

Capacity Credit allocation in a Constrained Network

Progress update





Agenda

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Purpose of today

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Recap

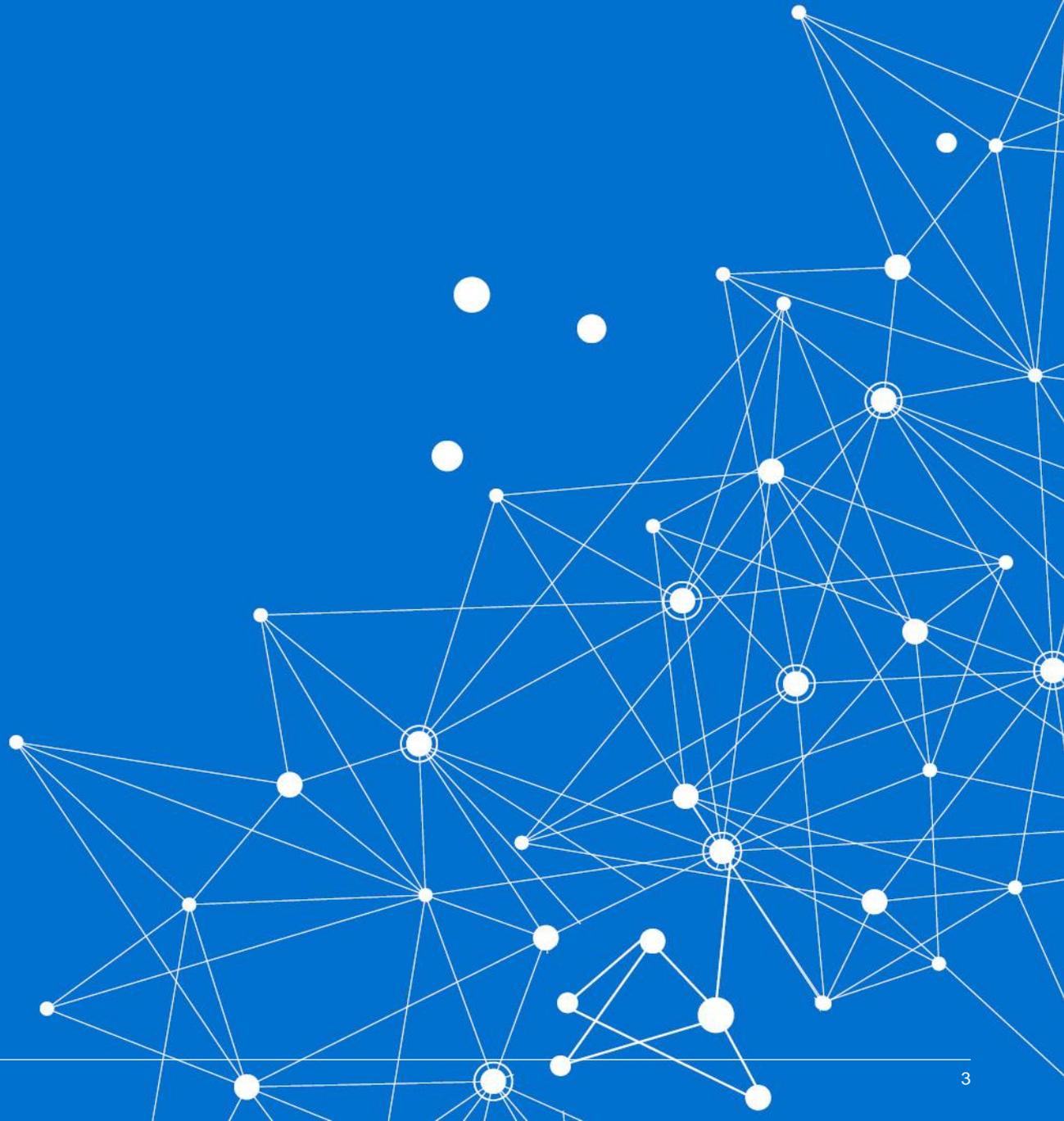
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Key issues

4

Questions

Recap





Capacity Credit allocation

Recap

Taskforce provided in-principle support for the proposal subject to:

- Further consultation with industry on the proposal.
- Identify any ‘fatal flaws’ in the proposed approach.

The proposal was presented to the TDOWG in October.

- We called it ‘Capacity Credit Rights’.
- We think a better term is ‘Network Access Quantity’ (NAQ).

ETIU conducted 1:1’s with stakeholders over November.

- No fatal flaws.
- General support for the proposal.
- Key issues requiring Taskforce decision in January 2020 identified.



Capacity Credit allocation

Issues in a constrained network

Purpose of the Reserve Capacity Mechanism

- Ensure reliability by incentivising investment in generation capacity when needed by the system by:
 - Providing an expected stream of revenues that provides investment certainty; and
 - Rewarding capacity for being available when needed by the system.

Issues in a constrained network

- Network constraints will be a more prominent factor when allocating Capacity Credits.
- Network capability may be affected by congestion which is influenced by many complex factors, including new market entry.
 - Accounting for constraints may expose capacity revenues to volatility and result in uncertainty.
 - May result in capacity resources locating in areas of the grid where their capacity does not contribute to overall reliability.

Capacity Credit allocation

Proposed solution



Provide a mechanism that protects existing facilities from having their Capacity Credits displaced by new entrant facilities. This provides **investment certainty** and **signals the value of capacity** across the grid.



Capacity Credits are allocated to new entrants based on **maximising residual network capacity**. This ensures that Capacity Credits are allocated to facilities **based on their contribution to system reliability**; and that **Capacity Credits are not over-allocated**.



The mechanism to protect Capacity Credits is performance-based and subject to a 'use it or lose it' principle. This ensures that **capacity resources are remunerated for being available** and penalises facilities that fail to provide their capacity into the market.



Capacity Credit allocation

Taskforce decision points

Taskforce endorsement will be sought in January 2020 for:

- The high-level design of the RCM Capacity Credit allocation process (the design proposal in the October paper), including:
 - A mechanism, Network Access Quantity, that is intended to optimise the location of new investment and protect a facility's Capacity Credits from the impact of new entry.
 - Network Access Quantity will be a performance-based mechanism and will endure so long as a capacity resource is performing and available.
 - The process for allocating Network Access Quantity to facilities.
- Endorse the key issues outlined in this presentation.

Taskforce to note:

- There are many matters of detailed design to work through with industry over the first half of 2020.
- Detailed design will be presented to Taskforce by mid-2020.

Key issues for Taskforce decision



Transition (and initial allocation)

- New systems and processes will not be ready for the 2020 Capacity Cycle.
- Transitional arrangements are therefore required



Availability and performance of capacity resources

- Minor improvements to the availability, refunds and testing regime for certified capacity in the context of NAQs.



Adjustments to Network Access Quantity

- Circumstances when NAQ will be adjusted.



Transfers

- No market mechanism to facilitate transfers as part of these reforms.

Transitioning to new arrangements



Transitioning to new arrangements

Proposal: Run the 2020 Capacity Cycle and provide for Network Access Quantities to apply to Capacity Credits.



Market participants have more certainty if the 2020 Capacity Cycle is not deferred.



Network Access Quantities provide certainty as to the quantity of Capacity Credits for future years.



No delays in publishing the Reserve Capacity Price.



Transitioning to new arrangements

2020 Capacity Cycle

The 2020 Capacity Cycle will be run as usual and AEMO will allocate Capacity Credits under existing processes and timelines.

- EOIs open 31 Jan 2020 and applications for Certified Reserve Capacity close 1 July 2020.
- New facilities seeking to access the network for the 2022 Capacity Year are treated as a Constrained Access Facility (under WEM Rules Appendix 11).
 - Western Power will calculate the Constrained Access Entitlement for these facilities and provide this to AEMO.
- AEMO allocates Capacity Credits as per the usual process (i.e. following trade declarations in September 2020).

ETIU will introduce new WEM Rules in mid-2020 to provide for:

- Network Access Quantities to be allocated to Capacity Credits allocated in the 2020 Capacity Cycle (the transitional arrangement).
- The changes to the Capacity Credit allocation process to apply for the 2021 Capacity Cycle (the enduring arrangement).

Transitioning to new arrangements

2021 Capacity Cycle (and subsequent cycles)



Stage 1

Assign Certified Reserve Capacity

- Run RLM for intermittent generators
- Assess scheduled generators' capacity at 41°C



Stage 2

Trade declaration

- Facilities nominate: trades, minimum Capacity Credits required, and the floating vs. fixed price
- New facilities provide reserve capacity security



Stage 3

Confirm existing NAQs

- Confirm existing NAQs based on declarations
- Confirm network can support existing NAQs
- Allocate credits up to NAQs



Stage 4

Assign new NAQs

- Assess residual network capacity
- Assign NAQs based on maximising allocation of new NAQs
- Allocate credits up to NAQs

Transitioning to new arrangements

2020 Capacity Cycle and 2021 Capacity Cycle

2020 Capacity Cycle (transition)

Scheduled Generators

CRC (41°C) ⇒ CC ⇒ NAQ

Intermittent Generators

CRC (RLM) ⇒ CC ⇒ NAQ

GIA Generators

CRC (CAE) ⇒ CC ⇒ NAQ

New applications

CRC (CAE) ⇒ CC ⇒ NAQ *

* CAE for new applications will be determined under WEM Rules Appendix 11

2021 Capacity Cycle (enduring)

Existing facilities

2020 NAQ ⇒ CC *

* Subject to AEMO's assessment of the facility's CRC and the facility's trade declaration.

