RCP | Rule Change Panel

Workshop for RC_2014_03: Administrative Improvements to the Outage Process

17 January 2018

Session 1 – Consequential Outages

- Main focus on ex-ante Consequential Outages
- General terminology, principles and assumptions
- Linking ex-ante Consequential Outage to triggering outage
- Normal process for ex-ante Consequential Outage
- Changes to triggering outage
- Late notification rules
- Ex-post Consequential Outages
- Consequential Outages and Reserve Capacity Tests
- Next steps

Consequential Outages terminology

- Triggering outage
- Consequential Outage verbs – requested/reported(?), accepted, accepted with conditions, approved, rejected, cancelled, withdrawn, rescheduled
- Ex-ante (requested before commencement) vs ex-post (requested after commencement)

Ex-ante Consequential Outages – general principles

- Market Participants need timely approval/rejection for ex-ante Consequential Outages
- Changes to triggering outages are unavoidable and need to be accounted for
- Market Participants need prompt notification of changes to triggering outages
- Processes need to be efficient, transparent and auditable

Consequential Outages – working assumptions

- Ex-ante Consequential Outages not used for “maybe” outages
- Participants will be able to amend end time and outage quantity for Forced and Consequential Outages (where appropriate)
- A rescheduled Planned Outage is still the same outage
- Minor delays to start of a (planned) triggering outage ignored unless outage rescheduled and affected participants notified
- AEMO will know (or be advised) which equipment list generators are affected by a planned triggering outage
- Question – do Consequential Outages ever need to extend past the end of the triggering outage?

Linking ex-ante Consequential Outage to triggering outage

- Straw man for discussion
  - Network Operator decides to request Planned Outage (PO), liaises with affected Market Generators, logs Outage Plan or Opportunistic Maintenance request with AEMO
  - If AEMO accepts/accepts with conditions/approves then AEMO notifies affected Market Generators and provides reference id
  - Affected Market Generator requests PO (normal process) or CO (providing reference id) or mixture of both
  - If CO details are
    - consistent with TO - assign TO status to CO
    - inconsistent with TO - reject

Linking ex-ante Consequential Outage to triggering outage

- Straw man variations
  - Network Operator provides reference id to AEMO and affected Market Generators
  - AEMO provides reference id to Network Operator, Network Operator passes on to affected Market Generators
  - Market Generators can log ex-ante CO before the TO is requested and/or accepted/approved
  - Market Generators can also provide reference id if they request a PO and want to be kept informed of changes to the TO
  - Market Generators are obliged to log an outage of some kind if notified of a TO

Normal process for ex-ante Consequential Outage

- Straw man for discussion
  - AEMO approves any linked COs
    - asap (time limit?) if TO already approved
    - otherwise when AEMO approves the TO
  - AEMO notifies Market Generators with linked COs of TO approval
  - Market Generator can cancel CO and request a PO (subject to normal timeframes)

Normal process for ex-ante Consequential Outage

- Straw man variations
  - AEMO does not notify Market Generators with linked COs when it approves a TO
  - The Network Operator notifies the Market Generators with linked COs when the TO is approved
  - AEMO also notifies any Market Generators with linked POs
  - AEMO notifies all affected Market Generators (regardless of which outages logged/approved)

Changes to triggering outage

- Straw man for discussion
  - Rejection/withdrawal before approval
    - AEMO rejects linked COs and promptly notifies Market Generators (how?)
    - (Assume outage not yet in Balancing Horizon)
  - Cancellation
    - AEMO cancels linked COs and promptly notifies Market Generators
    - Market Generators report any new COs needed under late notification rules and update Balancing Submissions if required

Changes to triggering outage

- Straw man for discussion (2)
  - Reschedule
    - AEMO reschedules any linked COs to align with the TO unless this conflicts with other outages (in which case ??) and promptly notifies Market Generators
    - Market Generators report any new COs needed under late notification rules and update Balancing Submissions if required
  - Early finish
    - AEMO updates end time of linked COs and promptly notifies Market Generators
    - As for reschedule

Changes to triggering outage

- Straw man for discussion (3)
  - Delayed finish
    - If the TO was a PO, then Network Operator would need a new PO or FO
      - Same reference id or new reference id?
      - Same CO or amendment to existing CO?

