Energy Transformation Taskforce

Assigning Capacity Credits in a Constrained Network

Network Access Quantity - Key Design Parameters

Information Paper

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Energy Transformation Taskforce

David Malcolm Justice Centre
28 Barrack Street
Perth WA 6000
Locked Bag 11 Cloisters Square WA 6850

Main Switchboard: 08 6551 2777

www.energy.wa.gov.au
ABN 84 730 831 715

Enquiries about this report should be directed to:

Ashwin Raj

Telephone: 08 6551 1047
Email: ashwin.raj@energy.wa.gov.au

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Glossary

Term	Definition
Availability Quotient	The ratio between the modelled output of a facility at peak demand and its nameplate capacity.
Certified Reserve Capacity	The quantity of Reserve Capacity that the Australian Energy Market Operator has assigned to a facility for a Reserve Capacity Cycle.
Committed Facilities	The status of the facility for the purposes of the Reserve Capacity Mechanism. A Committed facility will be ranked higher in the Network Access Quantity assignment process than a Proposed facility.
Declared Sent Out Capacity	The maximum amount of electricity that a facility can transfer into the network at the facility's connection point as set out in the facility's access contract, or if no amount is specified, then as permitted under Western Power's technical rules.
Fixed Price Facilities	A facility that has chosen to receive a fixed price.
Market Price Facilities	A facility that has chosen to receive the market price.
Market Rules	The Wholesale Electricity Market Rules that set out the roles and responsibilities of the Australian Energy Market Operator and other governance bodies, and that guides the operation of the Wholesale Electricity Market including the trading and dispatch of energy, the Reserve Capacity Mechanism, and settlement.
NAQ holder	A facility that has been assigned a Network Access Quantity prior to the commencement of a Reserve Capacity Cycle.
NAQ seekers	A facility that is seeking to be assigned a Network Access Quantity in a Reserve Capacity Cycle. This includes facilities that have never been assigned a Network Access Quantity and NAQ holders that are seeking an increase in their assigned Network Access Quantity.
Network Access Quantity	The Network Access Quantity is an instrument, measured in megawatts, that is assigned to a capacity resource and that provides a preferential right to receive Capacity Credits up to the assigned Network Access Quantity ahead of other facilities that have not been assigned a Network Access Quantity.
Operating Facilities	A facility that is in Commercial Operation in the Wholesale Electricity Market as determined by the Australian Energy Market Operator under clause 4.13.10B of the Market Rules.
Proposed Facilities	The status of the facility for the purposes of the Reserve Capacity Mechanism. A Proposed facility will be ranked lower in the Network Access Quantity assignment process than a Committed facility.
RCR +3%	A three per cent margin over and above the Reserve Capacity Requirement is being introduced as part of the Reserve Capacity Mechanism pricing reforms and will apply if there are fixed price facilities to be considered by the Australian Energy Market Operator when accepting offers from facilities to achieve the Reserve Capacity Requirement.
Reserve Capacity Requirement	The amount of capacity required to meet peak demand forecast by the Australian Energy Market Operator in the Wholesale Electricity Market Electricity Statement of Opportunities for the relevant Reserve Capacity Cycle.

Abbreviations

The following table provides a list of abbreviations and acronyms used throughout this document. Defined terms are identified in this document by capitals.

Term	Definition
AEMO	Australian Energy Market Operator
BRCP	Benchmark Reserve Capacity Price
DSM	Demand Side Management
DSOC	Declared Sent Out Capacity
ERA	Economic Regulation Authority
ETIU	The Energy Transformation Implementation Unit
MW	Megawatt
NAQ	Network Access Quantity
PoE	Probability of Exceedance
RCM	Reserve Capacity Mechanism
RCR	Reserve Capacity Requirement
RLM	Relevant Level Methodology
SWIS	South West Interconnected System
Taskforce	The Energy Transformation Taskforce
WEM	Wholesale Electricity Market
WOSP	Whole of System Plan

Executive summary

Introduction

The Wholesale Electricity Market (WEM) in the South West Interconnected System (SWIS) is a capacity plus energy market with capacity procured through the Reserve Capacity Mechanism (RCM).

The Energy Transformation Strategy is adopting a model of constrained network access for Western Power's Network in the SWIS with the aim of reducing barriers to entry and participation in the WEM and improving the utilisation of the grid. Key elements of the WEM are also being redesigned to support this change and to meet the challenges of a transforming energy sector.

To support the adoption of a constrained network access model, changes to the assignment of Capacity Credits under the RCM are required so that under the new constrained model, the RCM continues to achieve its intended purpose of incentivising the investment needed to ensure a reliable power system. Without amendment, uncertainty around how network constraints affect facilities' Capacity Credits would undermine the functionality and effectiveness of the RCM.

To address this issue, the Energy Transformation Taskforce (Taskforce) provided its in-principle support for a mechanism, the Network Access Quantity (NAQ) (previously called the Capacity Credit Right), to ensure the RCM continues to achieve its purpose. A high-level design has been developed by the Energy Transformation Implementation Unit (ETIU) in consultation with industry participants.

This Information Paper describes the high-level design of the NAQ framework, including:

- those design parameters that have been endorsed by the Taskforce;
- matters that require further consultation and development during the detailed design and Wholesale Electricity Market Rules (Market Rules) development phase and that will be endorsed before implementation; and
- further elements of the design that will not be finalised before the implementation of the NAQ Framework but will be subject to review after the framework has commenced to determine if they should be adopted at a later date.

The development of the design in more detail and the development of Market Rules to implement the NAQ framework will occur over the first half of 2020. This work will be undertaken by the ETIU in consultation with stakeholders. The detailed design of the NAQ framework will be presented to the Taskforce for its endorsement in mid-2020, with Market Rules expected to be completed by September 2020.

The Network Access Quantity

What is it?

The NAQ is an instrument, assigned to a generation facility and measured in megawatts (MW), that establishes a preferential right to receive Capacity Credits. A facility that has been assigned a NAQ will receive Capacity Credits up to the amount of the NAQ that it holds ahead of other facilities that do not hold NAQ.

The NAQ has two functions:

1. It provides a cap on the amount of Capacity Credits a facility can receive based on the available network capacity at the relevant connection point.[1] The NAQ is assigned to a facility up to the facility's Certified Reserve Capacity at peak times or other periods of low reserve, subject to available network capacity, ensuring that Capacity Credits are assigned based on the transfer capability of the network.
2. It provides investment certainty against an unhedgeable risk of losing Capacity Credits due to network constraints caused by a new entrant locating in the same constrained region of the network. The NAQ protects a facility's quantity of Capacity Credits from being displaced by the new entrant and signals the value of additional capacity from a reliability perspective at locations throughout the SWIS.

Once a NAQ has been assigned to facilities in a given region of the network, subsequent facilities seeking to connect in that region can only receive a NAQ up to the residual physical capacity of the network in that region (i.e. net of the NAQ that has already been assigned).

The NAQ will have no bearing on dispatch or settlement of the energy or essential system services markets. These markets will operate under the new co-optimised security constrained economic dispatch design.[2]

How long does a facility retain NAQ?

The NAQ is a performance-based instrument and is not time-limited – i.e. the NAQ has no predetermined term or expiry. Once assigned, a facility's NAQ will be preserved for the life of the facility and can only be reduced under a limited and prescribed set of conditions.

These conditions include a situation where a facility is not assigned (or assigned a lower amount of) Certified Reserve Capacity for reasons related to the ongoing poor performance of the facility[3] or the facility is retired. A facility's NAQ may also be reduced where network capacity is no longer available to support it, for example where there has been a permanent reduction in network capacity due to a retirement or replacement of transmission assets. The conditions by which a facility's NAQ will be adjusted will be prescribed in the Market Rules.

How is the Network Access Quantity assigned to a facility?

In the first Reserve Capacity Cycle of the new NAQ framework, NAQ will be assigned first to facilities that have been assigned Capacity Credits in the year immediately preceding the Capacity Cycle.[4]

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1 A network capacity model is used to estimates the available capacity of the network by modelling the output of a facility that can be accepted at the connection point across a large range of credible generation dispatch scenarios to meet a particular demand level, subject to network constraints.

2 To be clear, a new facility can locate in a constrained area for the purpose of competing in the energy or essential system services markets, but will not be able to participate in the RCM unless or until it is able to obtain NAQ through network augmentation or the retirement of existing capacity in that location.

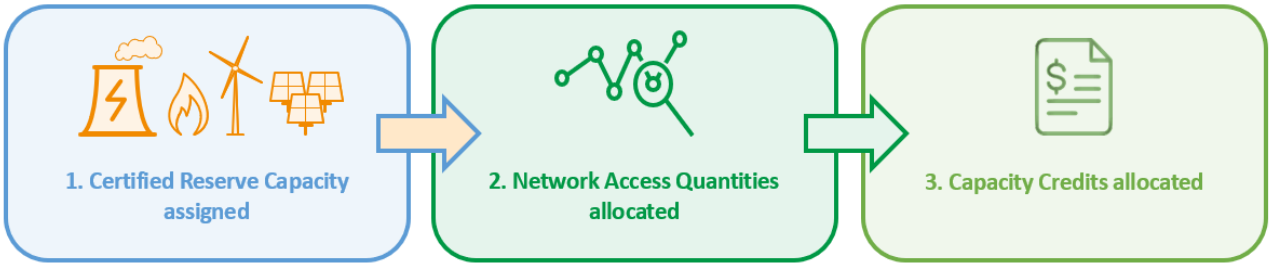
3 Under the current Market Rules, AEMO may reduce or determine not to assign a facility Certified Reserve Capacity due to poor performance, such as where a facility has a forced outage rate or a combined planned and forced outage rate greater than a prescribed threshold.

4 This includes facilities that are not yet in operation but have been assigned Capacity Credits.

Facilities seeking new or additional Capacity Credits will then be assigned NAQ up to the lesser of their Certified Reserve Capacity and the residual network capacity in the region where they are connecting (i.e. net of any NAQ that has already been assigned).

The relationship between Certified Reserve Capacity, NAQ, and Capacity Credits is illustrated below in Figure 1**Error! Reference source not found.**.

Figure 1: Relationship between Certified Reserve Capacity, NAQ, and Capacity Credits



The NAQ available to a facility is determined by a 'network capacity modelling' exercise conducted annually by the Australian Energy Market Operator (AEMO) to assess the capacity of the network to accept the facility's Certified Reserve Capacity at the 10 per cent probability of exceedance (PoE)[5] demand forecast for the relevant Capacity Year, subject to network constraints.[6]

The process for allocating NAQ to facilities is described in more detail in section 4.3.

[5] In the future, the link to peak demand may change for the allocation of both Capacity Credits and the NAQ if changes in technology further decouple peak demand and lowest reserve.

[6] This represents a similar approach to existing method of capacity allocation in the SWIS which is that scheduled generation facilities are assigned Capacity Credits up to their Declared Sent Out Capacity, intermittent facilities are assigned Capacity Credits up to their Relevant Level, and Generator Interim Access facilities are assigned Capacity Credits up to their Constrained Access Entitlement (i.e. any residual network capacity as determined by Western Power in accordance with Appendix 11 of the Market Rules).

