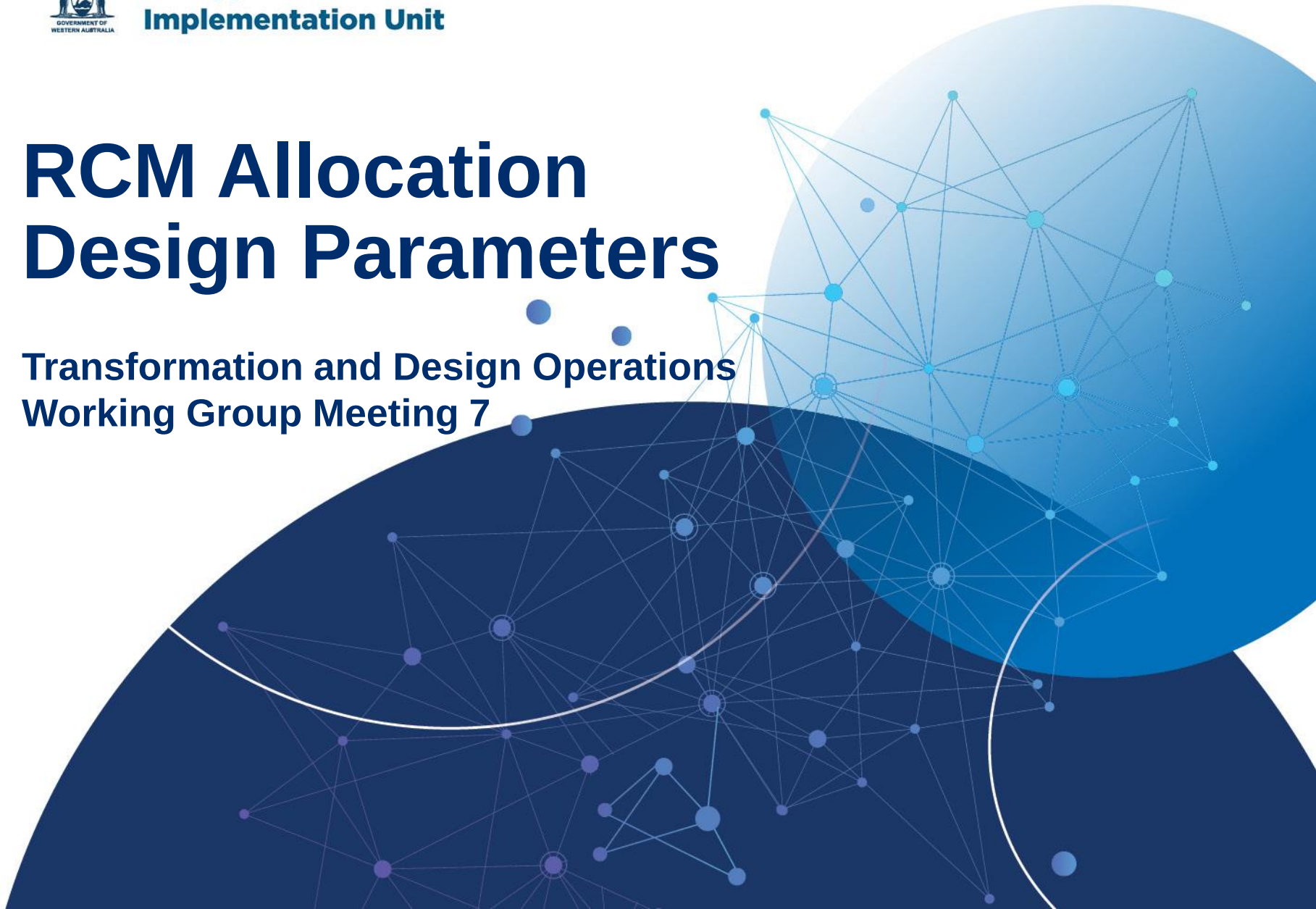
Energy Transformation Implementation Unit

RCM Allocation Design Parameters

Transformation and Design Operations Working Group Meeting 7



Ground Rules

- The Chair will aim to keep the meeting on time so that we can get through the large volume of material for discussion.
- Questions and issues raised must be kept relevant to the discussion. Other matters can be raised at the end of the meeting or via email to TDOWG@energy.wa.gov.au
- Please state your name and organisations when you ask a question to assist with meeting minutes.
- This meeting will be recorded for minute taking.