New NAQ applications

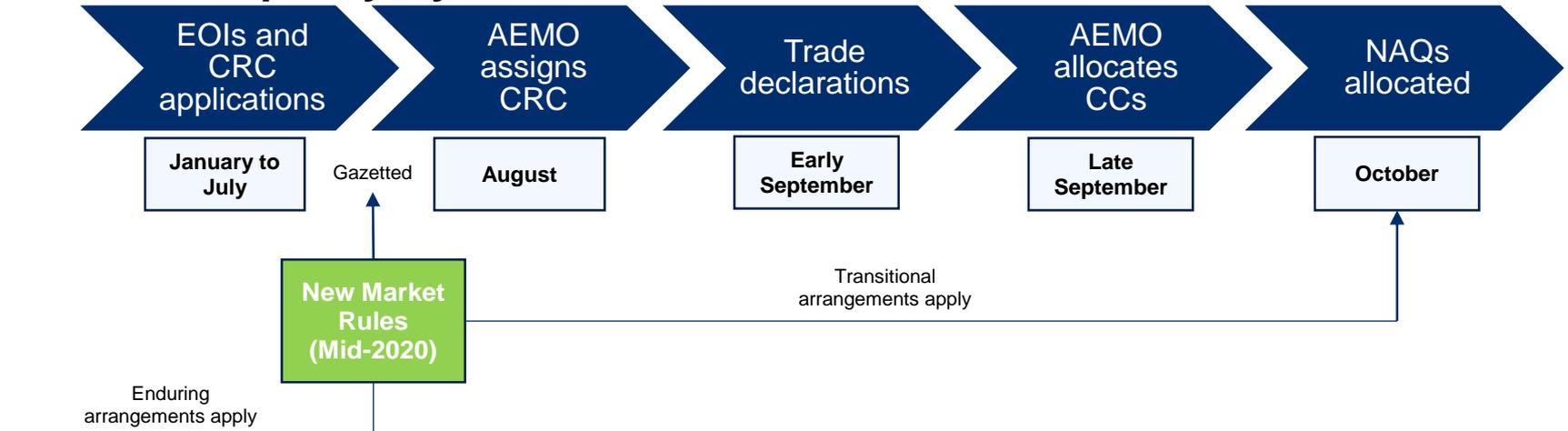
CRC ⇒ NAQ ⇒ CC *

* NAQs for new applications will be determined using AEMO's new systems/tools.

Transitioning to new arrangements

Process

2020 Capacity Cycle



2021 Capacity Cycle (and future cycles)



Availability and performance

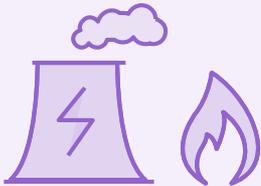


Availability and performance



- NAQs are linked with CRC. A facility cannot hold NAQ in excess of its CRC.
- Capacity obligations and penalties need to be fit-for-purpose in the context of NAQ. If a facility is failing to provide its capacity, it should not retain its CRC and NAQ.
- The rules appear to be mostly fit-for-purpose but there are some areas that could be improved.

Existing framework:



Capacity Obligations

Scheduled Generators must offer their accredited capacity in the STEM and Balancing Market.



Testing

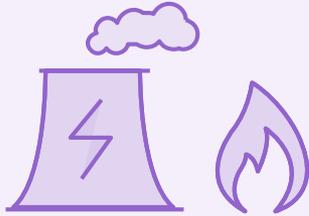
Generators must prove the capacity of their facilities twice a year.



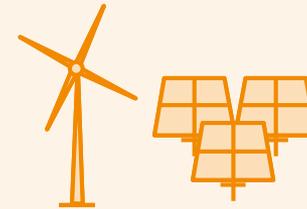
Consequences

Facilities failing to provide capacity face consequences (refunds and/or loss of CRC).

Availability and performance



A **Scheduled generator** must schedule and log outages. Refunds apply for forced outages and for planned outages that exceed a threshold.



An **Intermittent generator** pays refunds until its meets its required level.



Refunds are capped at total payments, but are based on the level of excess capacity. Refund rate is 6 x RCP when excess is <750MW and is scaled down when the excess exceeds 750MW.



AEMO has discretion to reduce a facility's CRC for high levels of outages and may disqualify a facility from CRC in future Capacity Cycles.

Potential Issues:

- Generators can meet their obligations without committing their facilities by bidding at high prices.
- The rules do not specify criteria AEMO must consider when reducing CRC due to poor performance.



Availability and performance

Potential issues and solutions

- 
- To avoid situations where facilities that are not run very often are called on but are unavailable, the Market Rules could be amended to allow more targeted testing of facilities with limited warning.
 - To ensure that facilities are sufficiently exposed to the risk of losing Network Access Quantities, the Market Rules could be amended to provide more guidance in the Market Rules on the circumstances where:
 - a failure(s) to make capacity available into the Balancing Market would disqualify a facility's Certified Reserve Capacity; and
 - outages will be taken into account when AEMO assesses a facility's Certified Reserve Capacity in a subsequent Capacity Cycle.

Adjustment to Network Access Quantities





Performance-related adjustments

Network Access Quantity is linked with Certified Reserve Capacity

Reductions

- The ‘use it or lose it principle’ means that facilities cannot hold NAQs without CRC. If a facility’s CRC decreases, its NAQs will be reduced accordingly.
- Facilities will not be able to keep their NAQs after they retire facilities.
 - New rules (under the RCM pricing reforms) will require facilities to announce their retirement three years in advance.
 - These NAQs will become available to the market.

Increases

- Equally, NAQs may increase with CRC.
- Incremental increases in a facility’s CRC would be treated as ‘new’ application for NAQ for the additional capacity.
- Network capacity would need to be assessed to ensure the additional capacity can be accommodated by the network.
- The existing facility should not receive priority over other new / existing facilities for that incremental capacity.



Replacements

Replacement of capacity

- Context: Market participants preserving their facility's NAQ through maintenance and / or replacement of units.
- An existing facility will maintain its NAQ so long as it continues to be certified for reserve capacity by AEMO during the Capacity Cycle (equal to its NAQ).
- Allowing facilities to retain their NAQ in these circumstances may be perceived as limiting competition in the market (by blocking new entry in constrained parts of the grid).
- However, requiring NAQs to be recontested in these circumstances could discourage market participants from making efficient investments in their existing capacity.
- NAQs should become contestable where a different generation technology is substituted for existing capacity.

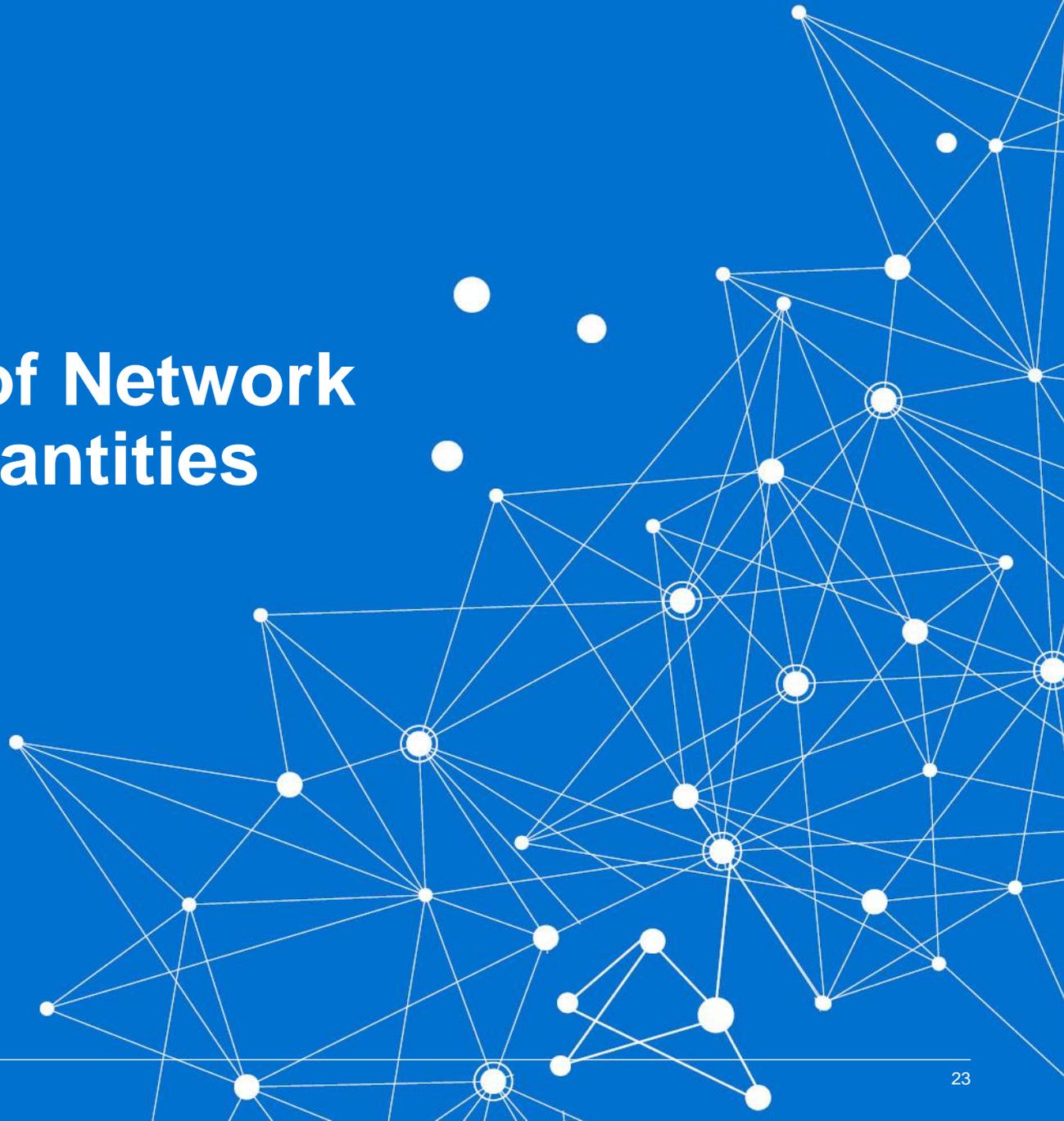


Non performance-related adjustments

Network related

- Permanent reductions in network capacity would require the Network Access Quantities of affected facilities to be adjusted.
 - A permanent reduction in network capacity could arise from the retirement of network assets or where a network asset is replaced by a different asset.
 - The changes to the Capacity Credit allocation process should not hinder the economic retirement of network assets where this is in the long term interests of consumers.
- The Whole of System Plan will provide a long-term outlook for investment in and retirement of network (and generation) capacity.
 - Market participants will have information to guide their investment decisions and, to some degree, the potential for network assets to be retired should therefore be foreseeable.
- On this basis, a ‘last-in, first-out’ approach will be suitable when reducing Network Access Quantities resulting from network asset retirements where the retirement was reasonably foreseeable.
- However, a pro-rata approach will be required where the network retirement was not reasonably foreseeable.