1. Purpose

1.1 The Energy Transformation Strategy

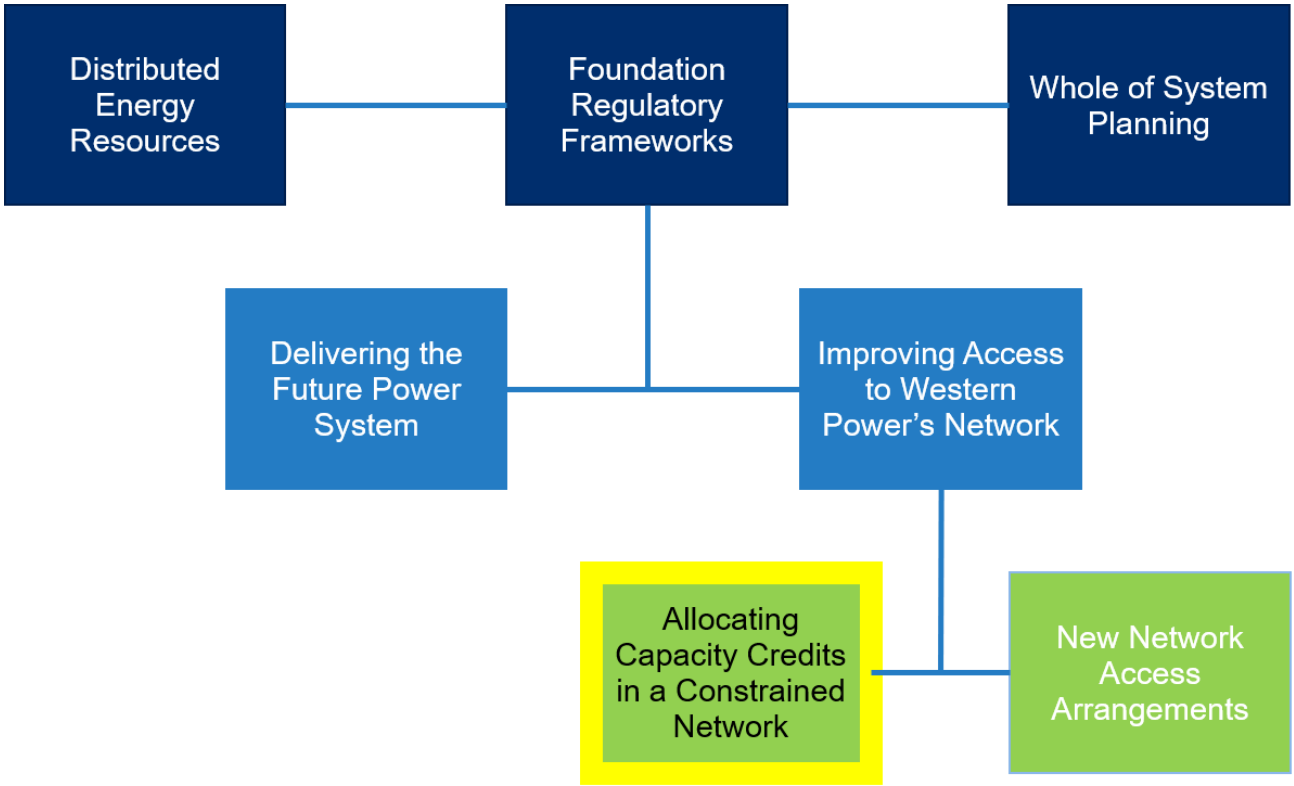
This paper forms part of the work to deliver the Energy Transformation Strategy. This is the Western Australian Government's strategy to respond to the energy transformation underway and to plan for the future of our power system.

The delivery of the Energy Transformation Strategy is being overseen by the Energy Transformation Taskforce (Taskforce), which was established on 20 May 2019. The Taskforce is being supported by the Energy Transformation Implementation Unit (ETIU), a dedicated unit within Energy Policy WA, a sub-department of the Department of Mines, Industry Regulation, and Safety.

More information on the Energy Transformation Strategy, the Taskforce, and ETIU can be found on the Energy Policy WA website at www.energy.wa.gov.au.

This paper is prepared as part of the Improving Access to Western Power's Network project (highlighted in Figure 2) within the Foundation Regulatory Frameworks work stream of the Energy Transformation Strategy.

Figure 2: Energy Transformation Strategy workstreams



1.2 The purpose of this paper

This information paper outlines the key design parameters for the Network Access Quantity (NAQ) framework that will be implemented to support the adoption of constrained network access.

The design parameters outlined in this paper reflect industry consultation following the ETIU's release of a Design Proposal in October 2019.[7]

1.3 Structure of this paper

The paper is structured as follows:

1. An introduction that provides the context for the NAQ framework, including the design principles that have informed its development.
2. The description of how NAQ will operate and used to ration network capacity among facilities.
3. The process to be used for assigning NAQ and the limited circumstances for subsequent variations; and
4. An outline of the available options to transition between the current approach for assigning Capacity Credits under the Reserve Capacity Mechanism (RCM) and the new arrangements to apply in the constrained network access model.

[7] Allocation of Capacity Credits in a constrained network, Design Proposal, 16 October 2019, available at the Energy Policy WA website here https://www.wa.gov.au/sites/default/files/2019-10/Allocation%20of%20Capacity%20Credits%20in%20a%20constrained%20network%20-%20Design%20Proposal.pdf

2. Introduction

2.1 The purpose of the Reserve Capacity Mechanism

A well-functioning electricity market should attract and retain the optimal mix of generation capacity resources to ensure system reliability with the lowest overall cost of supply. Reliability in the context of electricity markets means having sufficient generation, demand-side[8], and transmission capacity available to meet electricity demand, particularly during periods of peak demand.[9]

The purpose of capacity mechanisms like the RCM in the Wholesale Electricity Market (WEM) is to provide consumers with a reliable electricity supply by incentivising investment in adequate generation and demand-side capacity to meet demand.

Electricity markets with capacity mechanisms aim to ensure reliability by providing investors with a stream of expected revenues (in the form of capacity payments) that, together with expected revenues from energy and essential system services, provide financial viability. In particular, capacity mechanisms seek to resolve what would otherwise be a 'missing money' problem. Missing money occurs when wholesale spot markets for energy and essential system services do not of themselves produce prices that are high enough to support capacity investment; certainly an efficient portfolio of generation capacity. For example, wholesale energy prices are generally capped as a way of mitigating market power or to prevent unacceptable price volatility. The resulting missing money would – unless sourced from a capacity market – discourage investment (or the right type and timing of investment) and thereby imperil the market's ability to meet the reliability target.

Capacity mechanisms de-couple payments for capacity and energy by providing generators with a separate revenue stream for making capacity available. This revenue complements revenue from the sale of electricity and essential system services and reduces the risk of new investment, providing investors with confidence that the market will provide revenue adequacy.[10]

Energy markets with capacity mechanisms can accommodate lower energy price caps and thereby avoid the price volatility that would otherwise be required by facilities that run only occasionally for short periods (generally at times of peak) to recover their costs. Without a separate capacity market, energy price volatility would be exacerbated (and market power concerns increased) in a small isolated system such as the South West Interconnected System (SWIS), particularly as its peak demand is large relative to its average demand.

2.2 The current approach to allocating Capacity Credits

The RCM uses Capacity Credits as a basis for determining capacity revenue. The Capacity Credit is the capacity product traded between capacity buyers and sellers in the RCM. Where such a trade does not occur bilaterally, the Australian Energy Market Operator (AEMO) acquires the Capacity Credit at the administered Reserve Capacity Price (RCP) and recovers this cost from Market Customers.

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8 Demand-side capacity is capacity provided by electricity consumers reducing their demand when called upon to do so.

9 Electricity markets aim to achieve reliability up to a defined standard, noting that seeking 100 per cent reliability is prohibitively costly. The reliability standard in the SWIS is defined by the Planning Criterion in the Market Rules.

10 However, importantly, capacity mechanisms do not completely de-risk investment in capacity but rather incentivise an efficient level of capacity with a capacity price reflective of the demand / supply curve over time. In the RCM, the yearly capacity price is a function of the level of capacity excess for that Capacity Year. Where there is a high capacity excess, the capacity price falls to incentivise efficient exit of capacity and vice versa at times of looming capacity shortfall.

A Capacity Credit is a notional construct that reflects a key principle of the RCM – that one Capacity Credit is equal to one megawatt (MW) of physical generation (or demand-side management) capacity that can be provided during peak demand, or other low reserve, periods. Capacity Credits have performance obligations and expose the Capacity Credit holder to a Capacity Cost Refund regime if the capacity resource does not meet these obligations. AEMO may also assign a lower level of Certified Reserve Capacity to a facility that fails to meet the level of performance on which the assignment of Capacity Credits was based in a previous Reserve Capacity Cycle.

Each year, AEMO sets a Reserve Capacity Requirement (RCR) based on its estimate of the highest level of electricity demand ('peak demand') that may occur for a given Capacity Year[11] in two years' time. AEMO estimates peak demand assuming a 10 per cent chance of its estimate being exceeded, often referred to as a one-in-ten year, or 10 per cent probability of exceedance (PoE), peak demand forecast. The RCR also includes an allowance for certain essential system services and a reserve margin that is designed to ensure there is enough capacity to cover for a worst-case scenario – that is, failure of the system's largest generator; or, a capacity buffer of up to 7.6% of forecast peak demand (whichever results in the larger capacity requirement).[12]

AEMO assigns Capacity Credits to a facility based on its reasonable expectation of how many MW of capacity the facility can provide at peak times. This expectation is a function of both the technical performance capability of the facility[13] and the capability of the network to accept the output of the facility during peak times.

Market Customers (typically retailers and large industrial loads) are required to contract bilaterally to ensure capacity (in the form of Capacity Credits) based on AEMO's estimate of how much they contribute to peak demand. This is their Individual Reserve Capacity Requirement. The allocation of capacity costs to power consumers provides an incentive for consumers to avoid these costs by reducing their consumption during peak times. Market Customers may purchase Capacity Credits from AEMO at an administered price; or bilaterally from facilities that have been accredited and assigned Capacity Credits by AEMO.

2.3 Potential issues in the transition to constrained access

Changes are required to the RCM to allow it to operate efficiently and fulfil its role in a constrained network access model.

When the SWIS transitions to a constrained network access model, facilities will be able to connect to the network without having to fund network augmentations to increase the transfer capability of the system and maintain the existing level of access of incumbents.

11 A Capacity Year is the period beginning 1 October and finishing 30 September in the following year for which the RCR is set.

12 This reliability standard is referred to in the Market Rules as the 'Planning Criterion'. The Planning Criterion also requires accredited capacity to be sufficient to limit energy supply shortfalls to 0.002 per cent of the total demand forecast. However, historically this part of the Planning Criterion has not set the RCR. The Planning Criterion is subject to review every five years, but it has not been reviewed since 2012.

13 AEMO has historically assigned Capacity Credits up to the Declared Sent Out Capacity (DSOC) of a scheduled generator after considering the reasonableness of the assumption that the facility's DSOC is the amount of network injection capacity available under system normal conditions, including during peak demand periods. Intermittent generators are accredited based on their expected output during periods when there is peak demand on scheduled generation, de-rated for the expected variance of their output.

As a result, under a constrained network access model, facilities do not have an inherent or guaranteed level of access in the network; including during peak demand (or other predictable low reserve) periods. Instead, facilities will be subject to constraints based on their relative marginal cost and, consequently, a given facility might not be able to dispatch to its full capacity during peak periods (and other low reserve times) due to network constraints.

This has two implications for how Capacity Credits are currently assigned under the RCM.

Firstly, it means that AEMO can no longer assume a level of network access for a specific facility based on the facility's access contract with Western Power and will require a mechanism to account for the transfer capability of the network as part of the Capacity Credit assignment process. This is necessary to ensure that Capacity Credits are assigned based on the available capacity of the network and that the system as a whole is capable of meeting the RCR.

Secondly, the level of congestion in a particular region of the network could change from Capacity Cycle to Capacity Cycle due to new entrant facilities. This would render generators' output during peak times difficult to predict and subject to transient variations. As a result, the assignment of Capacity Credits would become uncertain and subject to year on year volatility, creating a risk for existing and new investments in generation capacity.

