity of Facility f at 41 degrees Celsius (determined from the information provided by the Market Participant for the relevant Reserve Capacity Cycle under clause 4.10.1(e)(i));

Otherwise, the number of Capacity Credits held by Facility f in Trading Interval t .

Appendix B. Use of Outage Quantity Types in the Market Rules

Note: In this table ‘ex-ante’ means the snapshot of values determined for a Trading Day early on the Scheduling Day (currently under clause 7.3.4), while ‘ex-post’ means values determined for a Trading Day using the latest outage information available to AEMO (i.e. the values are updated as necessary to reflect any amendments made by System Management or the Market Participant).

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
3.23.1(e), (f) and (h)	Requirements for LoadWatch Report – for each Business Day of a week, the total MW quantity of Outages; the total available generation capacity and total Demand Side Management capacity after accounting for total Outages; and the total available generation capacity and total Demand Side Management capacity after accounting for total Outages and the maximum Operational System Load Estimate.	Ex-ante capacity-adjusted values (no change from current)	AEMO has advised that it currently uses ex-ante capacity-adjusted values. Although unadjusted outage quantities may be more relevant, the cost of changing the outage type is unlikely to be warranted.
4.11.1(h)	Potential for AEMO to reduce the Certified Reserve Capacity assigned to a Facility on the basis of deficiencies in the Facility’s Forced Outage rate and/or Planned Outage rate over the previous 36 months.	Calculated under a new Appendix of the Market Rules (moved from the PSOP: Facility Outages), using the methodology described in Appendix C of this call for further submissions.	
4.12.1(a)(iv) and (b)(iv)	Specification of the Reserve Capacity Obligations of a Market Participant holding Capacity Credits – refers to “capacity expected to experience a Forced Outage at the time that STEM Submissions were due which becomes available in real time”	Ex-ante capacity-adjusted outage quantities	

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
4.12.6(b)	Reduction of the RCOQ for a Facility for a Trading Interval to reflect the amount of capacity unavailable due to a Consequential Outage or Planned Outage included in the schedule maintained by System Management in accordance with clause 7.3.4.	Ex-ante capacity-adjusted outage quantities	
4.26.1(e)	Capacity refund calculations – calculation of Spare(f,t) for a Scheduled Generator f in the Trading Interval t - uses “the MW quantity of Outage as recorded under clause 7.13.1A(b)”	Ex-post capacity-adjusted outage quantities	Note that these may be subject to late updates that affect settlement adjustments
4.26.1(f)(i)(2)	Capacity refund calculations – calculation of the minimum refund factor RF floor(f,t) – uses “the quantity of Forced Outage for a Facility f in the Trading Interval pt, as recorded in accordance with clause 7.13.1A(b)”	Ex-post capacity-adjusted outage quantities	Note that these may be subject to late updates that affect settlement adjustments
4.26.1A(a)(ii)(1)	Facility Reserve Capacity Deficit Refund calculation – uses “the total Forced Outage and Refund Payable Planned Outage in that Trading Interval measured in MW”	Ex-post capacity-adjusted outage quantities	Note that these may be subject to late updates that affect settlement adjustments

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
4.26.2	<p>Net STEM Shortfall calculation – uses MW quantities of Refund Payable Planned Outage; the total MW quantity of Planned Outage associated with Facility f before the STEM Auction for Trading Interval as provided to the AEMO by System Management in accordance with clause 7.3.4; the total MW quantity of Forced Outage associated with Market Participant p before the STEM Auction for Trading Interval t, where this is the sum over all the Market Participant’s Registered Facilities of the lesser of the Reserve Capacity Obligation Quantity of the Facility for Trading Interval t and the MW Forced Outage of the Facility for Trading for Trading Interval t as recorded in accordance with Section 7.3; the total MW quantity of Forced Outage associated with Market Participant p in real-time for Trading Interval t, where this is the sum over all the Market Participant’s Registered Facilities of the lesser of the Reserve Capacity Obligation Quantity of the Facility for Trading Interval t and the MW Forced Outage of the Facility for Trading Interval t as recorded in accordance with clause 7.13.1A(b).</p>	<p>For the 7.3 references, ex-ante capacity-adjusted outage quantities (highlighted in yellow), and for the other references ex-post capacity-adjusted outage quantities (highlighted in blue).</p>	<p>Note that the ex-post quantities may be subject to late updates that affect settlement adjustments</p>
4.26.6(d)	<p>Calculation of the Facility Capacity Rebate for a Scheduled Generator or Demand Side Programme – for a Scheduled Generator, uses “the MW quantity of Outage as recorded under clause 7.13.1A(b)</p>	<p>Ex-post capacity-adjusted outage quantities</p>	<p>Note that these may be subject to late updates that affect settlement adjustments</p>

