

# Workshop for RC\_2014\_03: Administrative Improvements to the Outage Process

25 October 2019

# Overview

- Update on original proposal issues
- New related issues
- Focus on specific issues to inform call for further submissions (**CFFS**)
- Not covering all issues in detail
- Next steps

# Original proposal

- Amendments to Consequential Outage process (removal of authorised notice requirement)
- Logging of Forced and Consequential Outages in advance
- Provision of quantities by the IMO to System Management (**SM**) for the calculation of Outages (RCOQ vs Capacity Credits)
- Quantity of de-rating for Scheduled Generators and Non-Scheduled Generators
- Provision of Outage quantities by SM to the IMO for certification and Available Capacity calculation
- Clarification of the timeframes for providing Outage information to SM

# Removal of authorised notice requirement (1)

February 2018 straw man

- Participant requests a Consequential Outage (**CO**) in SMMITS
- No requirement to provide an authorised notice
- SM assesses the request and either approves or rejects
- If SM does not approve
  - If outage has started then SM converts to a Forced Outage (**FO**)
  - If outage has not started then SM rejects the CO request

# Removal of authorised notice requirement (2)

## 2019 update

- Energy Transformation Strategy (**ETS**): likely removal of COs and potential replacement of SMMITS
- AEMO proposal: Participant records FO in SMMITS and advises SM by email that it has submitted a CO request (no authorised notice)
  - If approved – SM converts FO to CO in SMMITS (as now)
  - If not approved – remains a FO (as now)
- Considerations
  - Changes to Outstanding Amount calculation
  - Administrative overheads
  - Implementation costs

# Removal of authorised notice requirement (3)

## Revised straw man

- Amending Rules remove authorised notice requirement as originally proposed
- Market Rules do not specify submission details
- AEMO can implement using FOs but will need to prevent any distortion of Outstanding Amount calculations
- Treatment of requests that are not approved will depend on cost
  - Either rejected or converted to FO
- **Question: any concerns?**

# Logging Forced and Consequential Outages in advance (1)

## Original problem

- Cannot log FO or CO in advance
- Uncertainty for participants and reduced market transparency

## Original proposal

- Allow option to log FO or CO in advance
- SM can approve a CO before, during or after the outage starts
- Special provisions if CO not yet approved/rejected 30 minutes before Balancing Gate Closure (based on reasonable expectations)
- Exemption from Reserve Capacity Tests if participant has advised SM of a FO or CO

# Logging Forced and Consequential Outages in advance (2)

## Concerns with original proposal

- What happens to a CO request when there is a change to the triggering outage – potential for a Market Generator to suffer a FO
- Lack of transparency for the market about the availability of Facilities
- Exemption from a Reserve Capacity Test for submitted CO request – potential to avoid tests by submitting and withdrawing requests
- 30 minute rules do not adequately cover all relevant scenarios (as discussed in RC\_2013\_15)

# Logging Forced and Consequential Outages in advance (3)

Updated proposal (2018)

- Straw man for ex-ante COs discussed at January 2018 workshop and summarised at February 2018 MAC meeting
  - SM notifies all affected participants when triggering outage is submitted, accepted, accepted with conditions, approved, rejected, withdrawn, cancelled, rescheduled, ends early, or ends late
  - Participants include reference id (provided by SM) when submitting ex-ante CO requests
  - Provisions to cover changes to triggering outages
  - Additional CO triggers to cover late notifications of changes to triggering outages

# Logging Forced and Consequential Outages in advance (4)

Updated proposal (2018)

- Reserve Capacity Test results discarded if the Facility experiences a CO during the test
- Exemption from Reserve Capacity Tests only applies to approved COs
- Some discussion about treatment of 'controlled forced' triggering outages
- Some discussion about deadlines for submission of CO requests and FO notifications into SMMITS

# Logging Forced and Consequential Outages in advance (5)

2019 update

- ETS likely to remove COs and future of SMMITS uncertain
- AEMO has advised high implementation costs for 2018 straw man (high automation requirement)
- Review of options to address main concerns about Network Planned Outages that affect generators
  - Uncertainty and risk for affected Market Generators (e.g. for bidding, arranging bilateral cover, commitment decisions)
  - Lack of information for other Market Participants (lack of transparency about Facility availability, reliability of Forecast BMOs)
  - Auditability