The resulting uncertainty around how network constraints might affect the output of individual facilities during peak times (and hence their assignment of Capacity Credits) can undermine the intended purpose of the RCM to incentivise the investment needed to ensure a reliable power system. If capacity resources have no way to determine how they might be affected by network constraints created by the entry of new facilities, they face a risk that cannot be hedged. New investment in capacity may not occur (or may occur only at much higher cost) if this risk is seen to be substantial. At the very least, it would result in a higher hurdle rate for new investment which would ultimately be recovered from customers through higher electricity prices.

Allowing new entrants to displace the Capacity Credits of existing facilities would also allow new entrants to earn capacity revenue in excess of the marginal contribution they provide to the reliability of the system. This could lead to inefficient outcomes whereby new entrants locate in congested parts of the network and secure Capacity Credits assigned to incumbent capacity; yet the new investment contributes little, if at all, to overall system reliability.

2.4 Design principles

The design of the NAQ Framework has been developed using six key principles:

1. Capacity Credits are assigned based on the available 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. Investment certainty should be preserved by allowing existing assets to retain economic value under the RCM as long as facility performance is maintained.
4. The new regime 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 minimised.
6. The new regime should be simple, transparent, and readily implemented in the WEM with minimal changes to existing processes.

The application of these principles to the Capacity Credit assignment process is outlined in section 4.3.1.

3. The Network Access Quantity

3.1 What is it?

The NAQ is an instrument that:

1. defines the network capacity, in MW, available to a capacity resource for the purpose of determining the Capacity Credits that can be assigned to the facility up to the amount of its Certified Reserve Capacity[14]; and
2. establishes a preferential right to receive a Capacity Credit, which can only be reduced in specific circumstances.[15]

The primary purpose of the NAQ is to protect a facility's quantity of Capacity Credits from an unhedgeable risk of being inefficiently displaced by new entrant facilities connecting in constrained sections of the network, where that additional capacity is not needed for system reliability but is simply displacing an existing performing resource. This would result in capital inefficiency and add risk to new capacity investment.

The NAQ protects the investment in facilities that continue to participate in the RCM and meet all their performance obligations. A facility that, for reasons related to its own poor performance, fails to provide its capacity to the RCM when required by the system surrenders its ability to retain the unreliable portion of its NAQ. A facility that retires (or is mothballed or removed from service) must also relinquish its NAQ.

The NAQ is determined in relation to network capacity and is assigned based on the physical limits of the network. Hence, the NAQ serves as a cap on the amount of Capacity Credits that can be assigned in specific regions of the network. NAQ will be assigned to a facility up to the amount of network capacity that can accommodate the facility's Certified Reserve Capacity at peak times or other periods of low reserve. This will ensure that the total amount of NAQ assigned to facilities in specific network regions (and in aggregate for the network as a whole) does not exceed the transfer capability of the network.

Once NAQ is assigned, new facilities seeking to connect in a specific region of the network can only receive NAQ up to the residual capacity of the network in that region, after accounting for NAQ that has already been assigned.[16]

The NAQ has no role in dispatch or settlement of the energy or essential system services markets, which will operate under the new co-optimised security constrained economic dispatch design that is being implemented for the WEM.

A simple example to illustrate the operation of the NAQ framework is provided in Box 1: Capacity Credit assignment under the NAQ framework.

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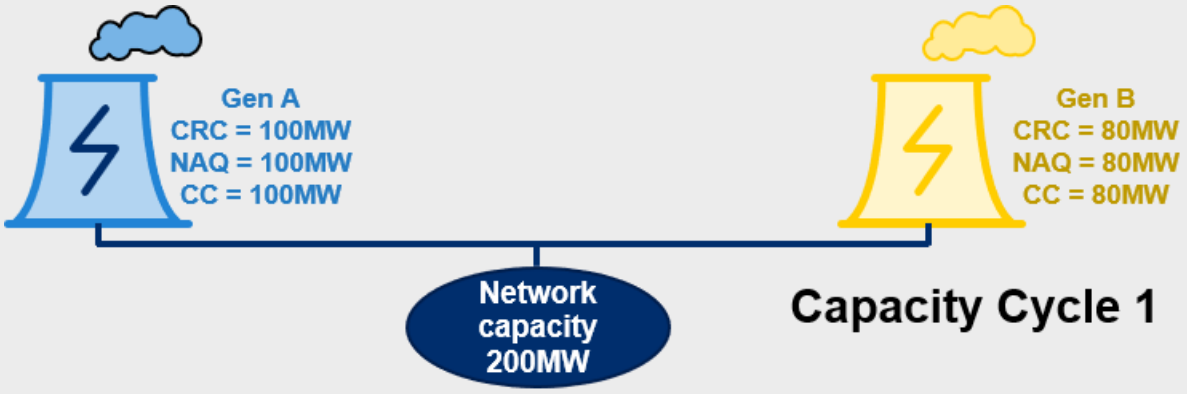
[14] For intermittent generators, this is the figure based on the RLM. For scheduled generators, this is the figure based on an assessment of the facility's output calculated at air temperature of 41 degrees Celsius.

[15] An exception may be required for DSM facilities, as these facilities are unlikely to require NAQ to protect them from the risk of displacement. DSM is discussed further in section 5.

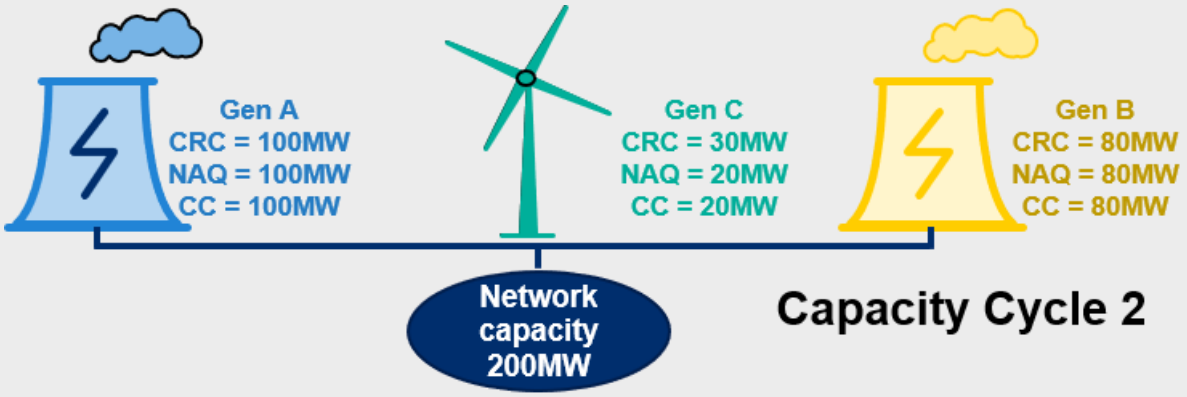
[16] This represents a similar approach to existing method of capacity assignment in the SWIS where firm access facilities are assigned up to their DSOC and facilities connected under the Generator Interim Access solution are assigned any residual as determined by Western Power in accordance with Appendix 11 of the Market Rules.

Box 1: Capacity Credit assignment under the NAQ framework

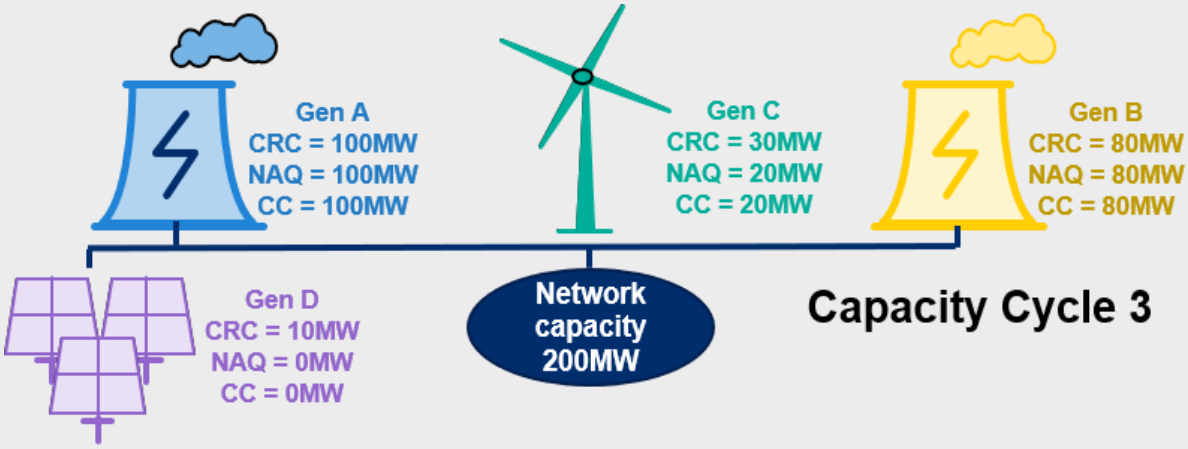
CC = Capacity Credit
CRC = Certified Reserve Capacity



In Capacity Cycle 1, AEMO Gen A and Gen B are assigned 100MW and 80MW of NAQ respectively. There is 20MW of residual capacity in the network.



In Capacity Cycle 2, new entrant Gen C is assigned Certified Reserve Capacity of 30MW but can only receive NAQ up to 20MW, being the residual network capacity remaining after accounting for the NAQ assigned to Gen A and B.

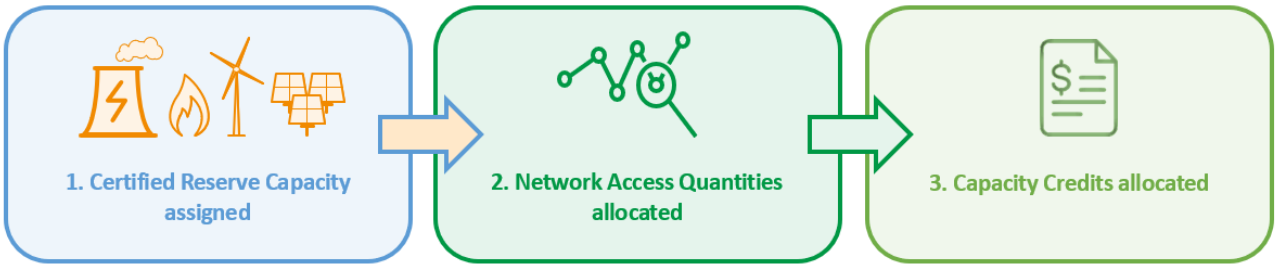


In Capacity Cycle 3, new entrant Gen D is assigned Certified Reserve Capacity of 10MW but cannot receive any NAQ as there is no residual network capacity remaining after accounting for the NAQ assigned to Gen A, Gen B, and Gen C.

3.2 Relationship between Network Access Quantity and Capacity Credits

The NAQ acts as a limit to the number of Capacity Credits that can be assigned to a facility based on its Certified Reserve Capacity. It represents the level of the network capability available to that facility based on the total network capacity and the priority of the facility in the assignment process. See Figure 3 below:

Figure 3: Relationship between Certified Reserve Capacity, NAQ, and Capacity Credits



Network Access Quantity compared to Capacity Credits

The general rule is that the quantity of Capacity Credits that are assigned to a facility will be equal to the facility's NAQ assignment (i.e. CC = NAQ).

Network Access Quantity compared to Certified Reserve Capacity

The general rule is that a facility cannot hold more NAQ than its level of Certified Reserve Capacity. That is, the quantity of NAQ will generally be less than or equal to the facility's Certified Reserve Capacity (i.e. NAQ ≤ CRC).

A partial exception to the general rule will apply for intermittent facilities. This is discussed further in section 4.7.

4. Key design parameters

The key elements of the NAQ framework are:

1. term;
2. performance framework;
3. how NAQ is assigned; and
4. when NAQ is adjusted.