Changes to triggering outage

- Straw man variations
  - AEMO only notifies Market Generators, who are responsible for making all changes to their COs
  - Network Operator is responsible for notifying affected Market Generators, who are responsible for updating their COs
  - AEMO is responsible for creating any new COs arising from the late notification rules
  - For early finishes to TOs, AEMO sets the end time of each linked CO taking into account some or all of the late notification rules

Late notification rules for changes to triggering outage

- Need to account for
  - Reaction time – how long (e.g. 30 minutes, 60 minutes?)
  - Gate closure time (different for Synergy and IPPs)
  - Start-up times – what needs to be considered?
  - Other factors?
- CO definition – additional limb for late delays/cancellations of a TO
- Who should calculate and review – what information needed?
- New vs amended CO?

Ex-post Consequential Outages

- Straw man for discussion
  - CO reported by Market Generator as soon as practicable – link optional
  - System Management approves or converts to FO
  - Market Generator can update CO or FO once clarity on end time
- Straw man variation
  - AEMO (or Network Operator) may provide reference ids (and expected end times) for major network Forced Outages to affected Market Generators, for use in logging COs

Consequential Outages and Reserve Capacity Tests

- Reserve Capacity Test exemption would only apply to approved COs
- Test results would be discarded if Facility experiences an unexpected CO during a Reserve Capacity Test

Next steps

- Action items?
- Any need for follow up workshop?
- Update at 14 February 2018 MAC meeting
- Call for further submissions asap

Session 2 – Outage quantities, RCOQ and other issues

- Terminology
- Outage quantity reporting - December 2017 MAC meeting straw man
- Forced Outage quantities for Scheduled Generators
- RCOQ and Capacity Adjusted Outage Quantities
- Use of outage quantities in the Market Rules
- Calculation of Outage Rates and Equivalent Planned Outage Hours
- Other issues
- Next steps

Relevant terminology

- Maximum Sent Out Capacity
- Unadjusted Outage Quantity
- Capacity Adjusted Outage Quantity
- 7.3.4 outage quantities

Outage quantity reporting - December 2017 MAC straw man

General Principles

- "Sent Out Capacity" in Standing Data remains temperature-independent – rename Maximum Sent Out Capacity (MSOC)
- Outage quantities for Generators reported as MW de-ratings from Maximum Sent Out Capacity
- Remaining Available Capacity for a Trading Interval
  = Maximum Sent Out Capacity - ∑Outage quantities
- Generator commitment that Facility will be (or was) capable of providing the Remaining Available Capacity for dispatch over the outage period
- No temperature adjustments required, but temperature expectations may affect the outage quantity recorded

Outage quantity reporting - December 2017 MAC straw man

- Clarification – outages not required for normal temperature de-rating (will include clarification in Market Rules)
- For discussion
  - Any concerns with temperature-independent outage quantity recording?
  - De-rating against Maximum Sent Out Capacity vs remaining available capacity - pros and cons of each option
  - Maximum Sent Out Capacity definition
    - Maximum Balancing Submission quantity?
    - Ignore contractual (vs physical) DSOC limitations?
    - Emergency output levels?

Forced Outage quantities for Scheduled Generators

- Need clarity on how to determine the outage quantity/ remaining available capacity for a Scheduled Generator that trips off during a Trading Interval or otherwise fails to meet its required output levels
- December 2017 MAC straw man assumes actual average MW output in Trading Interval equals remaining available capacity
- Alternative options? – need to consider
  - Auditability (e.g. for ERA compliance purposes)
  - Available Capacity for Minimum TES calculation
  - Implementation and operational costs
  - Suitability for both Synergy and IPP Facilities

RCOQ and Capacity Adjusted Outage Quantities

- RCOQ requirements for non-intermittent generation systems
  - Reduction if maximum site temperature > 41 degrees
  - May increase for short periods (clause 4.12.4(b)(ii))
  - “must account for staffing and other restrictions” (clause 4.12.4(b)(iii))
  - Reduced by 7.3.4 Planned and Consequential Outage quantities
- Clause 4.12.1(c) (Chapter 7) and ex-ante, non-7.3.4 outages?
- Appendix 1(k)(i)(3) and (4) imply RCOQ relatively static (given clause 2.34.4)