# Logging Forced and Consequential Outages in advance (6)

## Revised proposal

- Alternative approach to provide certainty and transparency
- Requires SM to use a notification mechanism to broadcast information about triggering outages to interested stakeholders
- ‘Triggering outage’ – 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 (**foreseeable constraint**)
- AEMO expects  $\leq 70$  triggering outages with foreseeable constraints per year
- Not proposing to cover ‘potential/likely’ generator impacts of network outages

# Logging Forced and Consequential Outages in advance (7)

Revised proposal – options for notification mechanism

- Option 1 – Use new mechanism (similar to Dispatch Advisories)
  - Allows stakeholders to decide whether to subscribe
  - ‘Push’ notifications and audit trail
  - Higher implementation cost (magnitude uncertain)
- Option 2 – Use Dispatch Advisory mechanism
  - Reduces implementation costs
  - Push notifications and audit trail
  - Increases the number of Dispatch Advisories  
(Question: how big a problem is this?)
  - Same subscription list as other Dispatch Advisories

# Logging Forced and Consequential Outages in advance (8)

Revised proposal – options for notification mechanism

Option 3 – AEMO has suggested

- <7 days before outage start – Dispatch Advisory
- ≥7 days before outage start – ‘communicated by revised PASA or similar’
- Reduces number of Dispatch Advisories
- Loses some push notifications and splits audit trail
- Delay in publication of some updates
- Implementation costs for PASA changes or alternative reporting (magnitude uncertain)

**Question: Other options?**

# Logging Forced and Consequential Outages in advance (9)

## Revised proposal

- No change to existing obligation on Network Operators to notify affected participants about upcoming outages
- SM issues a triggering outage notification (TO notification)
  - At the time of acceptance, approval or rejection of a triggering outage (SM controls timing)
  - 'As soon as practicable' after withdrawal or changes that affect foreseeable constraints (Network Operator initiated)
  - If Option 3 – for  $\geq 7$  days before outage start – next report (probably weekly) after outage in report period
- Notifications include reference id, timestamps, facility ids, start/end times, MW output limits

# Logging Forced and Consequential Outages in advance (10)

## Revised proposal

- Market Generators must take TO notification into account in their Balancing Submissions (as far as possible)
- Market Generators protected from FOs or compliance breaches if complying with TO notifications
- TO notifications provide most of the benefits of ex-ante COs
  - STEM and outage record visibility benefits insufficient to justify costs
- Allow ex-ante submission of COs only if low cost – seeking AEMO's advice
- No obligation on SM for ex-ante approval of COs

# Logging Forced and Consequential Outages in advance (11)

## Revised proposal

- If ex-ante CO requests are permitted
  - Cannot be submitted before first TO notification for triggering outage issued
  - Market Generator needs to quote reference id to submit ex-ante request
  - For ex-post CO requests reference id required if TO notifications were issued
  - SM must approve CO request if details are consistent with TO notifications

# Logging Forced and Consequential Outages in advance (12)

Revised proposal – Network Operator obligations

- Not permitted to start a Planned Outage (**PO**) early
- Late return from a PO is a FO
- Not permitted to make retrospective changes to a PO involving foreseeable constraints
  - e.g. change to delay outage start submitted after the approved start time

# Logging Forced and Consequential Outages in advance (13)

Revised proposal – Late changes to triggering outages

- Question: How much notice does the market need for late changes to triggering outages, e.g.
  - Delayed start to a triggering outage
  - Late cancellation of a triggering outage
  - Early return to service from a triggering outage?
- Balance between reducing market uncertainty and maximising generator availability
- Different implications for Scheduled Generators, Non-Scheduled Generators and Balancing Portfolio Facilities