There are several components of the detailed design that will require further development. This will be undertaken in consultation with stakeholders over the first half of 2020. The development of the detailed design will occur in parallel with the development of the Market Rules to implement the NAQ framework.

The detailed design of the NAQ framework will be presented to the Taskforce for endorsement in mid-2020, with Market Rules proposed to be made by September 2020.

4.1 Term

Investment in generation capacity may not occur without reasonable certainty regarding future capacity revenue streams. New and incumbent investments should not be exposed to arbitrary risks.

Hence the term, or duration, of the NAQ is a key element of the design of the NAQ framework.

The approach to selecting an appropriate term must ensure that efficient entry and exit of facilities occurs, and inefficient and wasteful “churn” of facilities is prevented. That is, investments in capacity that do not lead to an increase in the level of power system reliability should not be supported by being eligible for NAQ and Capacity Credits.

The ETIU considered two options for the term: linking the term to facility performance; and a term that is time-bounded. For the reasons discussed below, the Taskforce has endorsed a performance-based term for the design of the NAQ framework.

4.1.1 Performance-based term

A key feature of the RCM is that it rewards a capacity resource for its availability and contribution to meeting the Planning Criterion (the reliability standard in the WEM).

A facility’s availability and contribution to reliability is linked to its performance and its capacity has a value under the RCM for so long as the facility is capable of delivering its certified capacity.

On this basis, the Taskforce considers that a facility’s NAQ should be retained for as long as the underlying asset is capable of providing capacity and contributing to the reliability of the power system. This is consistent with the fundamental design of the RCM to support investment in reliable supply and the underlying principle of rewarding capacity where it adds value to the system.

Conversely, if a facility is unable to deliver the capacity for which it has been certified, then that capacity does not contribute to reliability and should have no value under the RCM. As a consequence, the facility’s capacity value must be capable of being adjusted downward, either by reducing the amount of Capacity Credits the facility receives under the RCM, or by requiring the facility to refund capacity payments. This is consistent with the existing performance framework of the RCM.

Box 2: A simple example

Consider that there is an imaginary form of capacity that, once built, can (and will) provide equivalent and reliable capacity 'services' forever at no additional cost. Such a form of capacity would merit access to a stream of capacity revenue that never expires. It would not be economically efficient to spend additional money to replace such capacity.

Allowing for access to this stream of capacity revenue to be 'recompeted' for after the expiry of an arbitrary period would create risk to the initial investment and result in an inefficient wealth transfer should a new entrant be given an opportunity to build unneeded capacity simply because it can now access a revenue stream that was previously assigned to capacity that will still be available forever.

This example highlights two key points:

- There is no theoretical requirement to define an expiry date for any given set of NAQs as the value of capacity is tied to a physical ability to support that capacity.
- However, if the capacity resource cannot physically meet the obligations and performance requirements of the RCM, then the value of its capacity should be reduced accordingly (either through refunds or by reducing its NAQ and its assignment of Capacity Credits).

4.1.2 The difficulty of a term linked with time

Limiting the term of a facility's NAQ to a predetermined time period is problematic because it may:

- cause current and effective capacity providers to be churned out of the market to be replaced by assets that do not add significantly to the effectiveness of the RCM; and
- attract new entrants to seek access to parts of the network that are constrained rather than seek access to unconstrained parts of the network.

Selecting a logical period for a time-based term of NAQ is also difficult. A short term may fail to encourage new investment in some types of generation technologies as it may not provide sufficient time for investors to recover their capital costs under the RCM. On the other hand, a long term (which is not conditional on facility performance) may fail to encourage the efficient retirement of facilities.

One option is to link the NAQ term to the calculation of the Benchmark Reserve Capacity Price (BRCP), specifically the 15-year period over which the cost of capital is annualised. The Market Rules places responsibility on the Economic Regulation Authority (ERA) for setting the method used to calculate the BRCP, with the method to be published in a market procedure. Linking the term of the NAQ with the calculation of the BRCP, however, has some difficulty as the BRCP method also adopts time periods other than 15 years (for example 10-year annualised values for Commonwealth Government bonds and forecast average rate of inflation). Linking the term of the NAQ with the calculation of the BRCP would also subject the term to change should the underlying method of calculating BRCP change. More importantly however, the BRCP has no relationship with the performance of a facility, yet it is performance that matters from the perspective of the RCM.

Another option would be to link the term of the NAQ to the estimated economic life of each capacity resource. The difficulty with this approach is how the economic life of a generator should be defined. All capacity resources will have different economic and technical life characteristics, which can also change over time. Assessments of economic life are particularly sensitive to assumptions with complexity and arbitrariness that would inevitably invite lengthy debate with participants over legitimate points of detail.

4.1.3 Endorsed term for NAQ

In selecting a term of the NAQ that is linked to the performance of a facility, the Taskforce has considered the underlying purpose of the RCM and the rationale behind the concept of the NAQ, which is to reward capacity where it adds value to the system and to avoid unhedgeable risk created for existing capacity providers by new entrants connecting in congested areas of the grid. Selecting a time-bound term would introduce an inherently arbitrary process for assigning value to capacity resources.

Linking the term to performance greatly reduce the risk of new entry into congested areas simply for the purpose of displacing capable capacity that is already able to provide the services for which the RCM is designed. Any form of a time-bound term creates windows where capable capacity can be challenged by new entry in an area that is already subject to congestion.

> **Taskforce decision**
>
> The NAQ is performance-based and will not be subject to a specified time limit.

4.2 The performance framework

The NAQ is a performance-based instrument. This means that a facility's eligibility to receive and retain NAQ is linked to the ongoing performance of the facility and its ability to supply capacity equal to its NAQ at times of peak demand or other periods of low reserve.

The ETIU has reviewed the existing performance framework under the RCM. While the framework is fit-for-purpose with a performance-based term for the NAQ framework, there are areas of improvement that the ETIU will examine in consultation with stakeholders.

To incentivise performance and to discourage inefficient hoarding of NAQ, a stringent 'use it or lose it' approach will be adopted such that if a facility fails to meet defined performance criteria, the NAQ associated with that facility will be surrendered if reduced performance issues are not addressed within a predetermined period. The performance approach will be complemented by the existing refunds and testing and compliance regime in the Market Rules.

4.2.1 The performance-based approach

A performance-based approach would require a participant to demonstrate that the underlying capacity resource (to which the NAQ is attached) is capable of providing capacity up to the NAQ assigned to the facility, consistent with the requirements of eligibility for Certified Reserve Capacity under the RCM.

In most cases, this will be demonstrated if the facility has been assigned Certified Reserve Capacity at a level equal to or greater than its NAQ and has performed up to or above that level in normal operations or testing. In a situation where a facility's Certified Reserve Capacity is reduced to below its NAQ, then, in general, its NAQ will be reduced to the corresponding level of Certified Reserve Capacity.

The circumstances that will result in a facility's Certified Reserve Capacity being reduced to a level below its NAQ are:

- **A Market Participant applies for no, or less, Certified Reserve Capacity for its facility.** If a participant applies for zero, or a lower level of, Certified Reserve Capacity for its facility during a Capacity Cycle, then the NAQ associated with the facility will be forfeited, or reduced, and the surplus NAQ will become available for assignment to other Market Participants.

- **The facility is not assigned Certified Reserve Capacity.** If AEMO does not assign Certified Reserve Capacity to a facility (either in full or in part), then NAQ will be reduced to the level of Certified Reserve Capacity and the surplus NAQ will be forfeited and becomes available to other Market Participants. This could occur, for example, if AEMO determines that the facility has not met its performance obligations.
- **A Market Participant does not commit to provide the Certified Reserve Capacity for its facility.** If a participant nominates less Certified Reserve Capacity for trading (in its trade declaration) than the NAQ assigned to its facility, then the NAQ for the facility will be reduced to the corresponding amount of Certified Reserve Capacity nominated in the trade declaration and the surplus NAQ will be forfeited and becomes available to other Market Participants.

Facilities may reapply for any lost NAQ if, in a subsequent Reserve Capacity Cycle, their level of Certified Reserve Capacity supports the NAQ assignment being sought *and corresponding NAQ is available*. However, a facility that previously had an assignment of NAQ that was subsequently reduced or forfeited will not have any advantage over other Market Participants seeking NAQ in the assessment and assignment process. That is, the facility that has forfeited its NAQ will have to compete with other facilities seeking NAQ.[17]

Taskforce decision

- The Certified Reserve Capacity that is assigned to a facility must always be greater than or equal to the facility's NAQ (CRC ≥ NAQ).
- If the Certified Reserve Capacity assigned to a facility is reduced below its current NAQ, the facility's NAQ will be reduced to the corresponding level of Certified Reserve Capacity.

4.2.2 Availability and performance

It follows from the above framework that the availability and performance of a capacity resource is critical to receiving and retaining NAQ.

The existing framework for availability and performance has been reviewed and is broadly fit-for-purpose to accommodate the NAQ framework. However, there are areas for improvement that the ETIU will consult on with industry and develop as part of a detailed design, specifically around Reserve Capacity Testing and the need for more guidance on the circumstances that could lead to a reduction in a facility's Certified Reserve Capacity. These are outlined below,

[17] There is an exception to this rule for intermittent facilities that experience a reduction in their relevant level. This is discussed further in section4.7.

Existing framework

The Market Rules place several obligations on a Market Participant holding Capacity Credits. There are different obligations on scheduled generators and intermittent generators.

Requirement	Scheduled	Intermittent
Reserve Capacity Obligation	Have a Reserve Capacity Obligation Quantity that penalises the facility for failing to make its accredited capacity available into the market. Failure to do so results in a requirement to pay capacity refunds.	Does not have a Reserve Capacity Obligation Quantity. An intermittent generator that does not make its capacity available into the market does not incur any obligation to pay capacity refunds.
Outages	Required to schedule and seek approval for Planned Outages with AEMO. Forced outages must be logged. High level of outages can impact the facility's Certified Reserve Capacity in a future Capacity Cycle.	Required to schedule and seek approval for Planned Outages with AEMO. Forced outages must be logged. High level of outages can impact the facility's Certified Reserve Capacity in a future Capacity Cycle.
Testing	Must submit to testing twice during a Capacity Year. Can be achieved by observation (i.e. has the facility been dispatched at their required level for 30 minutes), or by formal testing by AEMO.	No testing process as Certified Reserve Capacity is based on historical performance (which implicitly demonstrates performance).
Capacity Refunds	Required to pay capacity refunds if: 1. A Forced Outage applies. 2. The level of Planned Outages exceeds a specified threshold. Refunds are scaled such that facilities pay a higher amount when the amount of excess capacity in the system is low, and vice versa. Total amount of refunds is capped to the total capacity payments for the facility.	Required to pay refunds if the facility has not yet entered commercial operation by the required Capacity Year, or where the facility has entered commercial operation but has yet to achieve its Required Level. Total amount of refunds is capped to the total capacity payments for the facility.

Areas for improvement

Scheduled generators may currently meet their Reserve Capacity Obligation Quantity to make their accredited capacity available into the market without fear of being dispatched as a result of high-priced bids. This results in some uncertainty over whether these facilities will actually be available for dispatch when required by the system. The availability of facilities during a peak demand event is essential to support a reliable power system.

Regular testing of facilities provides a degree of confidence that all facilities will be available when required by the system.

Under the Market Rules, AEMO must verify and test each facility to ensure it is capable of meeting its reserve capacity obligations. Generation facilities must be tested twice a year – once in winter and once in summer – and demand side programs must be tested once a year.