Transfers of Network Access Quantities

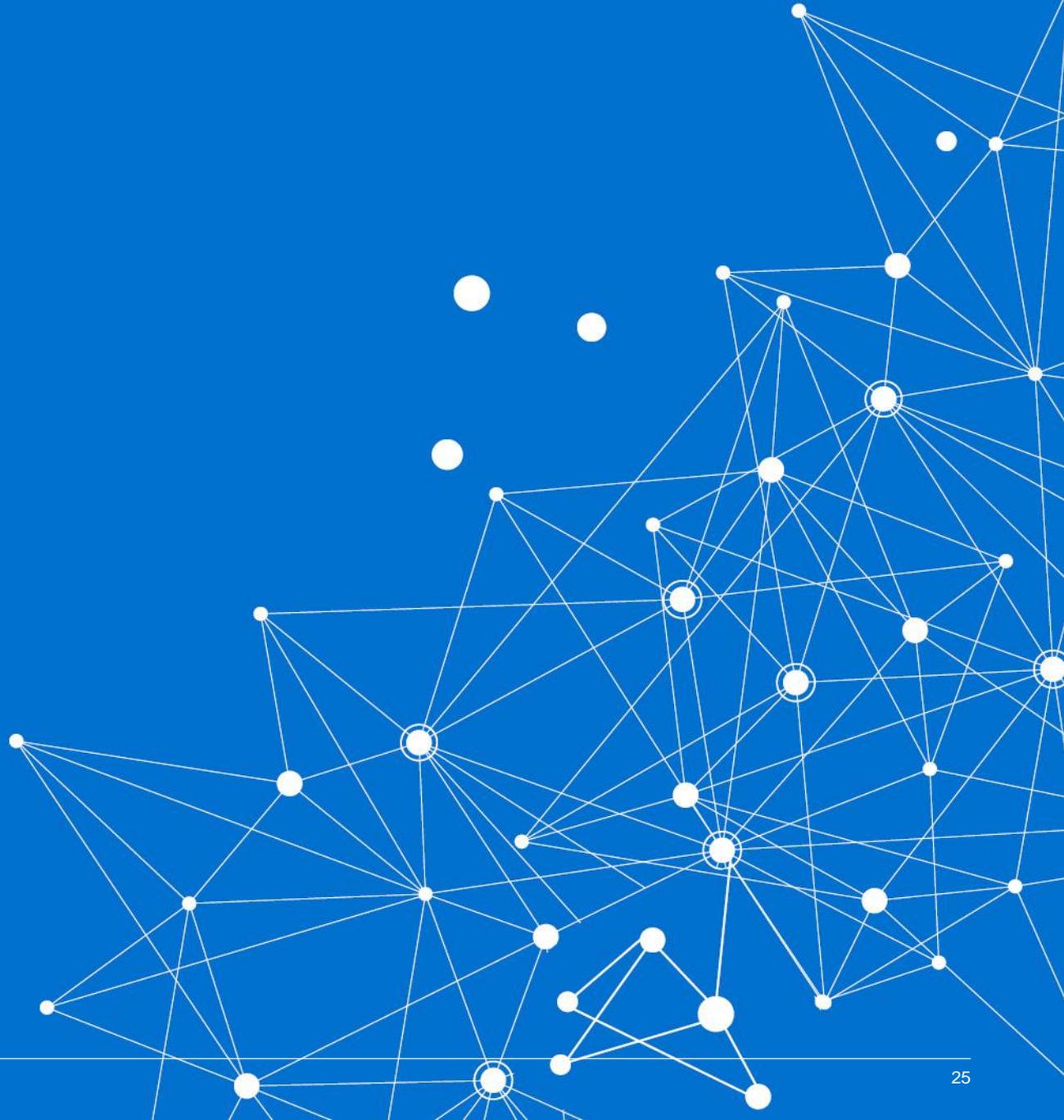




Transfers

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- Transfers are not essential to the overall design of the NAQ mechanism.
 - However, facilitating transfers may benefit the customer where they encourage earlier exit of older capacity and allow new facilities to enter that provide cheaper energy or ESS.
 - The issue only arises in a congested area of the network where inefficient plant is perceived as blocking access by more efficient capacity.
 - ‘Use it or lose it’ regime may not be enough to facilitate exit of old plant if RCP is high enough to cover the facility’s costs to maintain performance.
 - At this stage, the reforms will not include a market mechanism to facilitate transfers:
 - Limited examples where transfers would provide benefit.
 - Adds to administrative complexity.
 - Could be difficult to prevent incumbents from self-dealing.
 - Investment in more efficient capacity can still occur (albeit by the incumbent so long as it is like for like).
 - The issue could be reviewed (as part of a general review of the new process) once some experience has been gained in the constrained environment. The design would not rule out this later iteration.

Next steps



Next steps



22 October 2019

Design proposal presented to TDOWG



November 2019

One-on-one meetings with industry



17 December 2019

Present to TDOWG



January 2019

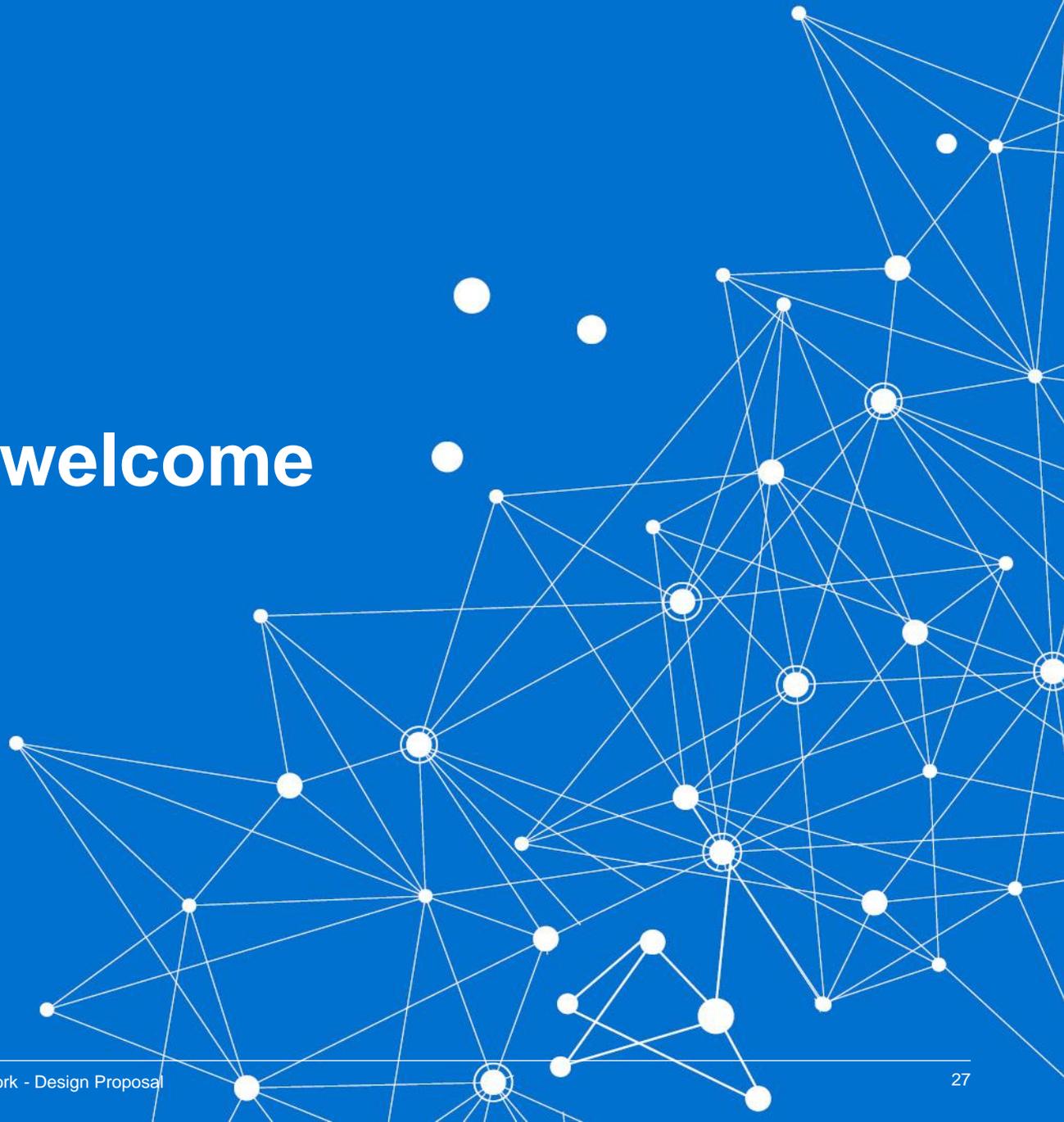
Taskforce endorses high-level design



Early 2020

Detailed design and Drafting Instructions

Questions welcome



Outage Management Key Principles Update

TDOWG Meeting 04
17 December 2019

Introduction

- Following our TDOWG industry meeting on 9 Sep 2019, the aim of these slides is to further discuss the work we have done to tackle the complexities and considerations of the following key principles:
 - Consequential Outages
 - Outage Quantities
 - Outage Planning Process
 - Outage Submission Deadlines
 - Forced Outage timeline requirements
- The following slides will walk through the key considerations and examples of the proposed options of the outage planning process.