RCOQ and Capacity Adjusted Outage Quantities

- What limit to use in clause 3.21.6 calculations?
  - Capacity Credits do not always reflect obligations
  - RCOQ creates circular definition
  - Trading Day temperatures unknown on Scheduling Day
- Straw man for discussion
  - For 7.3.4 assume no special cases (e.g. use Capacity Credits)
  - For 7.13.1A use RCOQ assuming no outages
  - Clarify definitions of Appendix 1(k)(i)(3) and (4)

RCOQ and Capacity Adjusted Outage Quantities

- Alternative approach (more extensive changes)
  - Remove outage adjustments from RCOQ definition
  - Clarify Scheduling Day assumptions (e.g. maximum site temperature)
  - Amend drafting of 4.12.1 obligations and Net STEM Shortfall accordingly
  - Clarify definitions of Appendix 1(k)(i)(3) and (4)

Use of outage quantities in the Market Rules

- Refer to handout
- Appear to need
  - “7.3.4” Unadjusted Outage Quantities and Capacity Adjusted Outage Quantities by Trading Interval
  - “7.13.1A” Unadjusted Outage Quantities and Capacity Adjusted Outage Quantities by Trading Interval
  - Unadjusted Outage Quantities for public website display
- To support late outage reporting may need updates of 7.13.1A schedules for settlement adjustments

Calculation of Outage Rates and Equivalent Planned Outage Hours

- Move to appendix of the Market Rules
- Make Planned Outage Rate and Forced Outage Rate defined terms
- Equivalent Planned Outage Hours zero if Facility not in Commercial Operation and assigned Capacity Credits
- Planned Outage Rate and Forced Outage Rate are each
  - Zero if no Trading Intervals where in Commercial Operation and assigned Capacity Credits
  - Calculated using only Trading Intervals where Facility in Commercial Operation and assigned Capacity Credits
- Refer to handout

Other issues

- Legal advice indicates OK to include MAC issues
  - Issue 17 (Bluewaters): ability to log Forced Outages after the 15 day deadline (note AEMO MAC action item)
  - Issue 33 (ERM Power): ensure Forced Outage details can be amended after their initial entry in AEMO's systems
- Materiality threshold for Non-Scheduled Generator outages – use straw man if no further feedback
- Bluewaters vs AEMO Supreme Court decision (Synergy)
- Inclusion of fixes for 30 June 2017 rule change problems?
- Bluewaters' request to remove any requirement to log a Forced Outage for Trading Intervals covered by an approved Commissioning Test

Next steps

- Action items?
  - MAC 31/2017
- Any need for follow up workshop?
- Update at 14 February 2018 MAC meeting
- Call for further submissions asap

Notes for 17 January 2018 workshop for RC_2014_03

Use of Outage quantities in the Market Rules – straw man

Requirement clause(s)	Description	Source	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.	???	Not sure how these values are being calculated.
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.	Proposed new Appendix 12 (moved from PSOP: Facility Outages)	Currently clause 4.11.1(h) states that the Planned Outage rate and the Forced Outage rate for a Facility for a period are calculated in accordance with the PSOP specified in clause 3.21.12. Clause 3.21.12 requires System Management to document to procedure to be followed in determining and reporting Forced Outages and Consequential Outages in the Power System Operation Procedure.
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"	As this quantity is being compared with RCOQ, 7.3.4 Capacity-Adjusted Outage Quantities (note these will be for Scheduled Generators only)	

Requirement clause(s)	Description	Source	Comments
4.12.6(b) (if retained)	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.	7.3.4 Capacity-Adjusted Outage Quantities for Planned Outages and Consequential Outages	
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)"	7.13.1A Capacity-Adjusted Outage Quantities	Need to determine the requirements for updating the schedules that are initially provided within 15 Business Days – depends on how late outage reporting is to be managed.
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)"	7.13.1A Capacity-Adjusted Outage Quantities	As above
4.26.1A(a)(1)	Facility Reserve Capacity Deficit Refund calculation – uses "the total Forced Outage and Refund Payable Planned Outage in that Trading Interval measured in MW"	7.13.1A Capacity-Adjusted Outage Quantities	As above