# Logging Forced and Consequential Outages in advance (14)

TO notifications for 'foreseeable constraints' caused by FOs

- Clarify obligation to notify SM if an Outage Facility will be subject to a FO from a specific time in the future, e.g.
  - Delayed return from a PO
  - Need to shut down/undertake maintenance but no approved PO
- If upcoming or current FO is a triggering outage provide option to SM to issue TO notifications
  - Only if SM considers material market impact
  - Will need to estimate foreseeable constraint end time
  - If option used then SM must issue updates
  - Similar Balancing Submission obligations apply

# Capacity-adjusted outage calculation: RCOQ vs Capacity Credits (1)

## Original problem

- Use of RCOQ in capacity-adjusted outage quantity calculation impractical – in practice using Capacity Credits
- Original proposal
  - Replace RCOQ with Capacity Credits in clause 3.21.6
- Concerns with original proposal
  - Capacity Credits do not always reflect Reserve Capacity Obligations (e.g. if site temperature exceeds 41 degrees)
- However, RCOQ also problematic
  - Max site temperature unknown on Scheduling Day
  - RCOQ has circular definition problem (reduced by PO and CO approved by Scheduling Day)

# Capacity-adjusted outage calculation: RCOQ vs Capacity Credits (2)

Updated proposal (2018)

- Only calculate capacity-adjusted outage quantities for Scheduled Generators
- For '7.3.4' outage schedule replace RCOQ with Capacity Credits
- For other purposes use RCOQ assuming no Outages
- Clarify definitions of Appendix 1(k)(i)(3) and (4) and use these values in capacity-adjusted outage calculations

# Capacity-adjusted outage calculation: RCOQ vs Capacity Credits (3)

## 2019 update

- Current use of RCOQ sets capacity-adjusted outage quantities to zero during a Commissioning Test
- If Commissioning Test adjustment was removed
  - If test during PO would still contribute to PO rates – OK
  - If test during extended FO then still incur capacity refunds – OK
  - Market Generators must report a FO for failures during a Commissioning Test – if non-zero RCOQ then could incur capacity refunds – Not OK

# Capacity-adjusted outage calculation: RCOQ vs Capacity Credits (4)

## 2019 update

- Stakeholders have raised concerns about the need to report Commissioning Test FOs
  - AEMO and the ERA have advised that they do not need these FOs to be reported
  - Unnecessary administrative burden since no capacity refunds payable
- AEMO uncertain of implications of changing the definitions of Appendix 1(k)(i)(3) and (4)
- Non-intermittent Non-Scheduled Generators can have RCOQ

# Capacity-adjusted outage calculation: RCOQ vs Capacity Credits (5)

## Updated proposal

- Calculate for Scheduled Generators and non-intermittent Non-Scheduled Generators (Non-Intermittent Generators)
- Not proposing to change or use Appendix 1(k)(i)(3) and (4)
- For '7.3.4' schedule replace RCOQ with Capacity Credits
- For other purposes depends on max daily site temperature
  - If  $\leq 41$  degrees use Capacity Credits
  - If  $> 41$  degrees use  
Capacity Credits \* MSOC\_45 / MSOC\_41
  - MSOC values from clause 4.10.1(e)(i) file (sent out)
- Remove requirement to report FOs for failures during Commissioning Tests

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (1)

- Details of problem, original proposal and updated proposal in appendix at end of slide pack
- No material changes from 2018 proposal
- Updates
  - 'Maximum sent out capacity' (MSOC) stored in Standing Data (Appendix 1(b)(iii) and Appendix 1(e)(iiiA))
    - No new Glossary term proposed
    - Maximum quantity that can be offered in a Balancing Submission
    - Overload capacity not dispatched through Balancing Market

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (2)

Updated proposal – Non-Scheduled Generator outage quantities

- Market Generator to report outage quantities as MW de-ratings from maximum sent out capacity
- No temperature adjustments required
- Unaffected by fuel (wind, sun) availability
- Subject to materiality threshold (RC\_2013\_15)
  - $\text{Min}(0.1 * \text{Nameplate Capacity}, 10)$
- Two related issues raised in RC\_2013\_15 submissions
  - Treatment of hybrid Non-Scheduled Generators
  - Administrative burden of outage reporting for large Non-Scheduled Generators

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (3)