Agenda

2pm	Opening and plan for today
2.10pm	RCM principles
2.30pm	Allocation process and worked examples
3.30pm	Tie breaking
3.45pm	Review of issues from today
3.55pm	Next Steps

Plan for today

Purpose

- Outline the design parameters to be endorsed by Taskforce
- Discuss allocation approach
- Review worked examples
- Identify detailed design issues for later discussion and for the Taskforce

Process

- Focus of discussion is on the allocation approach to clarify understanding
- Issues to be recorded for later
- Review, sort and resolve issues where possible
- Agreed process for resolution or transmission

Design parameters to be endorsed

Characteristics

- A mechanism, Network Access Quantity (NAQ), to ensure the RCM continues to achieve the Reliability Criterion through providing investment certainty.
- NAQ is performance-based, not time-limited.
  - Current performance framework is fit-for-purpose.
  - ETIU to consult further on potential improvements.
- Design principles for the NAQ framework.
- No market mechanism to facilitate transfer of NAQ.
- DSM providers will also receive the same level of investment certainty.
  - This may be through the NAQ framework or some other solution.

Design parameters to be endorsed

Allocation

- Allocation process to align with RCM pricing reforms
- Circumstances that require NAQ to be adjusted down
  - Reduction in facility performance
  - Reduction in network capacity
- Funders of network capacity receive priority
- Priority for specific facilities seeking an increase in NAQ
  - Intermittent facilities impacted by a change in relevant level
  - Facilities impacted by a reduction in network capacity

Other matters to be addressed

To be brought to Taskforce for endorsement post February 2020

Transition approach (application of NAQ framework for 2020 Cycle)

- ETIU to consult further on the approach
- Target TDOWG presentation in late February / early March
- Taskforce endorsement targeted for March

Treatment of storage and DSM

- ETIU will commence consultation with industry in February through 1:1s
- Target TDOWG presentation in March
- Taskforce endorsement targeted by mid-2020.

Background and design principles

Purpose of the RCM

Ensure reliability by incentivising investment in generation capacity when needed by the system.

- Provide an expected stream of revenues that provides investment certainty.
- Reward 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.

Design principles

1. Capacity Credits must not be allocated beyond the physical capacity of the network.
2. Available network capacity should be efficiently rationed to maximise the access of parties and therefore the economic benefit of the network.
3. The value of existing assets on the system should be respected and those assets should retain economic value under the RCM as long as facility performance is maintained.
4. The new framework should contribute to locational signals for new entrants so they can make informed decisions about risk and opportunity.
5. Barriers to entry and exit should be minimized.
6. The new framework should be simple, transparent, and readily implemented in the Wholesale Electricity Market with minimal changes to existing processes.

Design basis for RCM allocation

Other changes to the RCM are occurring (or are being proposed) at the same time as the changes to the allocation of Capacity Credits.

RCM Pricing Reforms

- Introduction of a ‘fixed’ and ‘floating’ price.
- Changes to the order in which facilities are considered to achieve the Reserve Capacity Target (RCT) (see next slide).

Review of the Relevant Level Method

- ERA has completed a review of the RLM.
- A facility’s Relevant Level is an input into the network constraint model.
- Some participants have requested that the Capacity Credit allocation reforms are deferred until the new RLM is adopted. The option of deferring is discussed later as part of Transition Arrangements.

Outage Management

- Minimal changes to the outage calculations for Scheduled Generators (the equations have changed and are now codified in the WEM Rules rather than the PSOP, but the new equations result in the same outcomes).
- New calculations for intermittent generators that will allow outage rates to be calculated for the purposes of CRC and performance monitoring (EPOH).

The RCM allocation design is being developed on the basis that RCM Pricing and Outage Management changes are implemented. For RLM, ETIU assumes that the ERA will consider RCM allocation design and propose changes as required.

RCM pricing reforms

Prioritisation order

AEMO must accept offers from all ‘Existing’ facilities and all ‘Committed Floating Price’ facilities.

Scenario 1 – there are no ‘Fixed Price’ facilities

- AEMO considers Proposed Floating Price facilities if the RCT is not met after accepting all Existing and Committed Floating Price facilities.
- Select facilities based on a ‘Prioritisation Order’.