Most facilities pass testing through observation by operating at the required level for at least one half-hour interval. If a facility does not pass by observation, the facility undergoes a defined process for testing that involves several steps and AEMO must provide the facility with notice of when the test is to be done. Providing facilities with notice of testing may allow the facility time to undertake preparations to ensure that its plant will perform on the date of the test. Therefore, a facility should not be able to know when it is to be tested any more than it would expect to know in a real market event. Accordingly, to avoid a situation where facilities that are not run very often are called on but are unavailable, the Taskforce considers that the Market Rules could be amended to allow more dynamic and targeted testing of facilities with limited warning.

The Market Rules also provide AEMO with substantial discretion when deciding whether to reduce a facility's Certified Reserve Capacity or to disqualify the facility from receiving Capacity Credits as a result of continued poor performance. AEMO's discretion to reduce a facility's Certified Reserve Capacity, or to disqualify it from the certification process, acts as an incentive for participants to maintain the performance of their facility.

However, the Market Rules are not clear as to how this discretion is to be applied. This leaves participants and AEMO with uncertainty as to the circumstances that justify reducing a facility's Certified Reserve Capacity or that should disqualify a facility from receiving Capacity Credits in a future Capacity Cycle. The Taskforce considers that more guidance is required.

Taskforce decision

- The existing framework for availability and performance is generally fit-for-purpose to accommodate the NAQ framework.
- ETIU will examine and recommend areas for improvement through further consultation with industry as part of detailed design.

4.3 How Network Access Quantities are assigned

A facility's assignment of NAQ is a function of:

1. the facility's Certified Reserve Capacity; and
2. the network capacity that is available to accommodate the facility's Certified Reserve Capacity.

Therefore, before NAQs can be assigned, AEMO must first verify the performance capability of the facility (through the process of assigning Certified Reserve Capacity) and then conduct an assessment (through a network capacity modelling exercise) to determine how much of the facility's certified output can be accommodated by the network. This process establishes the facility's NAQ.

The NAQ assignment process has been developed to be consistent with the prioritisation process for accepting offers from capacity resources that are being introduced as part of RCM pricing reforms.[18] The pricing reforms reflect the policy of prioritising the acceptance of offers from facilities that choose the market price over a fixed price. The NAQ assignment process will follow the same prioritisation order under the RCM pricing reforms to assess and assign NAQ to facilities. The interaction of the NAQ assignment process with the prioritisation process under the RCM pricing reforms is discussed further in section 4.3.3**.**

The NAQ assignment process will likely result in changes to the overall Reserve Capacity Cycle timetable for allocating Capacity Credits (including the timing for activities within the overall timetable), and this will be reviewed as part of the development of detailed design.

4.3.1 Key principles

The NAQ assignment process is guided by the following key principles:

- **NAQ is supported by facility performance and available network capacity.**

  This means adjusting a facility's NAQ where the facility's performance or the available network capacity no longer support the facility's NAQ.

- **NAQ is assigned to efficiently ration available network capacity to maximise the access of connected parties and therefore the economic benefit of the network.**

  This means that NAQ is assigned to facilities based on their expected contribution to network constraints, using a network capacity modelling tool. Facilities whose output contributes least to network constraints are able to transfer more of their output into the network, maximising the reserve capacity available to the RCM and therefore receive more NAQ relative to facilities whose output contributes more to network constraints.

- **NAQ assignment respects the value of existing assets on the system and allows those assets to retain economic value under the RCM as long as facility performance is maintained.**

  This means assigning Capacity Credits to an existing facility up to its NAQ before considering other facilities seeking Capacity Credits in the NAQ assignment process.[19]

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[18] At the time of preparing this Information Paper, Energy Policy WA has concluded consultation of the proposed amendments to the Market Rules for the RCM pricing reforms, and the proposed changes to the Market Rules have been submitted to the Minister for Energy to be made. Information on these reforms is available from the Energy Policy WA website www.energy.wa.gov.au.

[19] In general, an existing facility seeking more Capacity Credits than is supported by its existing level of NAQ (i.e. where CRC > NAQ) will not be assessed ahead of other facilities in the NAQ assignment process, except for the circumstances outlined in sections 4.5.1 and 4.7.

Additionally, the NAQ assignment process will prioritise (in line with the RCM pricing reforms):

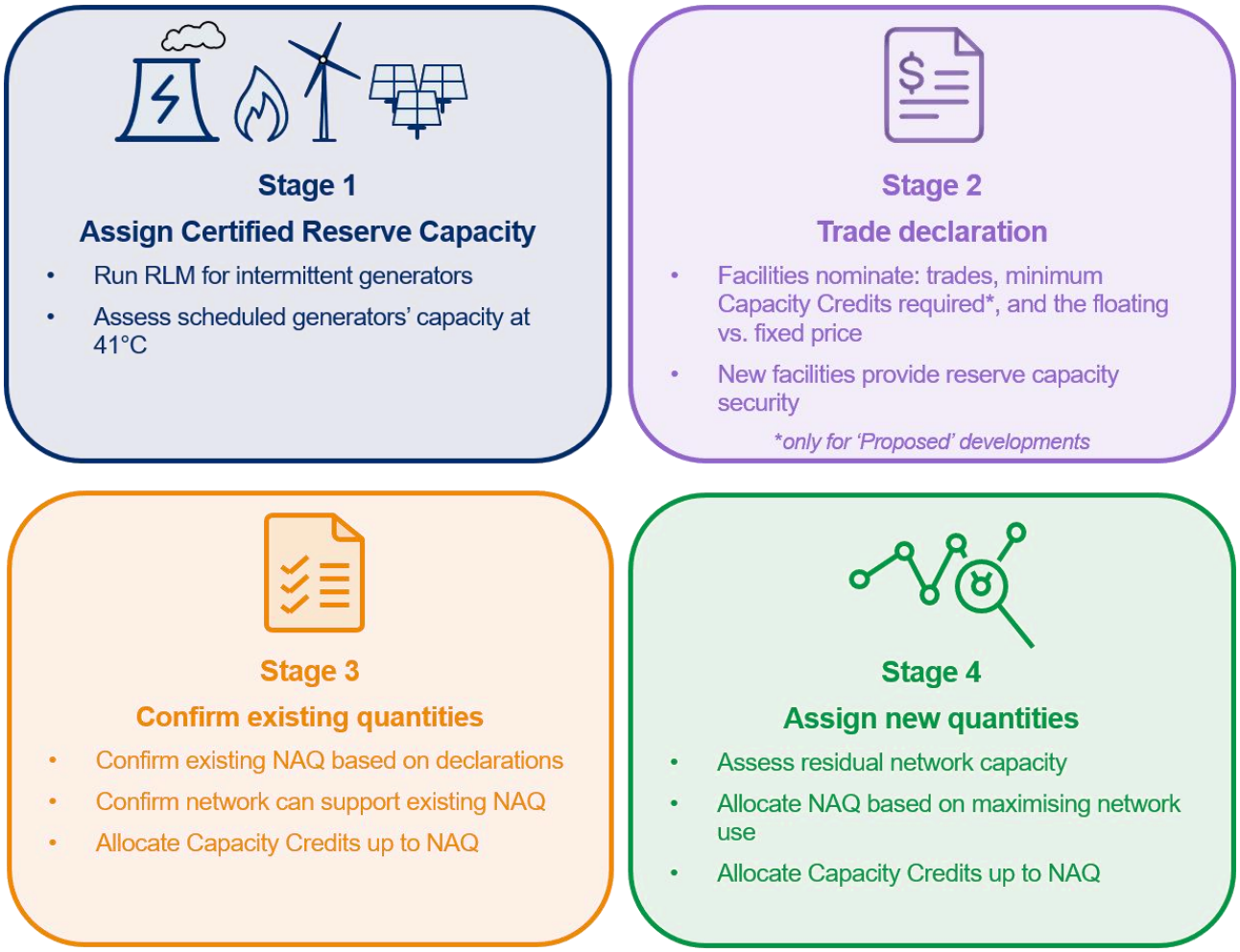
- market price offers ahead of fixed price offers; and
- committed developments ahead of proposed developments.

Note that the assignment process under the NAQ framework will prioritise facilities that have funded network augmentation ahead of other facilities seeking new or additional NAQ.

4.3.2 NAQ Assignment Process

The assignment of NAQ and Capacity Credits for each Capacity Year will involve the following four key stages.

Figure 4: Outline of the proposed NAQ assignment process



Stage 1: Assign Certified Reserve Capacity

Consistent with the existing process, facilities seeking to apply for Capacity Credits must first receive certification for that capacity – i.e. Certified Reserve Capacity. Certification requires a technical review of the performance capability of the facility. For example, for scheduled generators, AEMO will certify the facility's sent-out capacity calculated at an air temperature of 41 degrees Celsius. For intermittent generators, AEMO will assess the performance of the facility using the Relevant Level Methodology (RLM).

Stage 2: Trade Declaration

As under the current arrangements, facilities that are assigned Certified Reserve Capacity will be required to declare the quantity of their Certified Reserve Capacity they intend to offer into the market for bilateral trade.

The RCM pricing reforms require new entrant facilities to nominate in their trade declarations whether their capacity will be subject to the market (or administered) RCP or a five-year fixed RCP.

The NAQ assignment process will introduce a new requirement for Proposed Facilities to nominate in their trade declaration the minimum quantity of Capacity Credits they require (minimum required Capacity Credits).[20]

Stage 3: Confirm existing NAQ

In this stage, AEMO assesses whether the existing NAQ requires adjustment. This step is undertaken for all facilities with NAQ (NAQ holders), including those in operation and facilities that have been assigned NAQ but are not yet in operation.

Firstly, AEMO will verify NAQ holders have committed, through their trade declarations, to trade Certified Reserve Capacity at least equal to their NAQ.

If the amount of Certified Reserve Capacity nominated for trading by a facility is lower than its NAQ (for example due to being assigned a lower quantity of Certified Reserve Capacity than in the previous Reserve Capacity Cycle in Stage 1), then AEMO will automatically reduce the quantity of the facility's NAQs to the corresponding amount of Certified Reserve Capacity nominated in the trade declaration. This represents one application of the performance-based regime.

If the amount of Certified Reserve Capacity is equal to the facility's NAQ, a process is required to confirm that there has not been a material change in the configuration of the network (e.g. the retirement of a transmission element) that permanently reduces network capacity and prevents the NAQ holder from delivering the capacity associated with their NAQ when required.[21]

If there has been a material change in the configuration of the network,[22] then a NAQ holder may have its NAQ reduced to reflect the reduced transfer capability of the network. This is discussed further in section 4.4.

Once AEMO has confirmed existing NAQ, Capacity Credits are assigned up to the quantity of NAQ for each facility.

Stage 4: Assign new NAQ

Once existing NAQ has confirmed, AEMO will then assess whether the residual capacity of the network can support assigning NAQ to facilities seeking new or additional NAQ (NAQ seekers).

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[20] This is to simplify and streamline the allocation process. If the Reserve Capacity Target is not met after accepting offers from Existing and Committed facilities, AEMO chooses from individual offers from Proposed Facilities (using a Prioritisation Order) and Proposed Facilities that achieve their minimum requirements in the network capacity model will receive an NAQ allocation equal to its modelled output. Those that do not achieve their minimum requirements may not be considered. See Box 2section 4.3.3 below.

[21] The process will need to define what is to be considered a material change that results in a permanent reduction in network capacity.

[22] Such events would be rare, and that for most Capacity Years an existing facility's NAQ would be equal to the NAQ it was assigned in the previous Capacity Year.

This will involve a network capacity modelling exercise to assess the capability of the network to accept the output of NAQ seekers under the most recent 10 per cent PoE demand forecast by AEMO for the relevant Capacity Year.[23]

The assignment of NAQ through the network capacity modelling exercise is intended to be consistent with the prioritisation process for assigning Capacity Credits under the proposed RCM pricing reforms. Section 4.3.3 outlines how the proposed NAQ assignment process will work in the context of the facility prioritisation order introduced by the new RCM pricing reforms.