Consequential Outage

Removal of Consequential Outages

- The method of dispatch will account for network outages via constraints.
- Proposed STEM design removes the obligation to offer based on adjustments for ESS and network outages.
- Based on the above, there is no specific need to capture Consequential Outages from participants to avoid capacity refunds under network constraint situations.
- Considerations;
 - Identification of Forced network outages constraining MPs
 - Identification of network outages impacting future generation dispatch
 - Taking into account generation start up times
 - NSG estimated quantities to support RCM

Removal of Consequential Outages – WEM Reform Design

- Energy Transformation Taskforce - Energy Scheduling and Dispatch Information Paper (6 August 2019) stated the reform design will:
 - Retain the obligation for Facilities holding capacity credits to offer at least that much capacity into the STEM and real-time energy market
 - There is no need for participants to structure their offers to account for network constraints, as those will be automatically dealt with by the new SCED market clearing engine
 - Each participant can offer its full capability at its local injection point

Removal of Consequential Outages – WEM Reform Design

- Introduce availability categories in offers to allow participants to signal availability without risking being dispatched with less notice than their minimum start-up time:
 - In-service capacity
 - Available capacity
- This changes the information on Facility unavailability required from Market Generators

Removal of Consequential Outages- Proposed approach to dispatch compliance

- Due to constraint equations catered in Dispatch, for vast majority of cases, network issues will no longer be a reason for dispatch non-compliance;
 - Constraint equations will cover the bulk of impacts on facilities from network outages
 - Outage equations are enabled manually post contingency for forced network outages
- If Facility output is **greater** than Dispatch Instruction
 - Current Process unchanged
 - Market Participant to explain to AEMO
 - AEMO records and advice ERA

Removal of Consequential Outages- Proposed approach to dispatch compliance

- If Facility output is **less** than Dispatch Instruction, AEMO will investigate:
- If constraint equation binds in next Dispatch Interval, then variation assumed to be a result of network impacts – No further action required
- If constraint equation binds in subsequent Dispatch Interval, then AEMO determines whether the variation is a result of network impacts;
 - If so, no further action required – AEMO records and advise ERA
 - If not, Market Participant to explain

Removal of Consequential Outages- Proposed approach to dispatch compliance

- Where Market Participant is requested to explain:
 - If generator has a problem - Forced Outage
 - If other valid reason for non-compliance – AEMO records and advise ERA
- If Market Generator indicates network impact, AEMO will investigate:
 - If due to network reason, then no action on generator
 - AEMO will record and develop new constraint equation (where required)
 - If no network reason can be found - Market Participant will be on a Forced Outage
- From RC_2014_03, retain the ability to reverse Forced Outage after deadline if new information becomes available.
- Proposed dispatch compliance approach will cover;
 - Identification of Forced Network outages constraining MPs
 - Identification of Network Outages impacting future generation dispatch
 - NSG estimated quantities to support RCM

Removal of Consequential Outages- Constraint Report

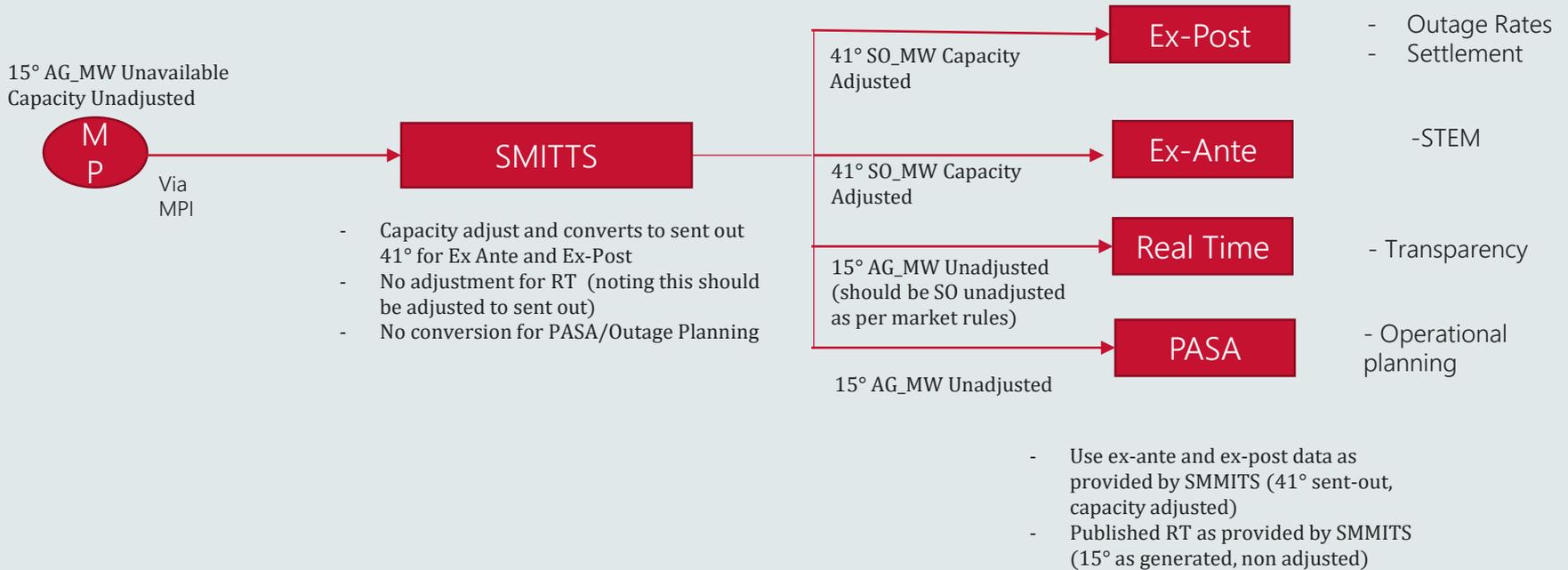
- AEMO will develop a report to provide stakeholders with information on constraints and resulting network congestion that are updated regularly.
 - Congestion Information Resource
 - Analysis of the constraint equations that bound during a trading interval
 - Annual WEM Constraint Report
- The report is also to provide details on particular incidents such as;
 - Violating constraint equations
 - Performance of Pre-dispatch constraint equations
- AEMO propose to develop a report for the ERA to indicate unavailability by Facility by Dispatch Interval as a result of a constraint equation and AEMO's investigation including offer unavailability

Outage Quantities

Modify outage quantities

- Participants are currently required to submit outage quantities that reflect the quantity of “unavailable” capacity.
- SCED, Pre-Dispatch and PASA will require knowledge of available quantities for dispatch via bids (as opposed to “unavailable” capacity).
- Look to align information required by participants to submit for dispatch/PASA and outage submissions.
- Some complexities to resolve:
 - Alternative maximum sent-out quantities (based on different fuel types)
 - Adjusted outage quantities for Reserve Capacity
 - Temperature adjustment
 - Forced outage quantities
 - Partial outages, and overlapping outages
 - Fuel outage notification
 - ESS service outages

Current Outage Process



Modify outage quantities

RC_2014_03

- Unadjusted outage quantities for generators reported as MW reductions from MSOC.
- Available capacity for a trading interval is $MSOC - \sum \text{Outage Quantities}$
- 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.

RC_2014_03 Proposed Outage Process

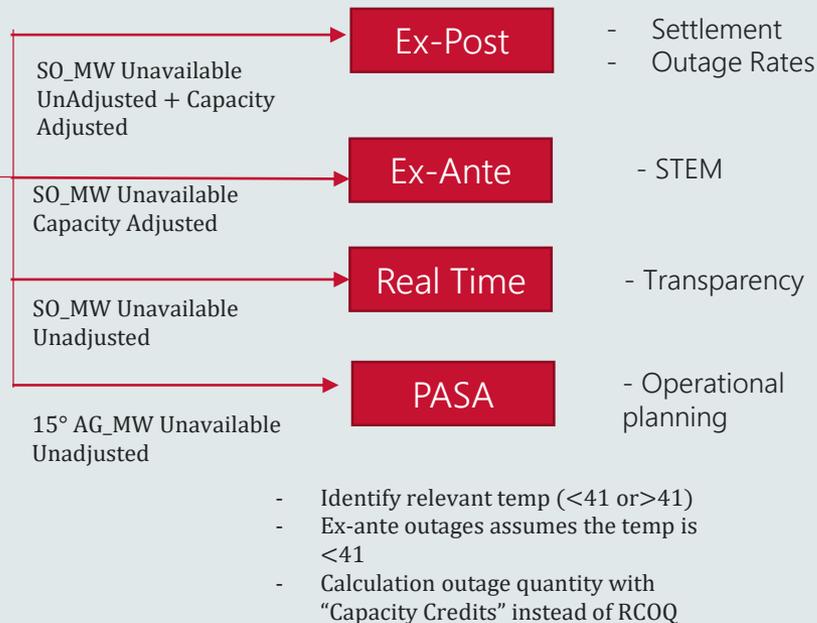
SO MW Unavailable (reduction from
MAX_SENT_OUT_CAPACITY in Standing Data
at XX°)



Via
MPI



- No temperature adjustment, but temperature expectations may affect the outage quantity recorded
- Publish RT outages on SO basis
- New functionality to perform conversion for PASA/Outage Planning



Outage Scenarios

- Reviewing how outage quantities are submitted under RC_2014_13 for:
- Full outage, partial outage, dual fuel facility

Outage Scenario 1 (full outage)

- As generated capacity = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity (MSOC) = 95 MW