Scenario 2 – there are ‘Fixed Price’ facilities

- If the RCR +3% is not met after accepting Existing and Committed Floating Price facilities, consider facilities in the following order until the RCT is met
  - Committed Fixed Price facilities. AEMO must accept all offers.
  - Proposed Floating Price facilities. AEMO accepts individual offers until the target is met using the Prioritisation Order.
  - Proposed Fixed Price facilities. AEMO accepts individual offers until the target is met using the Prioritisation Order.

NAQ Allocation Process

NAQ Allocation

Relationship between CRC and NAQ and CC

General Rules

- CRC ≥ NAQ
  - Facilities can apply for increase in NAQ
  - Increase treated as ‘new’ NAQ, to be competed for with everyone else
- CRC < NAQ
  - NAQ adjusted down until CRC = NAQ
  - ‘Surplus’ NAQ is available to other market participants
- CC = NAQ

NAQ allocation

Process

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

**only for 'Proposed' Developments*

Stage 3

Confirm existing quantities

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

Stage 4

Assign new quantities

- Assess residual network capacity
- Allocate NAQ based on maximising network use
- Allocate credits up to NAQ

NAQ allocation

Existing NAQ – Adjusting for facility performance

Where CRC < NAQ

If a facility's CRC is reduced below its existing NAQ allocation, then the facility's NAQ will be reduced to the corresponding CRC level.

- There is a partial exception to the general rule for intermittent facilities. Discussed in another slide.

The surplus NAQ becomes available for reallocation to other facilities.

A facility's CRC can be reduced below its existing NAQ for several reasons, e.g.

- AEMO does not assign the facility NAQ because the facility has not met its performance obligations (e.g. a scheduled facility has a high amount of outages)
- The facility nominates an amount of CRC for trading that is lower than its existing NAQ allocation.
- The facility does not apply for CRC in a Capacity Cycle

NAQ allocation

Existing NAQ – Adjusting for facility performance

Where CRC > NAQ

The facility may seek an increase in NAQ to match its higher CRC.

A facility's CRC may be above its existing NAQ for several reasons, e.g.

- The facility has made improvements to increase output
- There was insufficient network capacity to support the facility's CRC in the initial NAQ allocation

The facility will be eligible to receive additional NAQ if the network capacity supports the higher CRC.

Network capacity may support a higher CRC in several circumstances, e.g.

- Network funded augmentation.
- Retirement of existing facilities.

Worked example

Existing NAQ – Adjusting for facility performance

Scenario 10	Figures in MW	Year 1				Year 2				Year + x		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Facility performance degrades Facility suffers a performance degrade and CRC is reduced.	Existing SG	100	100	100	Facility suffers performance downgrade with no agreed repair time.	70	70	70	Facility conducts repairs (say two years later). Limited NAQ (10) is available as other facilities have used the spare network capacity	100	80	80
	Performance has degraded, say due to turbine or single unit failure, that cannot be addressed in a reasonable timeframe. The NAQ is reallocated to maximise the availability of capacity to the RCM. If the plant subsequently adds capacity, it is treated as a new facility and can only gain NAQ is it is available on the system.											

NAQ allocation

Existing NAQ – Adjusting for facility performance

Replacement of capacity through maintenance or improvements

A facility may replace part (or all) of its capacity to maintain its CRC.

Existing NAQ is retained so long as the facility continues to be be assigned CRC to a level equal to (or greater than) NAQ.

The capacity that is replaced is not treated as ‘new’.

NAQ will, however, become contestable where a different generation technology is substituted for the existing capacity.

Where the replacement of capacity results in an overall increase in CRC:

- The facility may apply for an increase in NAQ.
- Increase in NAQ treated as ‘new’ to be competed for with other facilities.
- NAQ will be allocated if supported by network capacity.

Worked example

Existing NAQ – replacement of capacity

Scenario 13	Figures in MW	Year 1				Year 2				Year 3		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Existing facility replaced	Incumbent Generator	50	40	40	**Case 1.** Five out of 30 wind turbines are replaced like for like.	50	40	40	No further change	50	40	40
					Case 2. Gas turbine is replaced by thirty 5MW wind turbines (RLM = 50)	50	0	0	NAQ of 20 becomes available to the plant.	50	20	20
	Case 1. No change in technology. The RLM is the same and the NAQ is unchanged. **Case 2**. The change in technology results in the reallocation of the NAQ. Later NAQ becomes available and is allocated.											