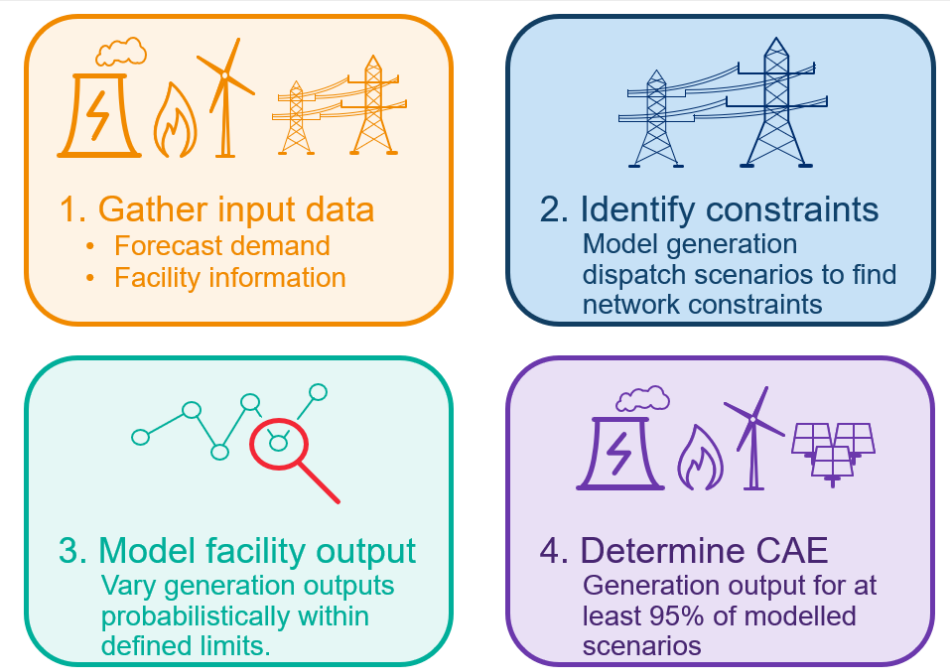
Box 3: The Constrained Access Entitlement process

The Constrained Access Entitlement (CAE) process under Appendix 11 of the Market Rules determines the maximum amount of a Constrained Access Facility's Certified Reserve Capacity that can be transferred into the network under the 10 per cent PoE demand forecast across a large range of generation dispatch scenarios, subject to network constraints. A Constrained Access Facility is a facility that was connected under Western Power's Generator Interim Access solution.

AEMO is currently examining options to model network capacity for the purpose of assigning NAQ, with one option being to use a similar process to the CAE.

Figure 5 below outlines the four key steps in the CAE process and Appendix B-1 provides further information.

Figure 5: Key steps in the Constrained Access Entitlement process



4.3.3 Assignment priority for all facilities

The RCM pricing reforms will introduce new rules for allocating Capacity Credits in scenarios where there are no new offers from Fixed Price facilities (Scenario 1) and where there are offers from Fixed Price facilities (Scenario 2).

[23] This is expected to be similar to the current Constrained Access Entitlement process for allocating Capacity Credits to facilities connecting under the Generator Interim Access solution

The NAQ assignment process is being designed to accommodate the changes to the prioritisation order being introduced by the RCM pricing reforms. This means that for the NAQ assignment process, the following priorities are applied:

- AEMO must accept offers from all existing facilities.[24] AEMO confirms the NAQ assignments for these facilities (Stage 3 in section 4.3.2) before considering any new applications.
- AEMO must accept offers from all Committed Market Price facilities. These facilities are included as a group in the network capacity model (along with existing facilities) to determine the amount of NAQ available to be assigned to each facility (Stage 4 in section 4.3.2).

Scenario 1 – there are no Fixed Price facilities

- If the RCR is not met after accepting operating facilities and Committed Market Price facilities, then AEMO considers and accepts individual offers from Proposed Facilities until the RCR is met.
- A prioritisation order is applied to select which offer from the group of Proposed Facilities to accept.
- For the purposes of the NAQ assignment process, the selected offer must then be included in the network capacity model (along with the existing and Committed Market Price facilities) to determine the amount of NAQ available to be assigned to the selected facility.
  - If the NAQ available to the selected facility meets their minimum Capacity Credit requirements,[25] then NAQ is assigned up to the amount that is available and if the RCR is met then no other facilities are considered.
  - If there is insufficient NAQ to meet the facility's minimum Capacity Credit requirements and/or if the RCR is not met, then the prioritisation order is applied to select the next facility to be considered in the network capacity modelling tool and the process repeated until the RCR is met.[26]

Scenario 2 – there are Fixed Price facilities

- If the RCR +3% target[27] is not met after accepting operating facilities and Committed Market Price facilities, then AEMO must accept offers from all Committed Fixed Price facilities.
  - All Committed Fixed Price facilities are included in the network capacity model as a group (along with existing and Committed Market Price facilities) to determine the NAQ available to be assigned to each Committed Fixed Price facility.
- If the RCR +3% is not met, then AEMO considers and accepts individual offers from Proposed Market Price facilities before considering offers from Proposed Fixed Price facilities.
- The same process and prioritisation order outlined under Scenario 1 applies in this Scenario 2 to select the facility from the group of Proposed Facilities to accept offer(s) from and include in the network capacity modelling tool.

Prioritisation order for Proposed Facilities

Where there are multiple offers from Proposed Facilities and accepting all of those offers would result in the total capacity selected exceeding the total capacity requirement of the RCR, then the following process is used to select which offer (or offers) to accept until the RCR is met:[28]

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24 Including facilities that have been assigned Capacity Credits but are not yet in operation.

25 This is a new requirement that will be introduced in Stage 2 of the NAQ allocation process. See section 4.3.2.

26 If the RCR is not met after considering all Proposed Facilities, then AEMO will run an auction under the current Market Rules.

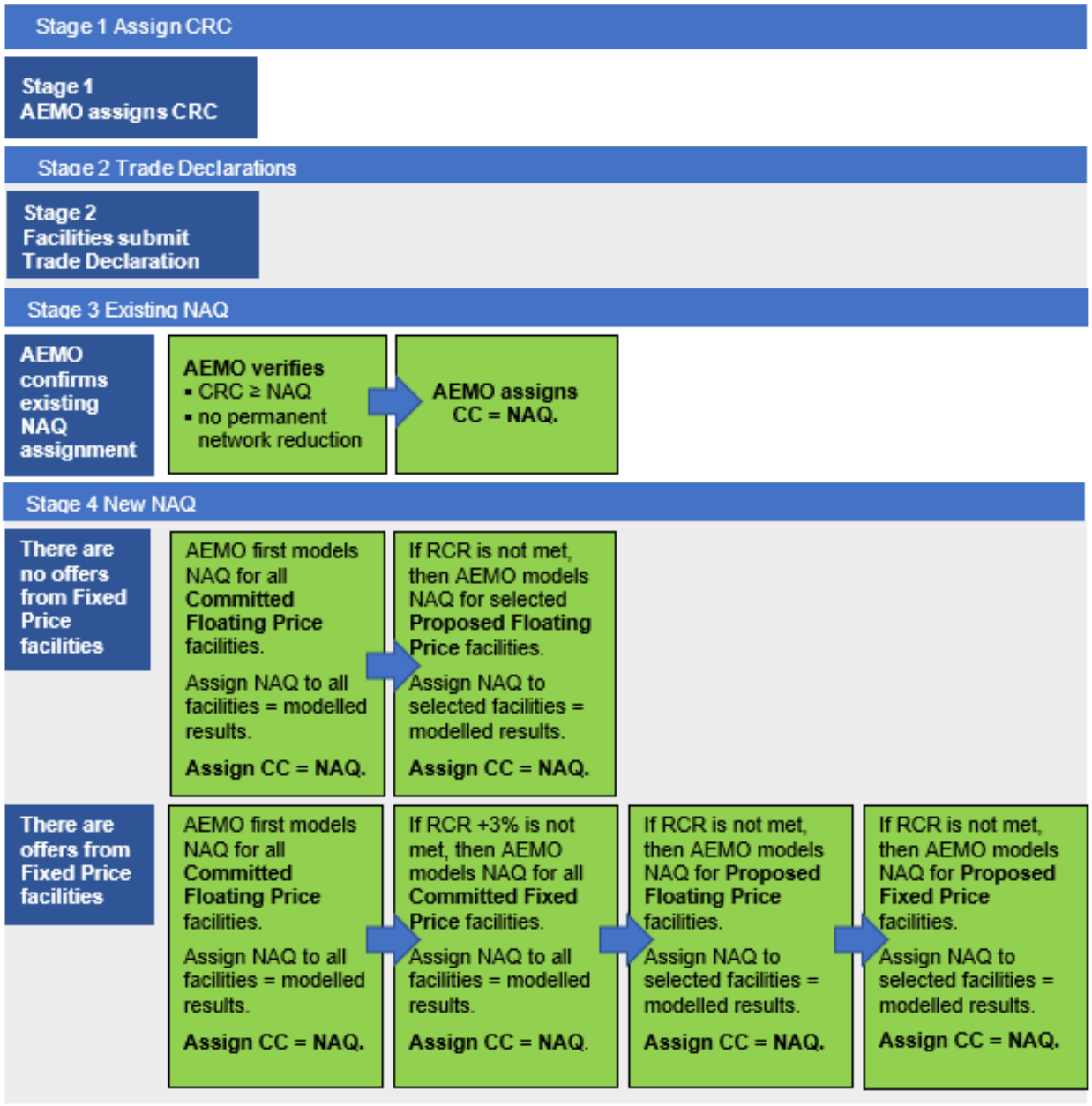
27 Where there are offers from Fixed Price facilities, the RCM pricing reforms require AEMO to apply a 3% margin to the RCR for the sole purpose of accepting offers from Committed developments.

28 Market Rules Appendix 3

1. Accept offers in decreasing order of capacity offered; then
2. Accept offers for which an Expression of Interest has been received (ahead of offers for which no Expression of Interest was received); then
3. Accept offers in the order of the time the offers were received, with the earlier offer being taken first; and then
4. Accept offers in the order of the time the applications for Certified Reserve Capacity were received by AEMO, with the earlier application being taken first.

Figure 6 provides a simple flow chart illustrating the NAQ assignment process. Appendix C provides further detail.

Figure 6: Simple flow chart – NAQ assignment process



An alternative to using the size of offered capacity to prioritise the selection of offers is to use an 'Availability Quotient'. This would involve including *all* Proposed Facilities[29] as a group in the network capacity model (along with existing and committed facilities) to determine the NAQ available to each facility and then calculating the ratio of the modelled facility output to its nameplate capacity. This quotient would measure how efficient the facility is at providing its energy into the market under peak demand conditions. Accepting offers from a facility with a higher quotient over those with a lower quotient may better achieve the principle of maximising the use of the network.

The ETIU will consult further with industry on the prioritisation order for Proposed Facilities as part of the development of detailed design before recommending its preferred option to the Taskforce.

Taskforce decision

- The NAQ assignment process will accommodate the changes to the order with which offers are accepted by AEMO that are being introduced by the RCM pricing reforms.
- ETIU will consult further with industry on the prioritisation order under the NAQ assignment process to be applied to Proposed Facilities as part of the development of detailed design.

4.4 Accounting for reductions in network capacity

The Reserve Capacity Cycle commences around two years in advance of the start of the relevant Capacity Year. It will therefore be necessary for the calculation of NAQ to be based on the expected network configuration for the relevant Capacity Year. Network capacity would be reviewed ahead of each Capacity Cycle to determine if there are any expected increases or decreases that would require NAQ assignments to be amended as part of the Capacity Cycle.