Requirement clause(s)	Description	Source	Comments
4.26.2	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).	For the 7.3 references, 7.3.4 Capacity-Adjusted Outage Quantities, and for the other references 7.13.1A Capacity-Adjusted Outage Quantities.	As above
4.26.6(d)	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)	7.13.1A Capacity-Adjusted Outage Quantities	As above

Requirement clause(s)	Description	Source	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"	7.3.4 Unadjusted Outage Quantities?	Maximum Supply Capability is described in clause 6.3A.2(a) as "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 Market Participant's Scheduled Generators and Non-Scheduled Generators assuming the use of the fuel which maximises the the capacity of each Facility", less allowances for outages and Ancillary Services. Given this definition, unadjusted outage quantities seem more appropriate than capacity-adjusted outage quantities.
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"	Remove?	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.

Requirement clause(s)	Description	Source	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	7.3.4 Unadjusted Outage Quantities?	See above
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	7.3.4 Unadjusted Outage Quantities?	See above
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	7.3.4 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 relevant.

Requirement clause(s)	Description	Source	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)	7.3.4 Unadjusted Outage Quantities?	Assume the outage quantities mentioned here are 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 Maximum Sent Out Capacity less the sum of the 7.13.1A 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.

Requirement clause(s)	Description	Source	Comments
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 sum of the Maximum Sent Out Capacities less the sum of the 7.13.1A Unadjusted Outage Quantities for the Facilities in the Balancing Portfolio	The use of the (ii) value in the Balancing Portfolio Minimum TES calculation is problematic for various reasons (e.g. the inclusion of Non-Scheduled Generators), but addressing these concerns is not within the scope of this Rule Change Proposal. 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.
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)	7.13.1A Unadjusted Outage Quantities	Currently TES values cannot be altered after they are updated under 6.15.3(b). AEMO is investigating what is involved in relaxing this restriction to allow for late Forced Outage notifications to flow through to the TES calculations.
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.	Want two schedules produced at this time, for Unadjusted Outages and Capacity-Adjusted Outages	

Requirement clause(s)	Description	Source	Comments
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"	Unadjusted Outage Quantities	How is this assessed for Facilities that are providing LFAS and/or are in the Balancing Portfolio.
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 scheduled of all Planned Outages, Forced Outages and Consequential Outages relating to each Trading Interval in the Trading Day by Market Participant and Facility	Two schedules: • Unadjusted Outage Quantities (Scheduled Generators, Non-Scheduled Generators and Intermittent Loads) • Capacity-Adjusted Outage Quantities (Scheduled Generators only)	
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), i.e. reductions from Maximum Sent Out Capacity	
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)"	Maximum Sent Out Capacity minus Unadjusted Outage Quantities	See comments for clause 6.15.2(a)(ii)

Requirement clause(s)	Description	Source	Comments
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”	Included in the schedule of Unadjusted Outage Quantities	Need to consider the effects of any changes to allow late outage reporting
Appendix 9, Step 6(a)	Relevant Level determination – “the schedules of Consequential Outages determined by System Management under clause 7.13.1A”	The scheduled of Unadjusted Outage Quantities	Need to consider the effects of any changes to allow late outage reporting

New Appendix 12: Calculation of Outage Rates

- Propose making Planned Outage Rate and Forced Outage Rate defined terms in the Market Rules (references include 4.11.1(h) and 4.26.1D) and moving their definition to a new Appendix 12 of the Market Rules.
- Propose also including the definition of Equivalent Planned Outage Hours (referenced in clauses 4.26.1D, 4.27.2, 4.27.3, 4.27.3A and the Glossary) in Appendix 12.

Proposed Methodology

(Apologies for the formatting)

AEMO must calculate the Equivalent Planned Outage Hours for a Scheduled Generator or Non-Scheduled 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 Scheduled Generator then

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

where

CAPO(f,t) is the total Capacity Adjusted Outage Quantity for Planned Outages of Facility f in Trading Interval t

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

Else (Non-Scheduled Generator)

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

where

PO(f,t) is the total Unadjusted Outage Quantity for Planned Outages of Facility f in Trading Interval t

MSOC(f,t) is the Maximum Sent Out Capacity of Facility f in 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.