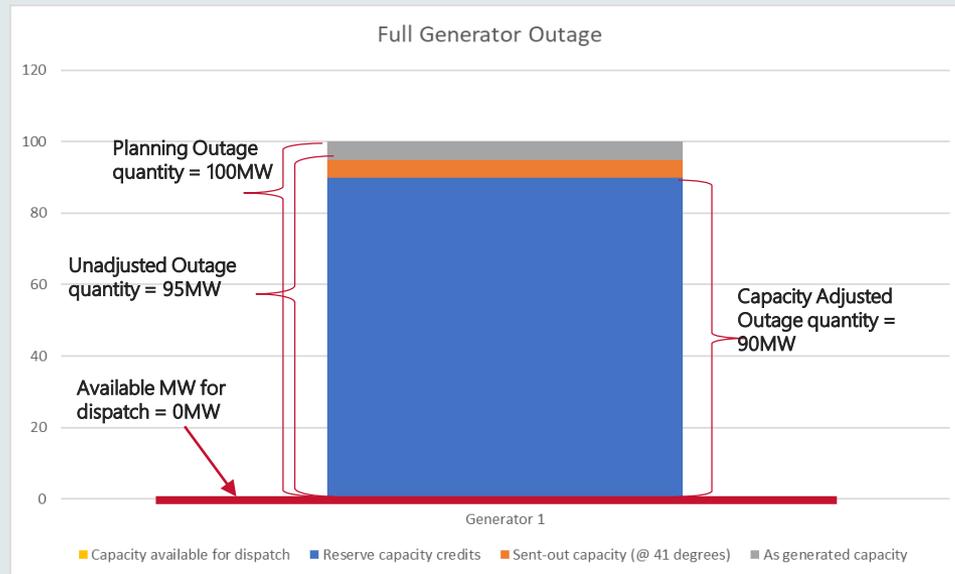
- MSOC - Unavailable MW = Available MW
- 95 MW - 95 MW = 0 MW

- Available MW used to determine other quantities

• Scenario 1: MP1 submitted unavailable quantity 95MW @ 41°C

▪ Simple Outage Calculations:

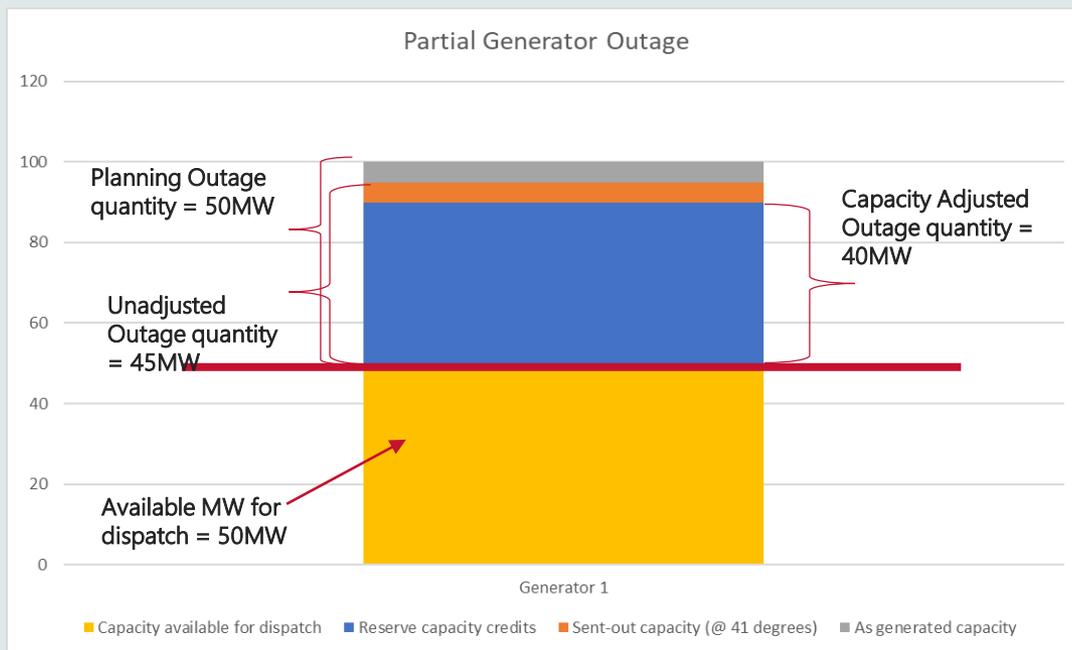
- $90\text{MW} - 0\text{MW} = 90\text{MW}$ (Capacity Adjusted Outage for refunds)
- $95\text{MW} - 0\text{MW} = 95\text{MW}$ (Unadjusted Outage quantity)
- $100\text{MW} - 0\text{MW} = 100\text{MW}$ (Planning outage)



Outage Scenario 2 (partial outage)

- As generated capacity = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity (MSOC) = 95 MW
- MSOC - Unavailable MW = Available MW
- 95 MW - 45 MW = 50 MW Available
- Available MW used to determine other quantities

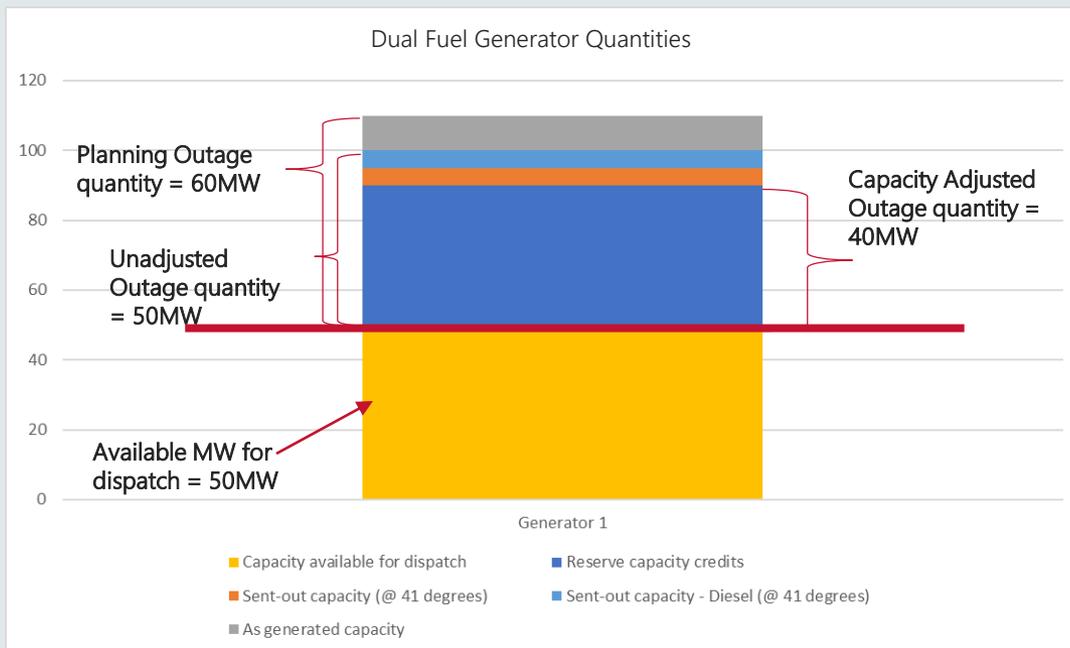
MP1 submitted unavailable quantity 45MW @ 41°C



Outage Scenario 3 (dual fuel facility)

- As generated capacity = 110MW
- Alternate Maximum Sent out capacity [Diesel] (AMSOC) = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity [Gas] (MSOC) = 95MW
- AMSOC - Unavailable MW = Available MW
- 100 MW - 50 MW = 50 MW Available
- Available MW used to determine other quantities

MP2 submitted unavailable quantity 50MW @ 41°C (from AMSOC)

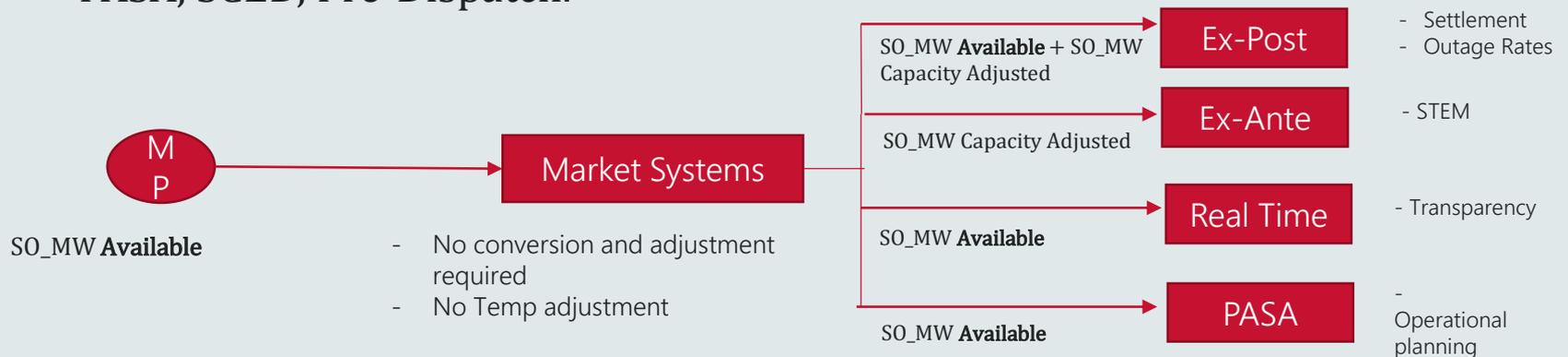


Outage Scenarios

- Looking at how outage quantities are submitted in the future for:
- Full outage, partial outage, dual fuel facility, overlapping outages

Future Outage Process - Reform

- Rule Participants have an obligation to offer capacity credit quantity at any temperature up to 41° to meet RCM obligations.
- To align information across the board from outage quantity, PASA, SCED, Pre-Dispatch.