Hybrid Non-Scheduled Generators - outage quantities and materiality threshold

- Issue raised by Alinta during second submission period for RC\_2013\_15
- AEMO considered reason to have multiple materiality thresholds and move process to a Market Procedure
- E.g. a Non-Scheduled Generator with 150 MW wind, 50 MW solar, MSOC = Declared Sent Out Capacity (DSOC) = 150 MW
- Uncertainty about how outage quantities should be reported, e.g. if the solar components are unavailable
  - Still have 150 MW of generating capacity available
  - BUT likely output of Facility materially reduced

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (4)

## Hybrid Non-Scheduled Generators

- Non-Scheduled Generator outages reported to
  - Support certification (Outage rates and estimation trigger)
  - Provide information to SM and participants
- Several options considered
- Option 1 – require NEM-like detailed outage reporting
  - Hard to justify given no proposal to implement AWEFS/ASEFS
  - Difficult to translate to a simple outage rate (e.g. for certification)

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (5)

## Hybrid Non-Scheduled Generators

- Option 2 – report Non-Scheduled Generator outages against maximum output capacity ignoring any physical network limitations (effectively Nameplate Capacity)
  - Introduces complications in how outage data is used and interpreted
  - Hard to justify complexity given current low Non-Scheduled Generator outage rates
- Option 3 – change materiality threshold from Nameplate Capacity to maximum sent out capacity
  - Reduces information available to SM
  - Inaccurate estimation for Consequential Outages
  - Potential unmonitored distortion of outage rates

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (6)

## Hybrid Non-Scheduled Generators

- Option 4 – maintain RC\_2013\_15 materiality threshold but provide supplementary details of partial outages
  - Proposed clause 3.21.4B(f) requires the provision of “any other information necessary for verifying the details of the outage requested by SM”
  - 0 MW outages if remaining components  $\geq$  MSOC
  - Provides AEMO with information for forecasting, estimation (for COs) if needed
  - Some distortion of outage rates but allows AEMO/ERA to monitor the extent of any distortion
- Proposing Option 4 at this time but welcome alternative options

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (7)

## Administrative burden of outage reporting for large Non-Scheduled Generators

- Issue raised by Alinta during second submission period for RC\_2013\_15
- Concern about Non-Scheduled Generators that routinely have some part of the Facility unavailable for planned maintenance, e.g.
  - One turbine always out for maintenance
  - Outage of a second turbine likely to exceed materiality threshold (if individual turbines are large)
  - Imposition of administrative burden on the Market Generator for outage reporting

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (8)

## Administrative burden of outage reporting for large Non-Scheduled Generators

- Proposing no change to RC\_2013\_15 arrangements
  - Individual component size does not affect overall impact of outages
    - Why should 4 x 3 MW units be reportable but 2 x 6 MW units not be reportable?
  - If components are counted towards certification then no reason to exclude them from outage scheduling requirements

# Use of outage quantities in the Market Rules and clarification of timeframes

## Use of Outage quantities in the Market Rules

- No material changes to updated proposal presented at the 17 January 2018 workshop
- CFFS will include
  - Updated table showing which outage quantities (unadjusted vs capacity-adjusted) will be used for which purposes
  - Planned Outage Rate, Forced Outage Rate and Equivalent Planned Outage Hours calculations

## Clarification of timeframe for providing Outage information to SM

- No concerns with original proposal but considering additional changes (see additional related issues)

# Additional related issues

- Outage definitions
- Timing requirements for FOs
- Timing requirements for COs
- Transitional requirements

# Outage definitions (1)

- RC\_2013\_15 and RC\_2014\_03 consultation – requests for
  - Clarification of FO definition
  - Additional CO triggers
- ETS proposing significant changes to relevant outage concepts and exceptions, e.g. for COs
- Limits on scope of Rule Change Proposal
- Propose to restrict RC\_2014\_03 to 2-3 specific issues
  - COs caused by non-Equipment List network equipment (subject to legal advice)
  - FOs during a Commissioning Test
  - (Potentially) expand CO definition to replace clauses 7A.2A.3 and 7A.2A.4