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
6.3A.2(a)	Information calculated by AEMO on a Scheduling Day and released to each Market Participant by 9:00 AM – Maximum Supply Capability – uses “an allowance for Outages in the schedule maintained in accordance with clause 7.3.4”	Ex-ante capacity-adjusted outage quantities (i.e. no change).	Although ex-ante unadjusted outage quantities would be more appropriate, retaining the use of ex-ante capacity-adjusted outage quantities would have no material consequences, and AEMO has advised that the cost of changing to unadjusted outage quantities would be material.
6.3A.2(b)	Information calculated by AEMO on a Scheduling Day and released to each Market Participant by 9:00 AM – Maximum Consumption Capability – uses “an allowance for Outages in the schedule maintained in accordance with clause 7.3.4”	Ex-ante capacity-adjusted outage quantities (i.e. no change).	<p>Maximum Consumption Capability is described as “the maximum Loss Factor adjusted quantity of energy, in units of MWh, that could be consumed during a Trading Interval by that Market Participant’s Non-Dispatchable Loads, Interruptible Loads and Dispatchable Loads, less an allowance for outages. The only outage quantities likely to be recorded for loads would be for Interruptible Loads (as ancillary service providers), and there seems to be little value in reducing the maximum consumption capability to account for these outages.</p> <p>It would therefore be preferable to remove the reference to an allowance for outages as it serves no useful purpose. However, the reference does not cause any problem and so to avoid incurring unnecessary costs no change is proposed.</p>

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
6.3A.2(c)	Information calculated by AEMO on a Scheduling Day and released to each Market Participant by 9:00 AM – for each Scheduled Generator or Non-Scheduled Generator that is registered as being able to run on Liquid Fuel only, the maximum Loss Factor adjusted quantity of energy, in units of MWh, that could be supplied during the Trading Interval based on the Standing Data of that Scheduled Generator or Non-Scheduled Generator less an allowance for Outages in the schedule maintained in accordance with clause 7.3.4	Ex-ante capacity-adjusted outage quantities (i.e. no change).	Although ex-ante unadjusted outage quantities would be more appropriate, retaining the use of ex-ante capacity-adjusted outage quantities would have no material consequences, and AEMO has advised that the cost of changing to unadjusted outage quantities would be material.
6.3A.2(d)	Information calculated by AEMO on a Scheduling Day and released to each Market Participant by 9:00 AM – for each Scheduled Generator or Non-Scheduled Generator that is registered as being able to run on both Liquid Fuel and Non-Liquid Fuel, the maximum Loss Factor adjusted quantity of energy, in units of MWh, that could be supplied during the Trading Interval when run on each of Liquid Fuel and Non-Liquid Fuel based on the Standing Data of that Scheduled Generator or Non-Scheduled Generator less an allowance for Outages in the schedule maintained in accordance with clause 7.3.4	Ex-ante capacity-adjusted outage quantities (i.e. no change).	Although ex-ante unadjusted outage quantities would be more appropriate, retaining the use of ex-ante capacity-adjusted outage quantities would have no material consequences, and AEMO has advised that the cost of changing to unadjusted outage quantities would be material.
6.3A.3(c)	Information calculated by AEMO on a Scheduling Day and released to each Market Participant by 9:05 AM – the total quantity of Planned Outages and Consequential Outages for that Market Participant in the schedule maintained in accordance with clause 7.3.4, in units of MW	Ex-ante capacity-adjusted outage quantities.	Assume the information provided under clause 6.3A.3 is intended to assist Market Participants to comply with their Reserve Capacity Obligations under clause 4.12.1, and so capacity-adjusted outage quantities are appropriate.