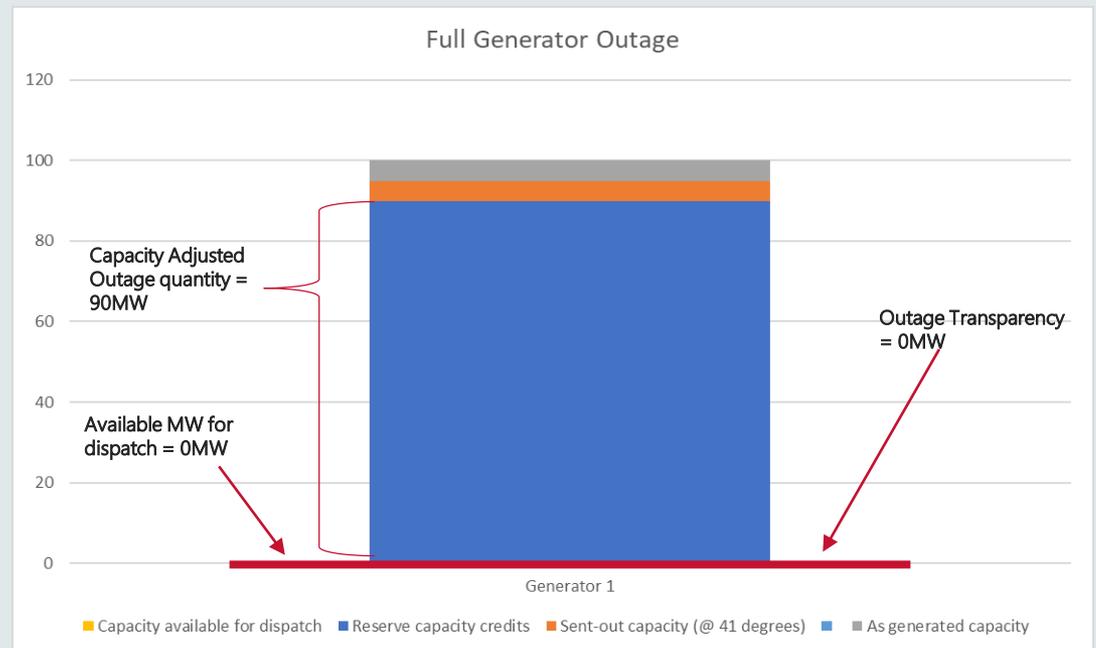


Future Outage Scenario 1 (full outage)

- As generated capacity = 100MW
- Capacity Credits (CC) = 90MW
- Max Sent out capacity (MSOC) = 95MW

- Available MW used for Real Time Outage transparency

- Scenario 1: MP1 submitted available quantity 0MW @ 41°C
 - Simple Outage Calculations:
 - $95\text{MW} - 0\text{MW} = 95\text{MW}$ (Unadjusted Outage quantity)
 - $90 - 0\text{MW} = 90\text{MW}$ (Capacity Outage for refunds)



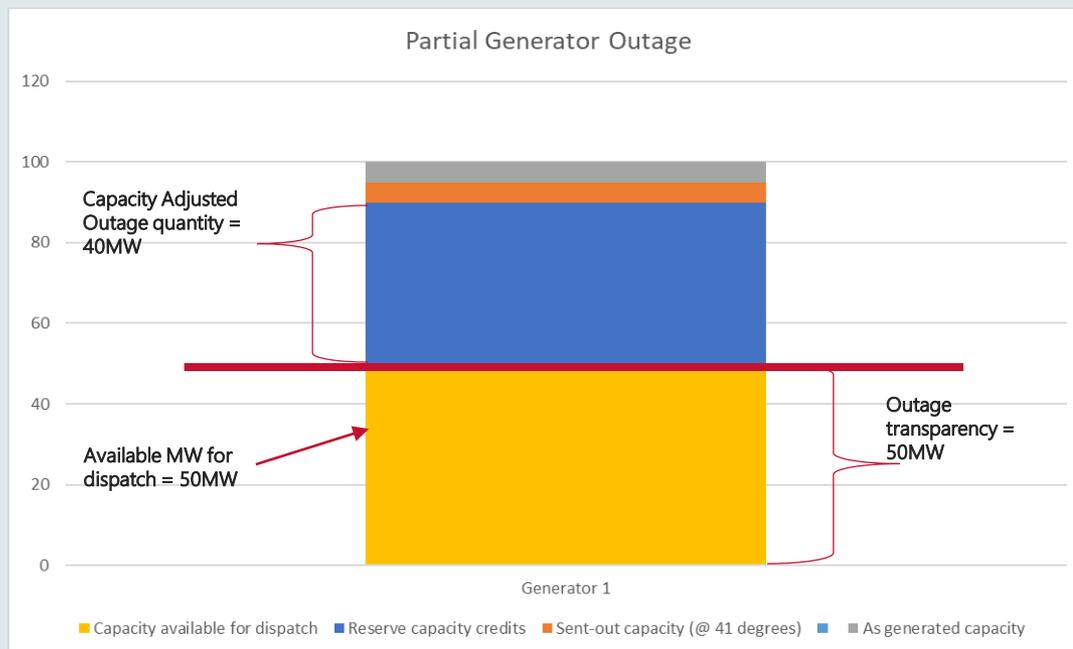
Future Outage Scenario 2 (partial outage)

- As generated capacity = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity (MSOC) = 95MW
- Available MW used to determine Real Time Outage transparency

MP1 submitted available quantity 50MW @ 41°C

Simple Outage Calculations:

- 95MW - 50MW = 45 MW (Unadjusted Outage Quantity)
- 90 - 50MW = 40MW (Capacity Outage for refunds)



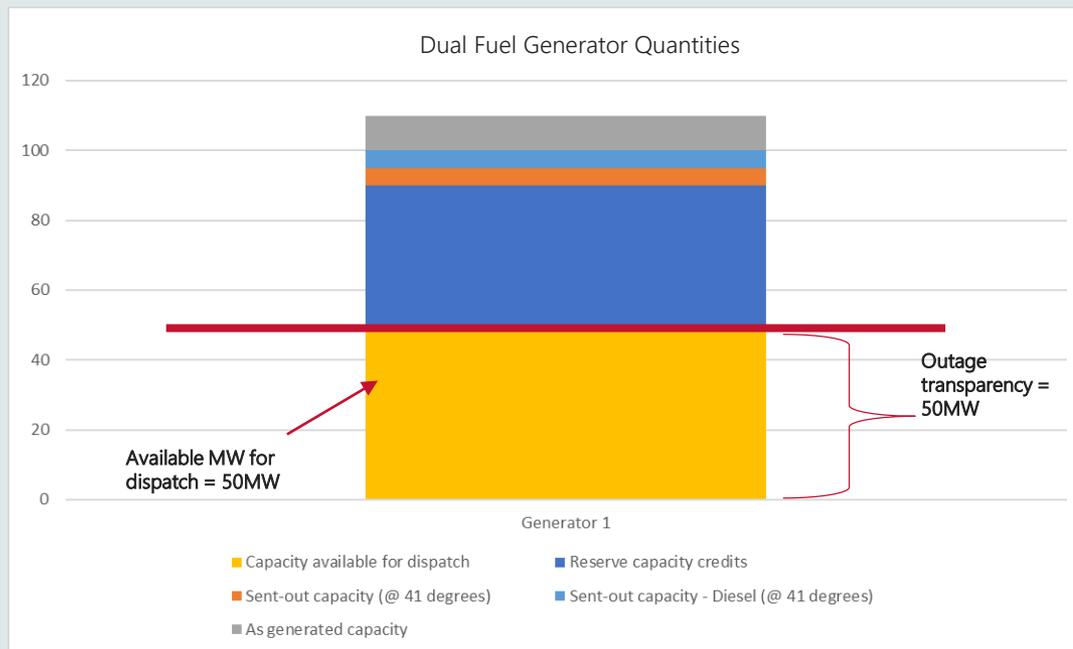
Future Outage Scenario 3 (Dual fuel facility)

- As generated capacity = 110MW
- Alternate Sent out capacity [Diesel] (AMSOC) = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity [Gas] (MSOC) = 95MW
- Available MW used to determine Real time Outage transparency

MP2 submitted available quantity 50MW @ 41°C (from AMSOC)

Simple Outage Calculations:

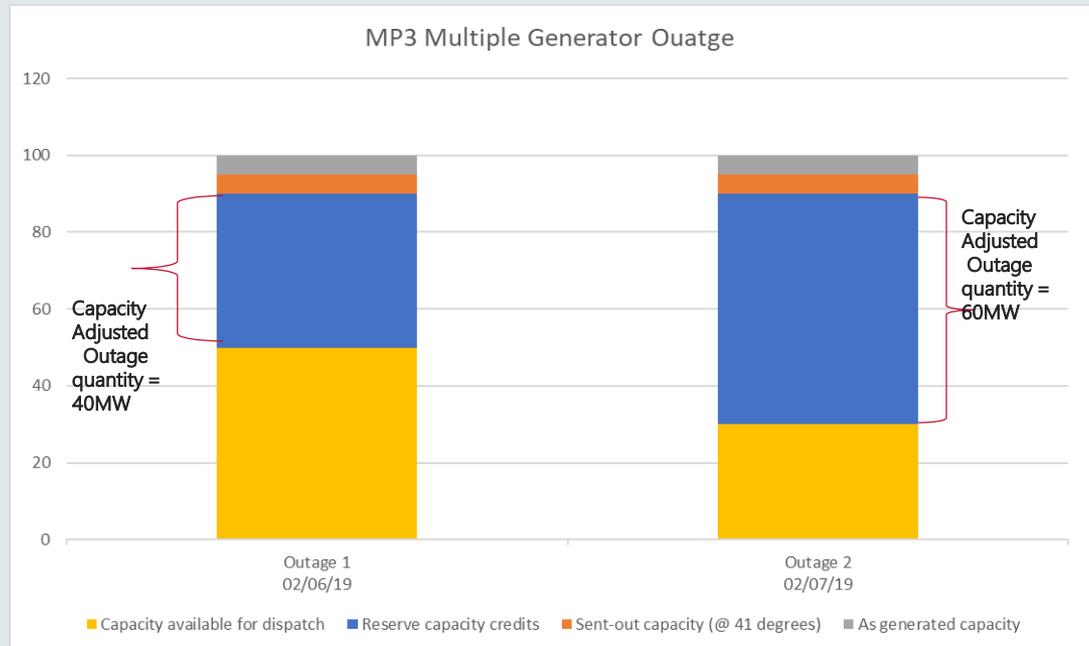
$$100\text{MW} - 50\text{MW} = 50 \text{ MW (RT Outage Quantity)}$$