# Outage definitions (2)

## COs caused by non-Equipment List network equipment

- Current CO definition depends on “Forced Outage” or “Planned Outage” of another Rule Participant’s equipment
- Implies the outage must be caused by the outage of an Outage Facility
- Affects
  - Most distribution-connected generators (main concern)
  - Generators affected by outages of secondary network systems (e.g. protection systems or comms systems) that are not included on the Equipment List
- Proposal: Amend clause 3.21.2 to cover outages of distribution system equipment that affects generators
- **Question: Should all Network equipment be included?**

# Outage definitions (3)

## Replacement of clauses 7A.2A.3 and 7A.2A.4

- Clauses introduced by RC\_2013\_15
- Remove obligation to report a FO or CO for unavailable capacity in a Balancing Submission where
  - Late rejection of a PO
  - Late changes to a CO or Commissioning Test Plan
- **Question: Is there any material benefit in replacing these clauses with an expanded definition of a CO?**
  - Preference is to retain the clauses due to ETS uncertainty about COs
- Update clause 7A.2A.4 (if retained) to deal with foreseeable constraints and TO notifications

# Timing requirements for Forced Outages in SMMITS (1)

## Background

- Request for definition of “as soon as practicable” in clause 7A.2A.1 (Collgar submission on RC\_2013\_15)
- Need timely recording of Scheduled and Non-Scheduled Generator FOs for transparency (website) and prudential monitoring (refunds will affect Outstanding Amount)
- Ability to amend FO records after their initial entry (Market Rules Issues List issue 33) – end time and outage quantity
- Ability to report a FO after the 15 day limit (Issues List issue 17)
  - Late entry still a breach of the Market Rules
  - Need to ensure late FO is processed correctly - capacity refunds, constrained off compensation, outage rates for certification

# Timing requirements for Forced Outages in SMMITS (2)

## Background

- Ability for late conversion of
  - CO to FO (AEMO suggestion, in Rule Change Proposal)
    - Question: What deadline for revised decision?
  - FO to CO (Bluewaters suggestion)
    - Question: How would this work?

# Timing requirements for Forced Outages in SMMITS (3)

## Proposal – Scheduled and Non-Scheduled Generators

- Obligation to notify SM asap remains
- Retain 15 day limit for ‘full and final details’
- Report in SMMITS within 1 Business Day of outage start
  - Best estimate of quantity and end time if uncertain
  - Amend records when better information available
    - Amendment or cancel/replace depending on cost
    - Obligation to report updated information within 1 Business Day of receiving it
- Question: if not 1 Business Day why and what deadline should apply instead (and why)?

# Timing requirements for Forced Outages in SMMITS (4)

- Allow FO creation/cancellation/update (with a reason) after the 15 day limit
- Question: What deadline for late changes?
- Question: What valid reasons for late FO changes?
- Participant must keep records of reasons for changes and make these available to AEMO/ERA on request
- Use Minimum TES recalculation to recover spurious constrained off payments (AEMO has advised negligible additional cost)
- Recording non-generator FOs in SMMITS may be less time-critical
- Question: what is an appropriate deadline for recording non-generator FOs in SMMITS?

# Timing requirements for Consequential Outages in SMMITS (1)

## Options for SMMITS submission deadline

- If TO notification mechanism then no need to require ex-ante CO submission or approval
- Several options considered
- Option 1 – Within 1 Business Day of the start of the outage (i.e. same as for FOs)
  - More likely to require subsequent update – administrative burden
  - No material benefit if TO notification mechanism used for material triggering FOs

# Timing requirements for Consequential Outages in SMMITS (2)

## Options for deadline for SMMITS submission

- Option 2 – Within 1 Business Day of the end of the outage
  - Need to account for outages that cannot be finalised by the 15 day limit
  - May require subsequent update (meter readings)
  - No material benefit and increased administrative burden
- Option 3 – When final details are available (subject to 15 day limit)
  - AEMO has advised it can meet its 15 Business Day deadline provided that it can revise its decision if better information becomes available

# Timing requirements for Consequential Outages in SMMITS (3)

## Proposal for SMMITS submission

- Submit CO into SMMITS by 15 day limit (option 3)
- Break outages longer than X days into multiple requests
  - Question: what is an appropriate value for X?
- Changes allowed but must be re-approved by SM
  - Amendment or cancel/replace depending on cost – seeking AEMO advice
- Allow CO creation/update/cancellation (with valid reason) after the 15 day limit
  - Question: what valid reasons for late CO changes?