AEMO must calculate the Planned Outage Rate for a Scheduled Generator or Non-Scheduled 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.)

4.12. Setting Reserve Capacity Obligations

4.12.1. The Reserve Capacity Obligations of a Market Participant holding Capacity Credits are as follows:

(a) a Market Participant (other than Synergy) must ensure that for each Trading Interval:

i. the aggregate MW equivalent of the quantity of Capacity Credits held by the Market Participant applicable in that Trading Interval for Interruptible Loads and Demand Side Programmes registered to the Market Participant; plus

ii. the MW quantity calculated by doubling the net MWh quantity of energy to be sent out during the Trading Interval by Facilities registered by that Market Participant; plus

iiA. if a STEM submission does not exist for that Trading Interval, the MW quantity calculated by doubling the total MWh quantity of energy to be consumed by that Market Participant including demand associated with any Interruptible Load, but excluding demand associated with any Dispatchable Load, during that Trading Interval as indicated in the applicable Resource Plan; plus

iii. the MW quantity calculated by doubling the total MWh quantity covered by STEM Offers which were not scheduled and the STEM Bids which were scheduled in the relevant STEM Auction determined by AEMO for that Market Participant under clause 6.9 for that Trading Interval, corrected for loss factor adjustments so as to be a sent out quantity; plus

iv. capacity expected to experience a Forced Outage at the time that STEM submissions were due which becomes available in real time,

is not less than the total Reserve Capacity Obligation Quantity for that Trading Interval for Facilities registered to the Market Participants, less double the total MWh quantity to be provided as Ancillary Services as specified by AEMO for that Market Participant in accordance with clause 6.3A.2(e)(i).

(b) Synergy must ensure that for each Trading Interval:

i. the aggregate MW equivalent of the quantity of Capacity Credits held by Synergy applicable in that Trading Interval for Interruptible Loads and Demand Side Programmes registered to it; plus

ii. the MW quantity calculated by doubling the total MWh quantity which Synergy is selling to other Market Participants as indicated by the applicable Net Contract Position of Synergy, corrected for loss factor adjustments so as to be a sent out quantity; plus

iii. the MW quantity calculated by doubling the total MWh quantity covered by STEM Offers which were not scheduled and the STEM Bids which were scheduled in the relevant STEM Auction determined by AEMO for Synergy clause 6.9 for that Trading Interval, corrected for loss factor adjustments so as to be a sent out quantity; plus

iv. capacity expected to experience a Forced Outage at the time that STEM submissions were due which becomes available in real time,

is not less than the total Reserve Capacity Obligation Quantity for Synergy for that Trading Interval, less double the total MWh quantity to be provided as Ancillary Services as specified by AEMO for Synergy in accordance with clause 6.3A.2(e)(i).

(c) the Market Participant must make the capacity associated with the Capacity Credits provided by a Facility applicable to a Trading Interval, up to the Reserve Capacity Obligation Quantity for the Facility for that Trading Interval, available for dispatch by System Management in accordance with Chapter 7.

4.12.2. A Market Participant holding Capacity Credits must also comply with the following obligations:

(a) the Market Participant must comply with the Outage planning obligations specified in sections 3.18, 3.19, 3.20 and 3.21;

(b) the Market Participant must submit to tests of availability of capacity and inspections conducted in accordance with section 4.25; and

(c) the Market Participant must comply with Reserve Capacity performance monitoring obligations in accordance with section 4.27.

4.12.3. AEMO must use the information described in clauses 4.10.1 and 4.25.12 to set the Reserve Capacity Obligation Quantity to apply to a Facility in each Trading Interval. The Reserve Capacity Obligation Quantity to apply to a Facility may differ between Trading Intervals.