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
6.6.2A(b)	Contents of a STEM Submission – Availability Declaration – the Market Participant must declare for each of its Scheduled Generators and Non-Scheduled Generators the maximum Loss Factor adjusted energy available from that Facility based on its Standing Data reduced to account for any energy committed to provide Ancillary Services or which is unavailable due to an outage (where such an outage should only be considered where that outage is reported to the Market Participant by AEMO)	Ex-ante capacity-adjusted outage quantities.	The assumption is that the outage quantities referenced here are those provided to the Market Participant under clause 6.3A.2.
6.15.2(a)(ii)	Minimum TES for a Scheduled Generator – refers to “where the Balancing Facility is subject to an Outage, the maximum amount of sent out energy, in MWh, which could have been dispatched given the Available Capacity for that Trading Interval”, where Available Capacity is currently defined as “for a Trading Interval, the sent out capacity, in MW, of a Scheduled Generator or Non-Scheduled Generator that was not subject to an Outage notified to AEMO under clause 7.13.1A(b)	Use Sent Out Capacity less the sum of the ex-post unadjusted outage quantities for the Facility and Trading Interval.	This assumes that for a Scheduled Generator that fails to comply with a Dispatch Instruction in a Trading Interval (e.g. trips off or fails to start) the Forced Outage quantity recorded is based on what the Facility actually generated in the relevant Trading Interval. If another approach is used, then this would need to be reviewed.
6.15.2(c)(ii)	Minimum TES for the Balancing Portfolio – refers to “where a Facility in the Balancing Portfolio is subject to an Outage, the maximum amount of sent out energy, in MWh, which could have been dispatched given the sum of the Available Capacity of Facilities in the Balancing Portfolio for that Trading Interval”, where Available Capacity is currently defined as “for a Trading Interval, the sent out capacity, in MW, of a Scheduled Generator or Non-Scheduled Generator that was not subject to an Outage notified to AEMO under clause 7.13.1A(b)”	The Sent Out Capacity of the Balancing Portfolio less the sum of the ex-post unadjusted outage quantities for the Facilities in the Balancing Portfolio.	Note that it is very unlikely that this value would be less than the (i) component of the calculation and therefore actually determine the Minimum TES value for the Balancing Portfolio.

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
6.15.3(b)	Update of Maximum and Minimum TES values as soon as practicable using the schedule of Outages maintained under clause 7.13.1A(b)	Ex-post unadjusted outage quantities.	Note the Rule Change Panel is considering changes to require the automatic recalculation of TES to reflect the late logging of outages.
7.3.4	System Management must prepare a schedule of Planned Outages, Forced Outages and Consequential Outages for each Registered Facility of which System Management is aware at that time where Outages are calculated in accordance with clause 3.21.6, for each Trading Interval of a Trading Day, between 8:00 AM and 8:30 AM on the Scheduling Day prior to the Trading Day.	Ex-ante capacity-adjusted outage quantities.	An ex-ante schedule of unadjusted outage quantities is not required at this time. Note the schedule will only contain quantities for Non-Intermittent Generators.
7.10.2(c)	Conditions under which a Market Participant is not required to comply with the most recently issued Dispatch Instruction, Operating Instruction or Dispatch Order applicable to its Registered Facility for the Trading Interval – refers to the “quantity of the Forced Outage or Consequential Outage notified is consistent with the extent to which the Market Participant did not comply with the most recently issued Dispatch Instruction, Operating Instruction or Dispatch Order applicable to its Registered Facility for the Trading Interval”	Ex-post unadjusted outage quantities.	
7.13.1A(b)	System Management must record the following data for a Trading Day by noon on the fifteenth Business Day following the day on which the Trading Day ends: the schedule of all Planned Outages, Forced Outages and Consequential Outages relating to each Trading Interval in the Trading Day by Market Participant and Facility	The requirement to record schedules at a particular point in time will be replaced by direct references to ex-post unadjusted outage quantities and ex-post capacity-adjusted outage quantities as required.	