# Timing requirements for Consequential Outages in SMMITS (4)

## Proposal for SM processing

- Approve/reject only
- Must approve 'as soon as practicable' after submission
- No automatic conversion to FO if 15 BD deadline is not met
- Must approve if related to triggering outage and consistent with foreseeable constraint information provided in TO notifications
  - Note CO may be longer than period of foreseeable constraint due to start-up requirements

# Timing requirements for Consequential Outages in SMMITS (5)

## Proposal for SM processing

- Retain current obligation to approve other CO requests (with no TO notifications) unless other information available
- Allow later reassessment if other information does become available
- Rejected CO request
  - Converted to FO (if low cost)
  - Rejected (if conversion to FO too costly)
  - Participant notified of rejection and reason

# Transitional requirements

- Likely to require transitional provisions
- Still to be determined but likely to include
  - Conversion of outage quantities for Scheduled Generators and Non-Scheduled Generators
  - Clarification of starting point for TO notifications
- Will request stakeholder input (particularly from AEMO) in CFFS

# Next steps

- CFFS – November 2019
- Draft Rule Change Report – targeting approval at 27 February 2020  
Rule Change Panel meeting

# Appendix: Quantity of de-rating for Scheduled and Non-Scheduled Generators

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (1)

## Original problem

- SMMITS data entry requirements for generator outage quantities complex and include non-Market Rules steps (e.g. use of as-generated quantities)
- Clauses 3.21.5 and 3.21.6 broken for Non-Scheduled Generators, e.g. Appendix 1(b)(iv) Scheduled Generator-specific
- Unclear how reduction in capacity measured in some cases (e.g. generator trips)

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (2)

## Original proposal

- Separate requirements for Scheduled and Non-Scheduled Generators
- “measured as an average over the Trading Interval” – change to clause 3.21.5 (for both Scheduled and Non-Scheduled Generators)
- For Non-Scheduled Generators
  - Enter de-rating as reduction in capacity from Sent Out Capacity
  - No temperature adjustment involved, but called “sent out, 15 degrees”
  - Unaffected by fuel (wind, sun) availability

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (3)

## Original proposal

- For Scheduled Generators

- Enter de-rating quantity “as generated, 15 degrees”
- SMMITS converts to “sent out, 15 degrees” (coefficient 1, source undefined)
- SMMITS converts “sent out, 15 degrees” to “sent out, 41 degrees” (coefficient 2, ratio of Sent Out Capacity at 41 degrees to Sent Out Capacity at 15 degrees, based on Standing Data temperature dependence file provided under Appendix 1(b)(iv))
- SMMITS applies clause 3.21.6 calculations (using Capacity Credits instead of RCOQ) to determine capacity-adjusted outage quantities at 41 degrees

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (4)

## Concerns with original proposal

- Definition of Sent Outage Capacity
  - Maximum output not necessarily at 15 degrees
  - Defined for Balancing Portfolio as a whole
- Appendix 1(b)(iv) temperature dependence file as-generated
- Use of coefficient 1 and 2 is confusing and adds little value
- Unclear why outage quantities should be ‘temperature adjusted’
- Lack of clarity around the need for both unadjusted outage quantities and capacity-adjusted outage quantities and where each should be used

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (5)

## Concerns with original proposal

- Lack of clarity about how available capacity is determined for a Scheduled Generator that fails to comply with the instructions given to it by SM (e.g. trips mid-Trading Interval, fails to synchronise when expected, fails to ramp fast enough or maintain expected output level)
  - Uncertainty about capacity refunds (unfair)
  - Impact on Minimum TES calculation and calculation of spurious constrained off compensation
- Does not account for outages where maximum site temperature exceeds 41 degrees and RCOQ reduced

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (6)