4.12.4. Subject to clause 4.12.5, where AEMO establishes the initial Reserve Capacity Obligation Quantity to apply for a Facility for a Trading Interval:

(a) the Reserve Capacity Obligation Quantity must not exceed the Certified Reserve Capacity held by the Market Participant for the Facility;

(aA) for generation systems that are Intermittent Generators, the Reserve Capacity Obligation Quantity is zero;

(b) for generation systems other than Intermittent Generators, except where otherwise precluded by this clause 4.12.4, the Reserve Capacity Obligation Quantity:

i. must not be less than the amount specified in clause 4.10.1(e)(ii) except on Trading Days when the maximum daily temperature at the site of the generator exceeds 41^{o}C, in which case the Reserve Capacity Obligation Quantity must not be less than the amount specified in clause 4.10.1(e)(ii) adjusted to an ambient temperature of 45^{o}C;

ii. may exceed the amount in clause 4.12.4(b)(i) by an amount up to the amount specified in clause 4.10.1(e)(iii), adjusted to an ambient temperature of 45^{o}C on Trading Days when the maximum daily temperature at the site of the generator exceeds 41^{o}C, for not more than the maximum duration specified in accordance with clause 4.10.1(e)(iii); and

iii. must account for staffing and other restrictions on the ability of the Facility to provide energy upon request; and

(c) for Interruptible Loads, Demand Side Programmes and Dispatchable Loads, except where otherwise precluded by this clause 4.12.4, the Reserve Capacity Obligation Quantity:

i. will equal zero once the capacity has been dispatched under clause 7.6.1C(d) or 7.6.1C(e) for the number of hours per year that are specified under clause 4.10.1(f)(ii);

ii. will equal zero for the remainder of a Trading Day in which the capacity has been dispatched under clause 7.6.1C(d) or 7.6.1C(e) for the number of hours per day that are specified under clause 4.10.1(f)(iii);

iii. [Blank]

iv. must account for staffing and other restrictions on the ability of the Facility to curtail energy upon request; and

v. will equal zero for Trading Intervals which fall outside of the periods specified in clause 4.10.1(f)(vi).

4.12.5. For the first Reserve Capacity Cycle, the initial Reserve Capacity Obligation Quantity for Western Power's generation systems is to equal the Certified Reserve Capacity for Western Power's generation systems, modified such that if the maximum ambient temperature at the site of Western Power's generation systems exceeds 41^{o}C on a Trading Day, as measured by Western Power's SCADA system, then Western Power's Reserve Capacity Obligation Quantity for that Trading Day is to be reduced by the difference between that generation system's rated capacity at 41^{o}C and its rated capacity at 45^{o}C.

4.12.6. Subject to clause 4.12.7, any initial Reserve Capacity Obligation Quantity set in accordance with clauses 4.12.4, 4.12.5, 4.28B.4, or 4.28C.11 is to be reduced once the Reserve Capacity Obligations take effect, as follows:

(a) if the aggregate MW equivalent to the quantity of Capacity Credits (as modified from time to time under the Market Rules) for a Facility is less than the Certified Reserve Capacity for that Facility at any time (for example as a result of the application of clause 4.20.1, clause 4.20.14, clause 4.25.4 or clause 4.25.6), then AEMO must reduce the Reserve Capacity Obligation Quantity to reflect the amount by which the aggregate Capacity Credits fall short of the Certified Reserve Capacity;

(b) during Trading Intervals where there is a Consequential Outage or a Planned Outage in respect of a Facility in the schedule maintained by System Management in accordance with clause 7.3.4, AEMO must reduce the Reserve Capacity Obligation Quantity for that Facility and that Trading Interval, after taking into account adjustments in accordance with clause 4.12.6(a), to reflect the amount of capacity unavailable due to that outage; and

(c) if the generating system, being a generating system referred to in clause 3.21A.2(a), is subject to a Commissioning Test Plan approved by System Management during a Trading Interval, then AEMO must reduce the Reserve Capacity Obligation Quantity for that Facility to zero during that Trading Interval.

4.12.7. If a Facility assigned Certified Reserve Capacity is not a Registered Facility for any time period during which its Reserve Capacity Obligations apply, then the Market Participant which holds the Capacity Credits provided by that Facility will be deemed to have failed to satisfy its Reserve Capacity Obligations during that time period.[1]

[1] See clause 4.26.1 in relation to the refund payable where a Market Participant holding Capacity Credits associated with a Facility fails to comply with its Reserve Capacity Obligations.