The guiding principle is that NAQ will not be assigned beyond the physical capacity of the network.

4.4.1 Permanent reductions in network capacity

The transfer capability of the network can be reduced permanently for several reasons, including a decision by the network operator to retire network assets or to replace a network asset with a different asset or a non-network solution. Transfer capability can also be affected by changes in load (demand) on the network.

The reduction in network capacity may cause a generation constraint to emerge. Where the network is no longer able to support the output of a facility located in the same side of the generation constraint, then the NAQ of the impacted facility (or facilities) must be adjusted accordingly. Where there are multiple facilities that are impacted, the NAQ for the impacted facilities will be adjusted on a proportional basis. This is consistent with the principle that NAQ should not be assigned beyond the available capacity of the network.

A definition of a permanent reduction will be developed as part of the detailed design.

Facilities that are impacted by a reduction in network capacity will receive a priority over other facilities in the NAQ assignment process should there be an improvement in transfer capability in a future year. This is because the reduction in NAQ is outside of the impacted facility's control. This is discussed further in section 4.5.1.

Examples of the NAQ adjustments due to a reduction in network capacity are shown in Box 4 below and in Appendix A.

[29] Noting that Proposed Market Price facilities will be considered as a group before Proposed Fixed Price facilities.

Box 4: Examples of the effect of network reductions

Situation: A transformer has been removed and is not planned to be replaced. This results in an effective reduction of transfer capability of 20MW, which impacts two generators

- Generator A (100MW) has NAQ of 80MW
- Generator B (60MW) has NAQ of 60MW
- The reduction in NAQ is applied proportionately. The NAQ of Generator A is reduced to 68.6MW and the NAQ of Generator B is reduced to 51.4MW.

(Note that the number in the example is rounded to one decimal place)

Taskforce decision

NAQ will be reduced across impacted facilities on a proportional basis where there is a permanent reduction in network capacity.

4.4.2 Temporary reductions in network capacity

Temporary outages do not result in a reduction in NAQ. If there are temporary changes in the network that result in a temporary reduction in the capability of the network to accept the output of facilities, then a facility's NAQ should not be affected provided the facility is still able to generate up to the level of its assigned NAQ. The modelling of available network capacity is unaffected as it is based on system normal conditions.

This would also apply when an expected network augmentation is delayed but NAQ and Capacity Credits have already been assigned for the associated Capacity Year.

A definition of a temporary reduction will be developed as part of detail design.

Taskforce decision

NAQ will not be reduced for temporary reductions in network capacity.

4.4.3 Improving transparency in decision-making

Changes to the configuration of the network can have significant market impacts where the changes result in permanent reductions in the transfer capability of the network. However, the Capacity Credit assignment reforms should not hinder Western Power's ability to efficiently manage the operation of its network where the decisions are made in the long-term interests of consumers.

Other reforms under the Energy Transformation Strategy will provide industry with more information to guide investment decisions. The Whole of System Plan (WOSP) will provide a long-term outlook for investment and retirement of network (and generation) capacity. In addition to the WOSP, Western Power publishes an Annual Planning Report to highlight network investment opportunities and outline emerging capacity constraints on its network. The Annual Planning Report focus is on the identification of emerging network capacity issues and potential solutions over a five-year period.

As part of the Energy Transformation Strategy, the regulatory framework will be reviewed to ensure that market impacts are adequately accounted for in operational decisions that impact network capacity and that these decisions are subject to appropriate scrutiny and transparency.

4.5 Accounting for increases in network capacity

4.5.1 Network funded development

Increased network capacity enabled by network augmentation funded by Western Power (that meets the regulatory investment tests) will be available as NAQ to facilities.

The process for assigning new NAQ to facilities will consider if there has been any previous reduction in network capacity that has impacted the NAQ of existing facilities. If so, then these existing facilities will receive a priority in the assessment and assignment process over other facilities. The rationale for granting a priority to existing facilities in these circumstances is to recognise the need to provide a measure of investment certainty to existing facilities that have been negatively impacted because of issues that are not related to their facility performance. This can be achieved by providing them a priority over other facilities when assessing and assigning new NAQ subsequently enabled by network augmentation, refurbishment or investment.

Any increase in network capacity that is enabled by augmentation funded by the network operator will therefore be available for assignment as NAQ to existing and new facilities in the following order:

1. Where there are existing facilities that were previously impacted by a decrease in network capacity in a previous Capacity Cycle, then NAQ will be assigned to these facilities in priority over other facilities.[30]
2. In all other cases, NAQ will be assigned using the same process to assign NAQ to facilities seeking new or additional NAQ.

> **Taskforce decision**
>
> New NAQ enabled by network funded augmentation will be assigned in the following order of priority:
>
> 1. To existing facilities that have been previously impacted by a reduction in network capacity where NAQ are available to be assigned to the facilities and facility performance supports the additional NAQ.
> 2. To all other facilities using the same process to assign NAQ to facilities seeking new or increased NAQ.

4.5.2 Participant funded network augmentation

Project proponents that fund the cost of augmenting the shared network will be granted NAQ in relation to the additional network capacity created by the augmentation.

The extent to which performance conditions attach to the NAQ enabled by the capital contribution will be developed by the ETIU in consultation with industry as part of detailed design.

> **Taskforce decision**
>
> Funders of network capacity will receive, in priority over other facilities, NAQ up to the network capacity enabled by their funding.

[30] Up to the level of NAQ that was assigned to the facility before it was impacted by the reduction in network capacity.

4.6 Accounting for changes in facility performance

4.6.1 Increases and decreases in Certified Reserve Capacity

The general rule under the NAQ framework is that a facility's level of Certified Reserve Capacity must always be equal to or greater than its current NAQ (i.e. CRC ≥ NAQ).

Decreases

Where a facility's Certified Reserve Capacity is lower than its NAQ (i.e. CRC < NAQ) in a Capacity Cycle, then the facility's NAQ is reduced to the level of its Certified Reserve Capacity under Stage 3 of the NAQ assignment process (see section 4.3.2) and any forfeited NAQ will become available to other NAQ seekers (i.e. under stage 4 of the NAQ assignment) for that Capacity Cycle.

A facility's Certified Reserve Capacity can be reduced below its current NAQ assignment for several reasons, including:

- The facility has failed to apply for Certified Reserve Capacity during a Capacity Cycle.
- The facility has applied for Certified Reserve Capacity but AEMO has not certified the facility (either in full or in part) because, for example, of reasons related to poor performance (see section 2).
- The facility nominates less Certified Reserve Capacity for trading (in its trade declaration) than its NAQ.

A NAQ holder that has its NAQ reduced because of a decrease in the Certified Reserve Capacity of its facility may be eligible for a higher NAQ in the next Capacity Cycle.[31]

Increases

In any one Capacity Cycle, a facility's Certified Reserve Capacity may be higher than its NAQ (i.e. CRC > NAQ). In these circumstances, the facility's NAQ is not automatically adjusted to its level of Certified Reserve Capacity. If the facility declares for trade an amount of Certified Reserve Capacity that is greater than its NAQ, the increase will be treated as a 'new' NAQ under Stage 4 of the NAQ assignment process (see section 4.3.2) and the facility will compete with other facilities for any NAQ that is available. There is no rationale for providing the NAQ holder with priority over other facilities based on its incumbency.[32]

A facility's Certified Reserve Capacity may be higher than its NAQ in certain situations, for example:

- There was insufficient network capacity to support assigning NAQ to the facility equal to its Certified Reserve Capacity.
- The facility's output has increased due to, for example, an upgrade.

The facility will be eligible to receive an increased NAQ provided that network capacity supports the increased NAQ to the facility; in the absence of which the facility's Certified Reserve Capacity will exceed its NAQ.

An exception to the general rule – that any increase in Certified Reserve Capacity will be treated as a 'new' NAQ – is provided for existing facilities (see section 4.5.1) and for intermittent facilities (see section 4.7).

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31 That is, where the facility is applying for a higher level of Certified Reserve Capacity in the subsequent Capacity Cycle.

32 However, the NAQ holder may receive a priority based on the classification of its development (whether it is Committed or Proposed).

Box 5: Changes in Certified Reserve Capacity (CRC)

Example 1 – Decrease and increase in CRC in an unconstrained part of the grid

- A facility has a CRC of 100MW and a NAQ of 100MW. It is assigned 100MW of CCs.
- In a subsequent year, AEMO reduces its CRC to 85MW
  - As a result, the facility's NAQ is reduced to 85MW and 85MW of CCs assigned.
  - The surplus NAQ is not reassigned.
- The following year, AEMO increases its CRC to 95.
  - As a result, the facility's NAQ is increased to 95MW and 95MW of CCs assigned.

Example 2 – Increase in CRC within a constrained network

- A facility has a CRC of 100MW and a NAQ of 100MW. It is assigned 100MW of CCs.
- In a subsequent year, AEMO reduces its CRC to 85MW
  - As a result, the facility's NAQ is reduced to 85MW and 85MW of CCs are assigned.
  - The excess NAQ are reassigned.
- The following year, AEMO increases its CRC to 95.
  - As no increase in NAQ is possible, the facility retains a NAQ of 85MW and 85MW of CCs assigned.

Taskforce decision

- Facility performance (i.e. Certified Reserve Capacity) must support NAQ assigned to the facility.
- A decrease in a facility's level of Certified Reserve Capacity (to a level below its NAQ) will reduce the facility's NAQ to the level of its Certified Reserve Capacity.
- A facility may be eligible for an increased NAQ provided that:
  - facility performance supports the higher NAQ; and
  - network capacity supports the higher NAQ.
- Increases in NAQ will be treated as new NAQ and must be competed for with all new facilities, subject to limited exceptions.

4.6.2 Replacement of capacity through maintenance or improvements

Linking NAQ to the performance of a facility provides incentives for market participants to undertake efficient investments in their existing capacity to maintain the performance of their facility to at least a level equal to the facility's NAQ. In some cases, this may involve replacing components of a unit, while in other cases it could involve replacing the unit itself with a like-for-like substitution (because, for example, it is the cheaper and quicker option). So long as the facility continues to be assigned Certified Reserve Capacity by AEMO during the Capacity Cycle to a level that is equal to or greater than its current NAQ, then the replacement of capacity will be treated as an 'existing' facility for the purposes of NAQ under the four-stage process (outlined in section 4.3.2).

Allowing facilities to retain their NAQ where there is an investment that results in the existing capacity being replaced with another facility of equivalent technical and performance characteristics may be perceived as limiting competition in the market (by entrenching incumbency and blocking new entry in constrained parts of the grid). On the other hand, requiring NAQ to be recontested would discourage market participants from making efficient investments in their existing capacity.

NAQ should become contestable where a different generation technology is substituted for the existing capacity (for example where a coal plant is replaced by a wind farm or vice-versa). The application of this rule will need to recognise the need to balance competing objectives. On the one hand, the reforms should not discourage investments in new and more efficient generation technologies that can provide capacity at lower cost for the benefit of consumers, or that can better meet the requirements of an evolving power system. On the other hand, the reforms must set a threshold at which investment in capacity resources is treated as a 'new' facility, triggering a requirement for the NAQ to become contestable and allowing new entrants the opportunity to compete for the available NAQ to ensure the lowest overall cost to supply the market.

Box 6: Replacement of capacity

Example 1 – Change in wind farm units

- A facility has a CRC of 20MW and a NAQ of 20MW. It is assigned 20MW of CCs.
- In a subsequent year, five turbines are replaced, and the CRC remains 20MW
- As there is no change, the NAQ remains at 20MW and it is assigned 20MW of CCs.