Requirement clause(s)	Description	Proposed Source and Outage Quantity Type	Comments
7.13.1E(d) and 7.13.1G(d)	Gathering of Outage information for display in near real time on the Market Web Site – “the MW quantity of any de-rating to a Scheduled Generator or Non-Scheduled Generator, as measured on a sent out basis at 15 degrees Celsius”	Unadjusted outage quantities (by Outage rather than by Trading Interval)	
Glossary – Available Capacity	“Means, for a Trading Interval, the sent out capacity, in MW, of a Scheduled Generator or Non-Scheduled Generator that was not subject to an Outage notified to AEMO under clause 7.13.1A(b)”	Sent Out Capacity minus ex-post unadjusted outage quantities	See comments for clause 6.15.2(a)(ii)
Appendix 9, Step 3(c)	Relevant Level determination – “was affected by a Consequential Outage as notified by System Management to AEMO under clause 7.13.1A”	Ex-post unadjusted outage quantities	
Appendix 9, Step 6(a)	Relevant Level determination – “the schedules of Consequential Outages determined by System Management under clause 7.13.1A”	Ex-post unadjusted outage quantities	

Appendix C. Calculation of Outage Rates

The proposed Equivalent Planned Outage Hours, Equivalent Forced Outage Hours, Planned Outage Rate and Forced Outage Rate calculations are presented below.

C.1 Equivalent Planned Outage Hours and Equivalent Forced Outage Hours

AEMO must calculate the Equivalent Planned Outage Hours for an Intermittent Generator or Non-Intermittent Generator f in a Trading Interval t as follows:

If Facility f is not in Commercial Operation or assigned Capacity Credits in Trading Interval t then:

Equivalent Planned Outage Hours(f,t) = zero

Else if Facility f is a Non-Intermittent Generator then

Equivalent Planned Outage Hours(f,t) = (CAPO(f,t) / CC(f,t)) x 0.5

where

CAPO(f,t) is the Capacity-Adjusted Planned Outage Quantity for Facility f in Trading Interval t (as defined in Appendix A of this call for further submissions)

CC(f,t) is the number of Capacity Credits assigned to Facility f in Trading Interval t

Else (Intermittent Generator)

Equivalent Planned Outage Hours (f,t) = (UPO(f,t) / MSOC(f,t)) x 0.5

where

UPO(f,t) is the Unadjusted Planned Outage Quantity for Facility f in Trading Interval t

MSOC(f,t) is the maximum sent out capacity of Facility f specified under Appendix 1(b)(iii) or 1(e)(iiiA) (as applicable) for Trading Interval t

End If

The calculation for Equivalent Forced Outage Hours is the same, except that the calculations use Forced Outage quantities instead of Planned Outage quantities.

C.2 Planned Outage Rate and Forced Outage Rate

AEMO must calculate the Planned Outage Rate for an Intermittent Generator or Non-Intermittent Generator f over a period P as follows:

If there were no Trading Intervals in period P in which Facility f was both assigned Capacity Credits and in Commercial Operation, then

Planned Outage Rate (f,P) = zero

Else

Planned Outage Rate (f,P) =

sum($t \in T$, Equivalent Planned Outage Hours(f,t)) x 100 / (Count_T x 0.5)

where

T is the set of Trading Intervals in period P during which Facility F was both assigned Capacity Credits and in Commercial Operation, and t is a member of that set

Equivalent Planned Outage Hours(f,t) is the Equivalent Planned Outage Hours for Facility f in Trading Interval t

Count_T is the number of Trading Intervals in T

End If

The calculation for Forced Outage Rate is the same, except that the calculations use Equivalent Forced Outage Hours instead of Equivalent Planned Outage Hours.