NAQ allocation

Existing NAQ – Adjusting for network capacity

Decreases in network capacity

General principle: Do not allocate more NAQ than can be supported by the network capacity.

A permanent reduction in network capacity will require NAQ allocations to be adjusted. This can happen in several circumstances.

- Western Power retires transmission assets, or replaces old transmission assets with different assets, or uses non-network solutions.
- Reduction in demand.

Adjustment process:

- Proportional reallocation

Impacted facilities will get a priority when allocating NAQs if network capacity is increased in a subsequent Capacity Cycle (next slide).

Regulatory framework will be reviewed to ensure operational decisions that impact network capacity are subject to appropriate scrutiny and transparency.

NAQ allocation

Existing NAQ – Adjusting for network capacity

Increases in network capacity

Facilities may apply for higher NAQ allocation where CRC > NAQ.

NAQ will be determined through the network capacity modelling exercise.

Allocation process:

- Facilities that have been previously impacted by a reduction in network capacity will be prioritised over other facilities seeking new or additional NAQ in the assessment process.
- In all other cases, facilities will be assessed with all other facilities seeking new or additional NAQ.

Worked example

Existing NAQ – Adjusting for network capacity

Scenario 6	Figures in MW	Year 1				Year 2				Year + X		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Permanent reduction in network capacity For example, a transformer reaches end of life with no planned replacement.	Incumbent SG	100	100	100	Network reduction of 40	100	90 Pro-rata	90	Later augmentation allows 20 to be shared.	100	95	95
	The impacted parties share the reduction on a pro-rata basis. If network augmentation occurs, the parties that suffered the reduction are given priority over others.											

NAQ allocation

Accounting for changes in Relevant Level

Issue

CRC for intermittent facilities estimated using the Relevant Level Method (RLM) that accounts for variability in the output due to intermittency of renewables.

General rules under the NAQ framework:

- If CRC < NAQ, then NAQ adjusted down to the corresponding level of CRC.
- Surplus NAQ becomes available to other participants.
- If the Relevant Level improves subsequently so that CRC > NAQ, then facility will compete for any additional NAQ with new entrants.

Concern that this is inconsistent with the objective of providing investment certainty.

Solution

Provide intermittent facilities with a partial exception to the general rule that CRC must support NAQ allocation (i.e. CRC ≥ NAQ).

Taskforce to endorse the need for protection.

Options will be developed for consultation with industry and a recommendation submitted to Taskforce as part of detailed design.

NAQ allocation

Accounting for changes in Relevant Level

Considerations for developing options.

Objective of reform is to provide investment certainty and should protect against impacts of new entry on Capacity Credits, within reason.

This involves providing a measure of protection for performance issues that are outside of the facility's control.

There is a need to balance:

- Providing investment certainty by not unfairly penalising intermittent facilities for performance issues that are largely out of their control.
- Maximising the use of the network by allowing new entrants the opportunity to compete for unused NAQ.

Worked example

Scenario 3	Figures in MW	Year 1				Year 2				Year 3		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Change in RLM for existing facilities Currently constrained RLM: • goes down by 10 MW • then up by 15 MW Other facilities can use the NAQ that may become available.	Incumbent INSG	100	100	100	**Option 1**. No exception from the general rule. The annual Relevant Level is used as the facility's output for the purposes of the NAQ RLM and CRC are reduced by 10	90	90	90	RLM and CRC rise to 115	115	90	90
					Option 2. Smoothing is required, Year-1 memory is applied. RLM and CRC are reduced by 10	90	90 10 NAQ held	90	RLM and CRC rise to 115	115	100	100
	Option 1 assumes the RLM should be considered the most likely long-term value and maximises the used of the network when others can make use of it. Option 2, however, notes the increased variability of the new RLM method and applies some averaging for stability and to protect the incumbent. This is a policy call to be made by the Task Force. The policy call needs to balance the need to protect investments and the need to promote competition. Treating the variability in the relevant level for a facility as a temporary change seems to provide the right balance and was superior to 3- and 5-year averages in simple modelling. **Issues** 1. When a Facility applies for CRC in Yr3 they will not know their RLM, therefore how will they know if they need to apply for an upgrade? Is the intention to just create a separate Trade Declaration? They will need to confirm, via their Trade Declaration, that they are willing to trade their additional capacity. Then the extent of network that can accommodate that additional capacity will be assessed and NAQ granted up to that amount. This additional capacity will be considered with all other applicants											