Future Outage Scenario 4 (overlap outages)

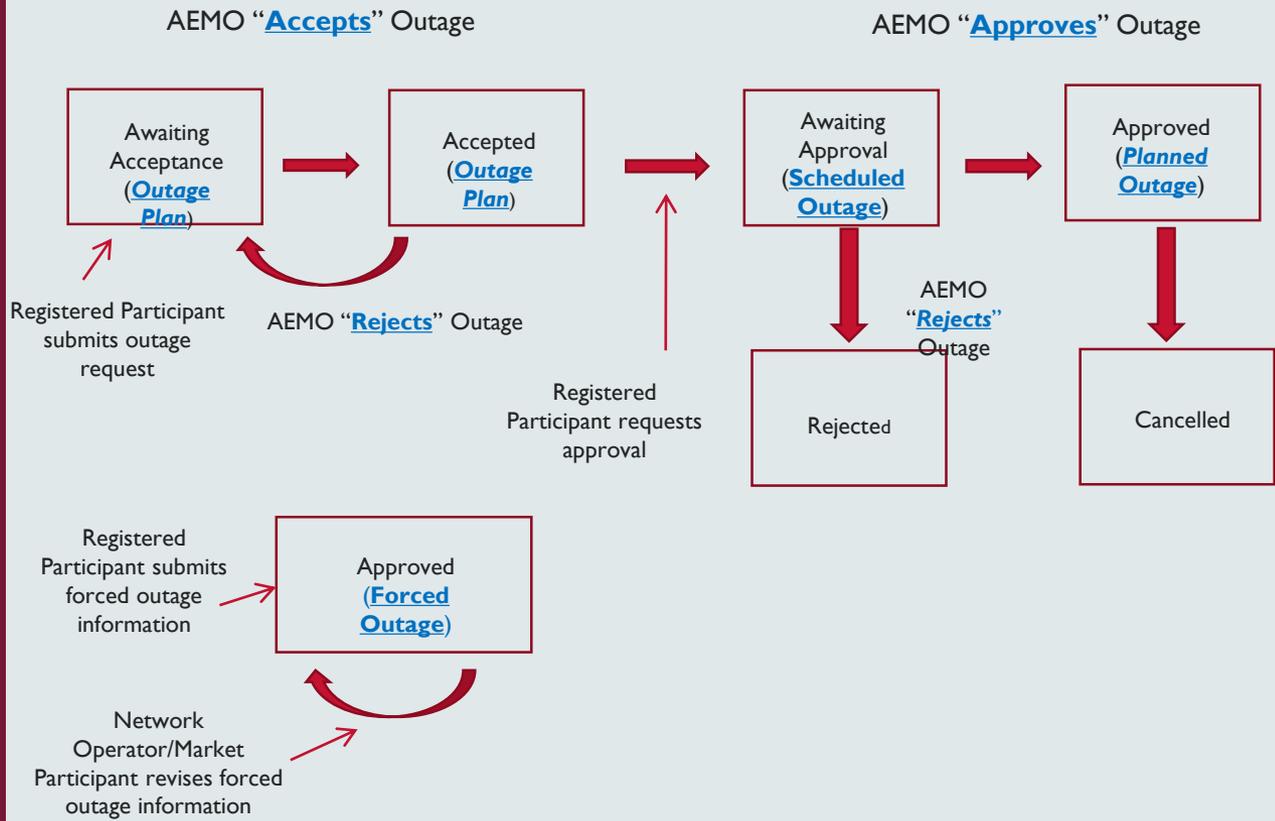
- As generated capacity = 100MW
- Capacity Credits (CC) = 90 MW
- Max Sent out capacity (MSOC) = 95 MW

- MP3 submitted available quantity 50MW @ 41°C on 02/06/19
- MP3 submitted another available quantity for 30 MW on 02/07/19
- Overlapping outages where for 3 days the available quantity for MP is 30MW.



Outage Process

Current Outage Process



Why do we need to change?

- The aim is to streamline the current outage planning process to;
 - Efficiently coordinate network and generator outages in a SCED world
 - Encourage forward planning
 - Make it less administrative to AEMO and registered participants
 - Improve transparency/timeline of processes and outage-related information
 - Provide as much certainty as possible and as early as possible to SM and registered participants.
 - To provide a better forecast for PASA, Pre-Dispatch and Dispatch
 - Align as much of the information required by participants to submit for Dispatch, Pre-Dispatch and outage submissions
 - Have the ability to manage the timing of outages efficiently to reduce impact on market costs
 - Support the integrity of RCM by helping to ensure that participants deliver the capacity service for which they are paid
 - Discourage the withholding of information from AEMO.

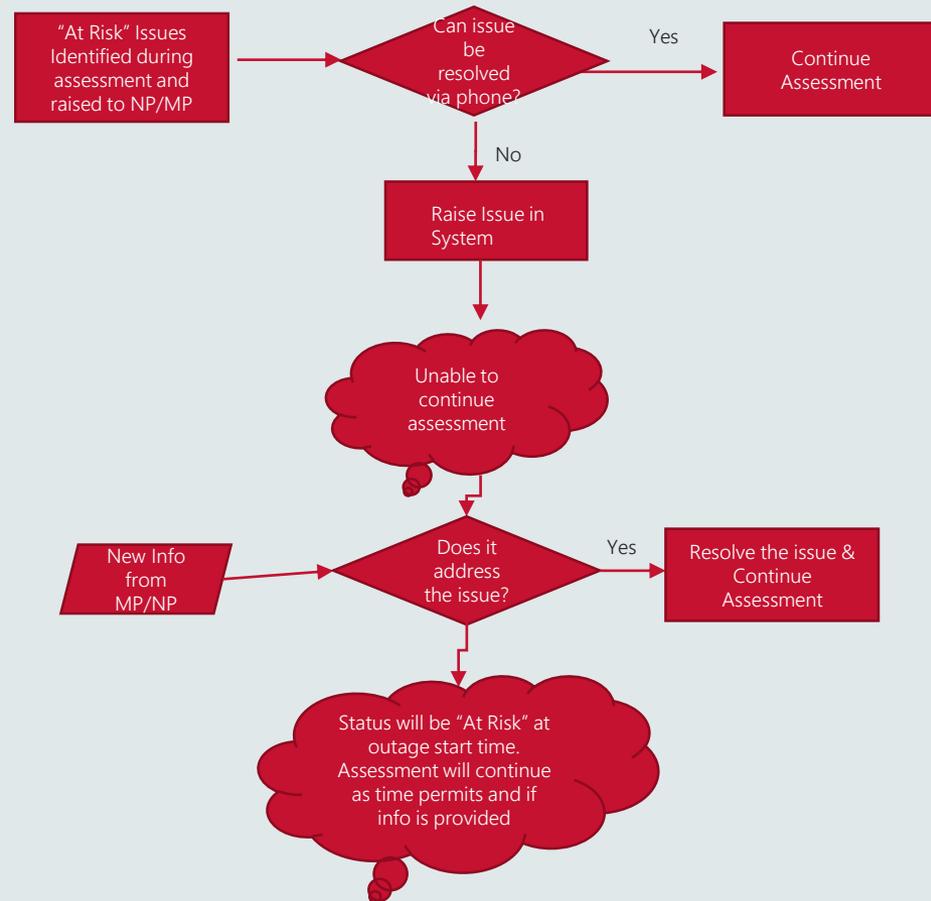
Options Proposed Previously

- Two options were proposed to TDOWG on 9 Sep:
 - Option 1: Move to a process similar to NEM that provides early indications of **likely or unlikely to proceed**
 - Option 2: Applicable Participants submit their outage plan by a particular date in the year Y-1. AEMO will approve the annual outage plan yearly.
- Considerations:
 - Ensuring principles identified are maintained
 - Balancing certainty and flexibility.