## Concerns with original proposal

- For Non-Scheduled Generators
  - Significance of “sent out, 15 degrees” unclear
  - No materiality threshold (has been addressed by RC\_2013\_15)
- Proposal does not account for non-intermittent Non-Scheduled Generators with Capacity Credits

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (7)

## Updated proposal – general principles

- Maximum sent out capacity (MSOC) specified in Appendix 1(b)(iii) and 1(e)(iiiA)
  - Remains temperature-independent
  - No new Glossary term proposed
  - Defined as “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”
  - Maximum quantity that can be offered in a Balancing Submission
  - Overload capacity not dispatched through Balancing Market (may change for ETS)

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (8)

Updated proposal – general principles

- (Unadjusted) outage quantities (OQs) for generators reported as MW reductions from MSOC
- Available Capacity for a Trading Interval is  
$$\text{MSOC} - \sum \text{OQ}$$
- Presumption that Available Capacity will be/was available for service over the outage period
- No temperature adjustments required, but temperature expectations may affect the outage quantity recorded
- Temperature adjustment still applies for Reserve Capacity Tests

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (9)

## Example for discussion – Scheduled Generator X

- Sent out capacity (based on clause 4.10.1(e)(i) temperature dependence file) of
  - 97 MW at 45 degrees (MSOC\_45)
  - 100 MW at 41 degrees (MSOC\_41)
  - 110 MW at 10 degrees (MSOC\_10 and MSOC)
- Assigned 90 Capacity Credits
- If no outage or approved Commissioning Test then Generator X
  - Required to provide 90 MW if  $\leq 41$  degrees
  - Required to provide  $90 * 97 / 100 = 87.3$  MW if  $> 41$  degrees

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (10)

Example 1: partial PO, still able to provide 60 MW over the duration of the outage (no other Outages)

- Participant enters unadjusted outage quantity
  - = MSOC – Available Capacity
  - = 110 – 60
  - = 50 MW
- AEMO calculates capacity-adjusted outage quantity
  - =  $\max(0, OQ - \max(0, MSOC - CC))$
  - =  $\max(0, 50 - \max(0, 110 - 90))$
  - = 30 MW
- No temperature adjustment involved provided the maximum daily site temperature does not exceed 41 degrees

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (11)

Example 2: FO – Scheduled Generator trips during Trading Interval, 25 degrees (no other outages)

- Interval readings show sent out 30 MWh in the Trading Interval
- Participant determines Available Capacity based on actual average sent out MW over the Trading Interval
  - = 30 MWh \* 2
  - = 60 MW
- Participant logs unadjusted FO quantity
  - = MSOC – Available Capacity
  - = 110 – 60
  - = 50 MW
- AEMO calculates capacity-adjusted outage quantity
  - =  $\max(0, \text{OQ} - \max(0, \text{MSOC} - \text{CC}))$
  - =  $\max(0, 50 - \max(0, 110 - 90))$
  - = 30 MW

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (12)

Example 3: FO – Scheduled Generator trips during Trading Interval, 43 degrees (no other outages)

- Interval readings show sent out 30 MWh in the Trading Interval
- Participant reports the same unadjusted FO quantity as for example 2 (50 MW) because Available Capacity is still 60 MW
- BUT the capacity-adjusted outage quantity calculation reflects the reduced obligation when max site temperature > 41 degrees  
=  $\max(0, OQ - \max(0, MSOC - CC * MSOC_{45} / MSOC_{41}))$   
=  $\max(0, 50 - \max(0, 110 - 90 * 97 / 100))$   
= 27.3 MW

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (13)

Updated proposal – Available Capacity assumption for FOs (trips and other failures to meet required output levels)

- Proposal assumes actual average MW output in Trading Interval equals Available Capacity
- No viable alternatives proposed to date – 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

# Quantity of de-rating for Scheduled and Non-Scheduled Generators (14)

Updated proposal - Non-Scheduled Generator outage quantities

- Market Generator to report outage quantities as MW de-ratings from maximum sent out capacity
- No temperature adjustments required
- Unaffected by fuel (wind, sun) availability
- Subject to materiality threshold (RC\_2013\_15)
  - $\text{Min}(0.1 * \text{Nameplate Capacity}, 10)$