Worked example

Accounting for changes in the Relevant Level

Scenario 9	Figures in MW	Year 1				Year 2				Year 3		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
New Facility New facilities that are developed and will exhaust the network capacity will be subject to constraints and a lower NAQ than their CRC.	New INSG (RL=30MW)	30	15	15	Demand shift cause increased network capacity of 5MW. Relevant Level also increases to 33.	33	20	20	Relevant Level reduces to 29	29	20	20
	New facility is only able to receive 15 NAQ as there is limited network capacity and the incumbents in Year 1 have their NAQ protected. In Year 2, the facility becomes an incumbent. Assuming that Year 1 incumbents have CRC = NAQ, then the INSG receives gains all of any increased network capacity.											

NAQ allocation

Prioritisation order (NAQ seekers)

AEMO must accept offers from all 'Committed Floating Price' facilities

- These facilities are considered as a group in the network capacity model because AEMO must accept all offers from this category.
- NAQ allocated based on the results of the network capacity model.

Scenario 1 – there are no 'Fixed Price' facilities

- AEMO considers Proposed Floating Price facilities if the RCT is not met after accepting all Existing and Committed Floating Price facilities.
- Apply a prioritisation order to select facilities for NAQ until the RCT is met.

Scenario 2 – there are 'Fixed Price' facilities

- If the RCR +3% is not met after accepting Existing and Committed Floating Price facilities, consider facilities in the following order until the target is met
  - Committed Fixed Price facilities. AEMO must accept all offers.
  - Proposed Floating Price facilities. AEMO accepts individual offers until the target is met using the prioritisation order.
  - Proposed Fixed Price facilities. AEMO accepts individual offers until the target is met using the prioritisation order.

NAQ allocation

Prioritisation order – Proposed developments

AEMO does not accept offers from all proposed developments but only accepts offers from proposed developments until the RCT is met.

Issue: Should proposed developments be considered as a group in the network model?

- If not, then we could use the current prioritisation order to select the individual facility to run through the model.
  - Size (largest first), then
  - Offers for capacity that was included in an EOI, then
  - Timing of the facility's offer (earliest first), then
  - Timing of the facility's CRC application (earliest first).
- If yes, then we could amend the prioritisation order to consider which facility to allocate NAQ.
  - Replace Size with an '**Efficiency Quotient**', then
  - As per the above prioritisation order.

NAQ allocation

Tiebreak process – the ‘Efficiency Quotient’

The ‘Efficiency Quotient’ is the ratio of the modelled facility output in the network capacity modelling tool at peak demand to its nameplate capacity. It is a measure of how efficient the facility is at providing its energy into the market under modelled conditions.

The network capacity modelling tool could operate in a similar fashion to Western Power’s current systems to estimate the Constrained Access Entitlement (CAE) of a facility (noting that there are other options available).

The CAE tool:

- Determines the maximum capacity able to be transferred into the network by each facility across numerous generation scenarios, at time of peak demand.
- Considers all system normal network constraint equations.
- Capacity determined for the relevant Capacity Year accounting for the expected configuration of the network.

A confidence interval is applied to determine the overall maximum capacity for each facility.

NAQ allocation

Prioritisation order – Proposed developments

Scenario: The RCT has not been met after accepting all offers from facilities in the Operating, Committed Floating Price, and Committed Fixed Price categories.

Option 1: In the network model, consider Proposed Floating Price facilities on an individual basis before Proposed Fixed Price facilities. Select facilities using the existing prioritisation order.

- Size.
  - Select the largest facility to run through the model.
  - Check if available NAQ = minimum CC requirement.
  - If yes and RCT achieved, then stop.
  - If not, then move to the next largest facility etc.
- If size does not differentiate, then consider facilities that submitted an EOI.
  - Select the largest facility that submitted an EOI to run through the model.
  - Check if available NAQ = minimum CC requirement. If not, then move to the next largest facility.
- Repeat process through the prioritisation order.

NAQ allocation

Prioritisation order – Proposed developments

Option 2: In the network model, consider Proposed Floating Price facilities as a 'group' before Proposed Fixed Price facilities. Select facilities using the amended prioritisation order.