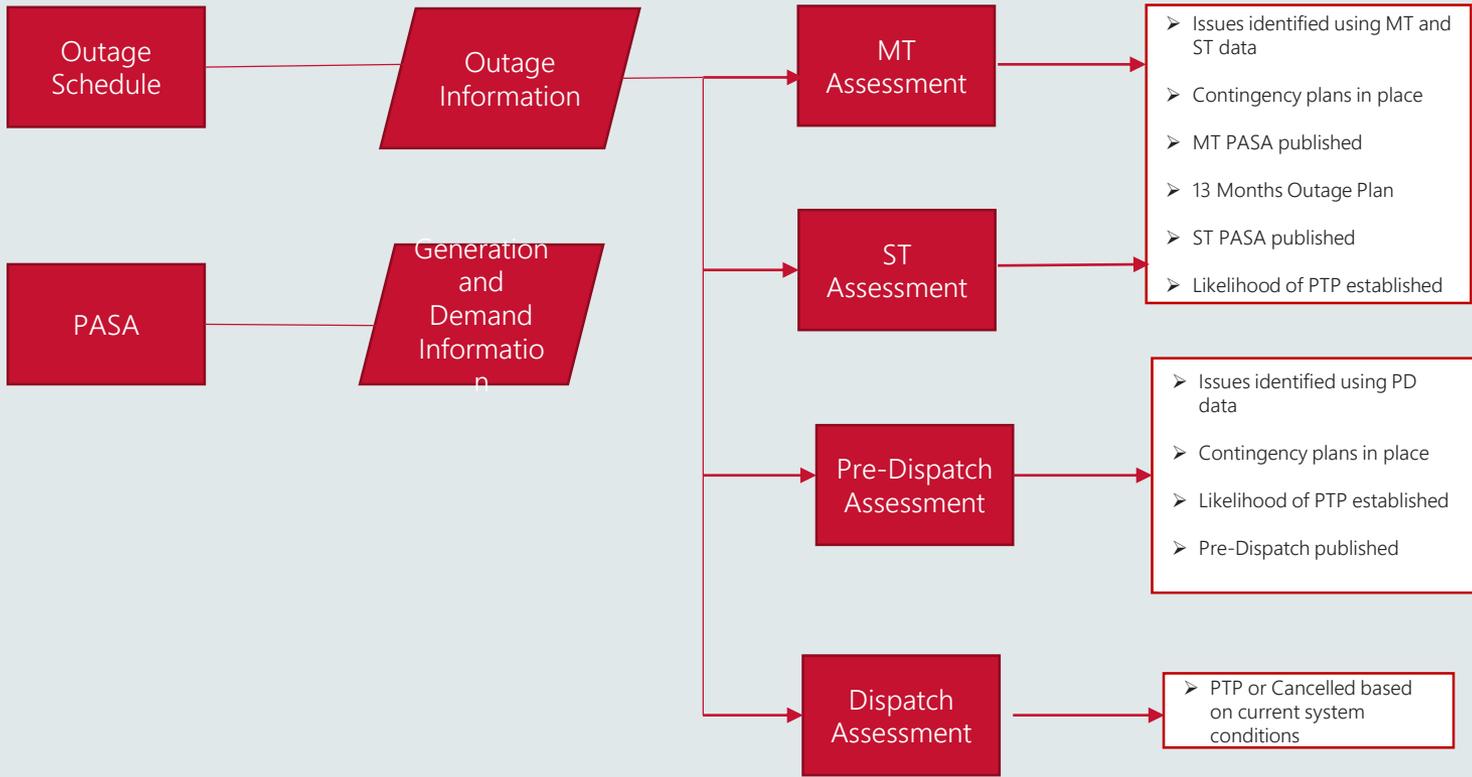
Proposal (cont)

- Following AEMO's assessment the outage would either "Approved" or "At risk" based on the assessment criteria
- This would provide as much certainty as possible and as early as possible to AEMO and registered participants.
- AEMO will continue to reassess outage plan based on changed circumstances (as is currently the case) and may move the status to "At risk"
 - Allows queueing principles to be maintained based on submission dates
 - May be transitioned back to Approved, or to Cancelled, depending on the situation
 - May require additional information to assist with further assessment
 - Each state change is published online for outage transparency
 - Rules would need to define specific data to be published

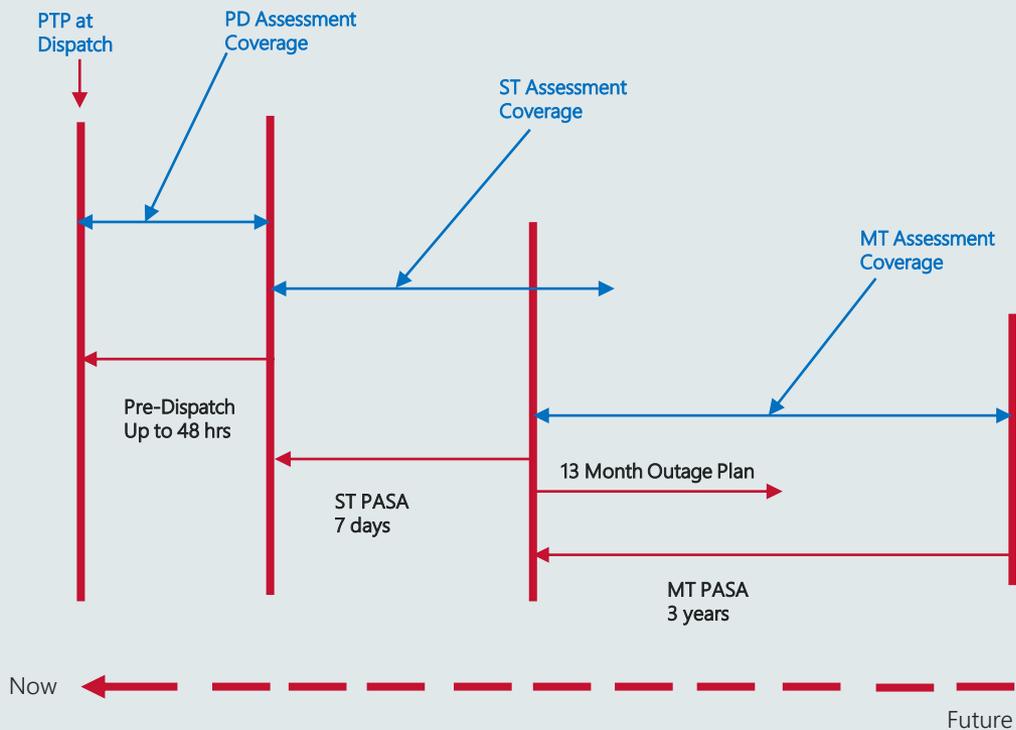
Proposal (cont)



Proposal (cont)- High Level Flowchart Process



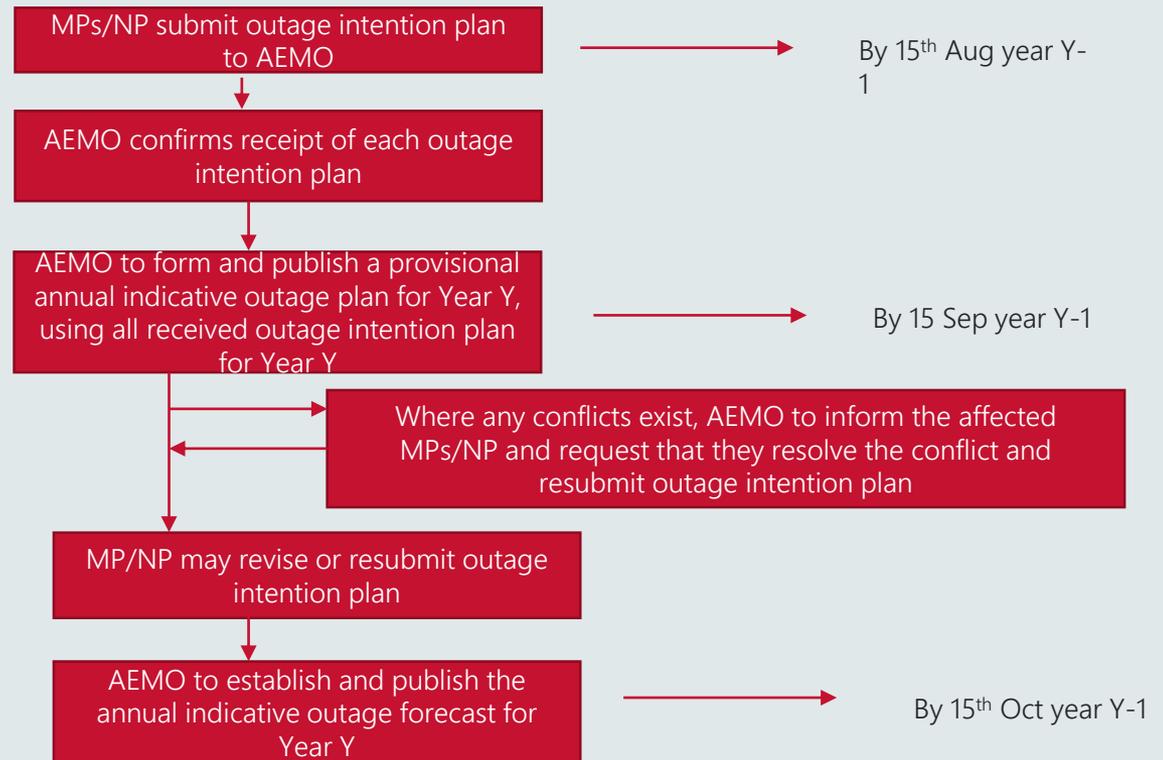
Proposal (cont)– Assessment timeframe



Proposal (cont)

- Desirable to have a requirement to submit a yearly outage forecast
- Encourage transparency, forward planning and increase market efficiency
- Enable efficient coordination between network and generator outages
- It is for information rather than firm outage submission
- Current WEM Rules allow AEMO to acquire this information via PASA
- AEMO has currently directed Participants not to provide.

What do working group think of this requirement?



Outage Submission Deadlines

- The proposed submission deadlines for outage plans are:
 - 10:00 am on TD-2 for scheduled outages; and
 - 2.5 hours before the proposed start of a short notice outage/opportunistic maintenance.
 - Both are as per RC_2013_15
- The proposed deadlines for outage plan approval or rejection are:
 - 14:00 on TD-2 for scheduled outages; and
 - 2.5 hours before the proposed start of a short notice outage/opportunistic maintenance.
- If AEMO has not provided a participant with a decision by the relevant deadline then the outage plan will be deemed to be rejected.

Timing Requirement for Forced Outages

- Currently, for Forced Outages notify asap after outage Within 15 business days provide full and final details.
- Proposal – Scheduled & Non- Scheduled Generators and Network Operator
 - MP/NP shall as soon as practicable notify AEMO of the occurrence of the forced outage.
 - Information required in respect of the forced outage will be provided to AEMO by the applicable MP/NP as soon as practicable and in any event within 24 hours.
 - A full and final details to be subsequently submitted by the applicable MP/NP to AEMO within 15 calendar days (as in the case today).
 - It is aligned with the RCP 2014_03 proposal to retain timing requirements for forced outages.



Questions