- Efficiency Quotient.
  - Select the facility with the highest quotient.
  - Check if available NAQ = minimum CC requirement.
  - If yes and RCT is achieved, then stop.
  - If not, then move to the facility with the next highest quotient.
- If Efficiency Quotient does not differentiate, then consider the facility that submitted an EOI.
  - Select the facility with the highest quotient and that submitted an EOI.
  - Check if available NAQ = minimum CC requirement.
  - If yes and RCT is achieved, then stop.
  - If not, then move to the facility with the next highest quotient + EOI.
- Repeat process through the prioritisation order.

Worked example

Prioritisation order – Option 1

	Figures in MW					
	Facility	CRC	Min CC	NAQ available	NAQ allocated	CC allocated
Option 1 Use existing prioritisation order to select individual Proposed facilities to run through the network capacity model. • Size (largest first), then • Offers for capacity that was included in an EOI, then • Timing of the facility's offer (earliest first), then • Timing of the facility's CRC application (earliest first).	Facility 1 (floating price) Did not submit an EOI	50	50	50	50	50
	Facility 2 (floating price) Did not submit an EOI	40	40	40	40	40
	Facility 3 (floating price) Submitted an EOI	40	40	30	0	0
	Facility 4 (fixed price) Did not submit an EOI	30	30	0	0	0
	100MW is available through the network but only 80MW is required to achieve the RCT. Facilities are selected for NAQ in the following order: - Facility 1 (largest facility). Minimum CC requirement achieved – allocate NAQ. RCT not achieved. - Facility 3 (EOI is the differentiating factor). Minimum CC requirement not achieved – do not allocate NAQ. RCT not achieved. - Facility 2. Minimum CC requirement achieved – allocate NAQ. RCT achieved. - Facility 4. Not considered as RCT achieved.					

Worked example

Prioritisation order – Option 2

	Figures in MW					
	Facility	CRC	Min CC	NAQ available	NAQ allocated	CC allocated
Option 2 Run all Proposed facilities through the network capacity model (floating before fixed). Use amended prioritisation order to select the facility for NAQ allocation. • Efficiency Quotient (largest first), then • Offers for capacity that was included in an EOI, then • Timing of the facility's offer (earliest first), then • Timing of the facility's CRC application (earliest first).	Facility 1 (floating price) EQ = 0.8 Did not submit an EOI	50	50	40	0	0
	Facility 2 (floating price) EQ = 0.7 Did not submit an EOI	40	25	28	28	28
	Facility 3 (floating price) EQ = 0.7 Submitted an EOI	40	20	28	28	28
	Facility 4 (fixed price) EQ = 0.8 Submitted an EOI	50	30	40	40	40
	100MW is available through the network but only 80MW is required to achieve the RCT. Facilities 1 to 3 are run through the network model as a group first and selected for NAQ in the following order: - Facility 1 (largest EQ). Minimum CC requirement not achieved – do not allocate NAQ. RCT not achieved. - Facility 3 (EOI is the differentiating factor). Minimum CC requirement not achieved – do not allocate NAQ. RCT not achieved. - Facility 2. Minimum CC requirement achieved – allocate NAQ. RCT not achieved. Facility 4 is then considered in the network model. - Facility 4. Minimum CC requirement achieved – allocate NAQ. RCT achieved.					

Transitioning to the new arrangements

Transitioning to new arrangements

ETIU's previous proposal

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).

Assign NAQ to the Capacity Credits that have been allocated under the 2020 Capacity Cycle.

Transitioning to new arrangements

Stakeholder concerns

Substantial changes are occurring to the RCM that need to be considered before implementing changes to the allocation of Capacity Credits.

- RCM pricing reforms.
- Changes to outage management.
- ERA review of the Relevant Level Method.

Assessment of network transfer capability should be undertaken with a full set of constraint equations (thermal and non-thermal).

ETIU will defer seeking a decision from the Taskforce on the transition approach until March to allow for further consultation on options, which include:

- Deferring current RCM timetable by up to 6 months (not preferred as rule changes are required).
- Deferring the assignment of NAQ until the 2021 Capacity Cycle.
- Continue as per the ETIU's previous proposal.

Transitioning to new arrangements

2020 Capacity Cycle and 2021 Capacity Cycle

2020 Capacity Cycle (transition)

Scheduled Generators

CRC (41℃) ⇒ 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.

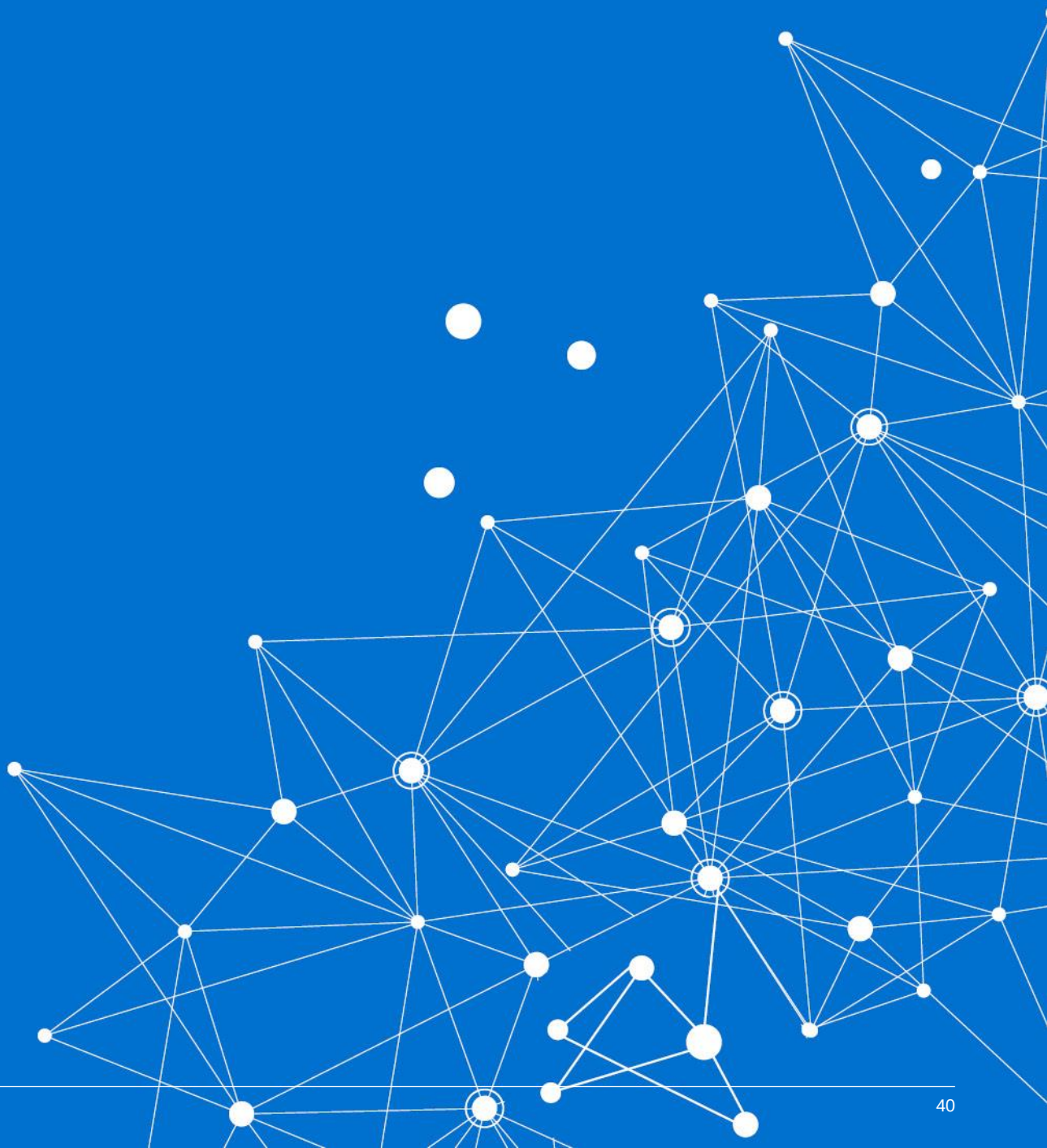
New NAQ applications

CRC ⇒ NAQ ⇒ CC *

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

Review of issues

Next steps



Next steps

7 February 2020

Design parameters presented to Taskforce for endorsement

March 2020

Transition approach endorsed by Taskforce.

April 2020

Commence consultation on draft detailed design. Commence drafting rules.

Mid-2020

Taskforce endorses detailed design.

By September 2020

Amendments to Market Rules gazetted.

Meeting close

- Questions or feedback can be emailed to TDOWG@energy.wa.gov.au

- The next meeting will be communicated via email.