Example 2 – Gas turbine facility is replaced by a wind farm

- A gas turbine facility has a CRC of 30MW and a NAQ of 30MW. It is assigned 30MW of CCs.
- In a subsequent year, it suffers catastrophic failure to the gas turbines.
  - The facility is replaced with a wind farm, comprising 25 5MW units.
  - AEMO assesses the relevant level (i.e. CRC) of the facility to be 30MW.
- Due to the technology change the NAQ is reduced to 0MW and it is assigned 0MW of CCs.
  - The plant can compete for available NAQ to match its CRC under Stage 4 of the NAQ assignment process.

Existing market participants raised concerns that the change in technology requirement would effectively discourage investment in new and more efficient generation technology, effectively incentivising participants to retain older technologies for longer to avoid the need to surrender and compete for the NAQ.

While these concerns are recognised, the Taskforce is concerned that protecting incumbents from competition indefinitely may not deliver the efficiencies that can eventuate from the NAQ becoming contestable at some point. The aim of the NAQ framework is to provide certainty of capacity revenues for a defined facility investment but the Taskforce will need to be convinced that extending NAQ entitlement into replacement technologies does not impose barriers to more efficient capacity entering the market from competitive rivalry. The threshold at which the replacement of capacity is treated as a 'change in technology' requires further consultation with industry and the ETIU will provide its recommendations to the Taskforce for endorsement as part of a detailed design.

Where the replacement of capacity though maintenance improvements results in an overall increase in the facility's level of Certified Reserve Capacity, then any increased NAQ would be treated as a new application to be competed for with all other facilities (Stage 4 of our process). That is, the NAQ holder gains no priority when assessing and allocating NAQ against NAQ seekers.

Taskforce decision

- Replacement of capacity through a 'like-for-like' substitution of generation technology that does not result in an increase in a facility's Certified Reserve Capacity is not treated as a 'new' application for NAQ, and a facility is eligible to retain its NAQ so long as its facility performance supports its NAQ and it continues to be assigned Certified Reserve Capacity by AEMO.
- The ETIU will consult with industry on the threshold at which investments in replacement of a capacity resource should be treated as a 'new' facility triggering the need for its NAQ to become contestable and provide its recommendations to the Taskforce as part of a detailed design.

4.6.3 Retirement of facilities

The NAQ assigned to facilities that are retired will be relinquished and will become available for all market participants.

New rules under the RCM pricing reforms will require Market Participants to announce the retirement of a facility three years in advance of the proposed retirement date. The ETIU will examine the feasibility of requiring facilities to relinquish NAQs on the announced retirement date (regardless of whether the facility then retires on that date or not). This may be necessary to avoid a situation where a new investment is made based on the retirement announcement and subsequently becomes stranded if the asset is not then retired.

Taskforce decision

- A facility's NAQ will be relinquished when the facility is retired.
- The ETIU will examine the feasibility of requiring facilities to relinquish NAQs on the announced retirement date (regardless of whether the facility then retires on that date or not) and provide its recommendations to the Taskforce as part of a detailed design.

4.7 Accounting for changes in the relevant level of an intermittent facility

An intermittent facility's Certified Reserve Capacity is determined using the RLM that accounts for variability in output caused by the intermittent nature of renewable resources. An intermittent facility could therefore experience a reduction in its level of Certified Reserve Capacity for a short period, which does not reflect its expected output.

During consultation with stakeholders over November and December 2019, several market participants raised concerns about the potential for this variability in output to disadvantage intermittent facilities with NAQ during the assignment process where there are other facilities seeking new or increased NAQ.

The concern arises from the NAQ framework requiring an intermittent facility's NAQ to be reduced if its level of Certified Reserve Capacity is reduced under the RLM (because of poor output over the previous years). If there is an improvement in output in a following year such that the relevant level of the facility improves, under the NAQ framework outlined in this paper, any increase in the Certified Reserve Capacity of the facility would not automatically translate into a higher level of NAQ. The increase would be treated as a 'new' application requiring the facility to compete for the increased NAQ with all other facilities (see discussion in section 4).

Requiring an existing intermittent facility to compete with all facilities seeking new or increased NAQ (under Stage 4 of the NAQ assignment process) is not consistent with a key design principle to respect the value of existing assets on the system and to provide a measure of certainty to existing facilities from the displacement effect of new entrants. While the reforms should not provide more certainty than facilities currently have, the facility has demonstrated its capability and the reduced performance is outside of its control.

To be clear, the reforms should not result in protection for the variability in a renewable resource (which is, by its nature, intermittent).[33] That is, the reforms should not protect a facility's quantity of Capacity Credits because of the variability in the facility's relevant level from year to year. The protection is intended to provide the existing intermittent facility a priority over other NAQ seekers in the circumstance where:

- the facility's initial NAQ is reduced because of a reduction in the facility's Certified Reserve Capacity (as estimated through the RLM) due to the variability of the renewable energy resource; but subsequently
- the facility's level of Certified Reserve Capacity improves in a subsequent year due to an improvement in the relevant level of the facility and the availability of the renewable resource; and
- there are other facilities seeking new or increased NAQ in the year that the intermittent facility's relevant level has improved, so that there are now multiple facilities competing for limited network capacity.

In arriving at a decision to provide a measure of protection for intermittent facilities from performance issues outside of the facility's control, the Taskforce has sought to achieve a balance between the following two key design principles of the NAQ framework:

[33] The Relevant Level for a facility is calculated based on the average output of the facility during a sample of periods over the previous five years. The averaging of the facility's output when calculating its capacity value provides a degree of protection from year on year variation in the renewable resource.

1. The need to efficiently ration available network capacity to maximise the access of parties and therefore the economic benefit of the network; and
2. The need to respect the value of existing assets on the system and to allow the assets to retain economic value under the RCM as long as facility performance is maintained.

This is achieved by not penalising a facility for a temporary reduction in performance but requiring NAQ to be relinquished where it is clear that the facility's level of performance can no longer support its existing level of NAQ.

The options to address this issue, and specifically the 'grace period' that will be provided to intermittent facilities to preserve their NAQ from performance issues outside their control, will be developed through consultation with industry and a recommended approach will be presented to the Taskforce for endorsement as part of a detail design.[34]

Several options have been investigated, with a one-year protection for NAQ the ETIU's preferred approach based on the outcomes of preliminary modelling.

Box 7: Example of one-year protection of NAQ

Example 1 – Single year reduction in output results in effective retention of the NAQ.

- An intermittent facility has a CRC of 100 MW after application of the RLM to its output.
- In a subsequent year, the RLM indicates a CRC of 90MW.
- The NAQ for the facility is reduced to 90MW and 90MW of CCs is assigned for that year, however the remaining 10MW of NAQ is not reassigned.
- The following year, the RLM indicates a CRC of 100MW.
- The Generator NAQ is returned to 100MW and 100MW of CCs are assigned.

Example 2 – Declining output results in a reduced NAQ.

- An intermittent facility has a CRC of 100 MW after application of the RLM to its output.
- In a subsequent year, the RLM indicates a CRC of 90MW.
- The NAQ for the facility is reduced to 90MW and 90MW of CCs is assigned for that year, however the remaining 10MW of NAQ is not reassigned.
- In the following Capacity Cycle, the RLM indicates a CRC of 95MW.
- The Generator NAQ is increased to 95MW, using 5MW of the 10 MW of unassigned NAQ and 95MW of CCs are assigned. The remaining 5MW of NAQ is available for reassignment.

To an extent, providing some protection to the NAQ of intermittent facilities would bring the treatment of intermittent facilities into line with the treatment of forced outages for thermal plant. Forced outages often occur for reasons outside of the control of the facility and can occur, including for example, due to an unexpected disruption in the power plant fuel supply chain.

[34] This will include consideration of temporary reassignment of the NAQ held by the intermittent facility to other parties to ensure that there is sufficient capacity to support the RCM. Participants raised this option during consultation, and it was considered earlier in the development of this design. This could be particularly important if the RCR is not met during the normal process. Approaches for temporary assignments will be developed in consultation with stakeholders.

A thermal plant that experiences a forced outage is not automatically exposed to a reduction in its Certified Reserve Capacity in the next Reserve Capacity Cycle, and the NAQ of the facility will be less affected by performance issues outside its control on a year to year basis. Where the average rate of the facility's forced outages over several years exceeds a specified threshold, then AEMO may consider this when assigning Certified Reserve Capacity to the facility.

Unlike a thermal plant, the variability in the fuel source for an intermittent facility will affect the calculation of its relevant level and therefore its assigned Certified Reserve Capacity each year. This can be detrimental to an intermittent facility where the renewable resource in a previous year is particularly poor (or at least across the intervals where peak load for scheduled generation is highest). Under the design of the NAQ framework, where the facility's Certified Reserve Capacity is reduced, its NAQ will be adjusted down to a corresponding level. Should the renewable resource perform better in a following year such that AEMO assigns the facility a higher Certified Reserve Capacity, the facility will be required to compete with other new facilities for additional NAQ unless it is provided with an exception to this rule.

Taskforce decision

- Intermittent facilities will receive a limited exception to the general rule that facility performance must support NAQ assigned to the facility. This exception will preserve the facility's NAQ from being reduced for a limited period of time due to performance issues outside its control.
- The duration of the exception will be developed in consultation with industry. The ETIU will provide its recommendation to the Taskforce as part of a detailed design. The Taskforce considers a one-year period to be acceptable.

4.8 Transfers of Network Access Quantities

A concept of NAQ reassignment or trading was considered during the development of the high-level design of the NAQ framework; however the Taskforce has decided not to pursue this avenue as it is an unnecessary and an unwarranted complication at the beginning of the NAQ framework. If there is merit for some form of reassignment in the future, the ETIU may be asked to examine the issue further.

Beyond the Taskforce, Market Participants can submit a rule change if they wish to see a formal trading mechanism introduced into the Market Rules.

Taskforce decision

A market mechanism to facilitate the transfer of NAQ will not be developed as part of these current reforms.

5. Treatment of Storage and Demand Side Management resources

Technologies such as storage, embedded generation and Demand Side Management (DSM) can have a complex impact on capacity available to the RCM in a constrained network environment.

Large scale storage

Storage, once accredited for Capacity Credits, will receive the same level of investment certainty that other capacity resources will receive under the NAQ framework.

The accreditation of storage facilities for Capacity Credits under the RCM is being examined separately and is not included in this paper. The ETIU will commence consultation with industry on the options to accredit storage facilities shortly.

Demand side management

DSM includes the operation of variable loads to reduce or shift consumption, the use of embedded generation within a facility and other forms of load-controlled supply.

DSM has been recognised in the RCM for its ability to contribute to reliability since the start of the WEM, albeit with recent significant change. Capacity Credits assigned to DSM providers can also be impacted by the entry of new generation capacity or other DSM providers.

In principle, DSM providers should receive the same level of investment certainty that other capacity resources will receive under the NAQ framework. This can be achieved by providing DSM providers with NAQ equal to their level of Certified Reserve Capacity, or through some other solution. The mechanism to achieve this will be developed in consultation with industry and a recommended approach will be provided to the Taskforce for endorsement as part of the detailed design of the NAQ framework.

The process for accrediting DSM providers for Capacity Credits must also incorporate a locational aspect as this will become increasingly important under the constrained network access regime. DSM contributes to the reliability of the power system where it can be dispatched in a network region that is import constrained, that is, where there is insufficient generation capacity to meet the local load. In these circumstances, dispatching DSM in another region of the network that does not have the effect of reducing the local load in the import constrained region would not contribute to the reliability of the system.

The development of a locational aspect for the accreditation of DSM will be developed in consultation with industry and provided to the Taskforce for endorsement as part of detailed design of the NAQ framework.

Taskforce decision

- Storage facilities, once accredited for Capacity Credits, will receive the same level of certainty that other capacity resources will have under the NAQ framework.
- DSM providers, once accredited for Capacity Credits should, in-principle, receive the same level of certainty that other capacity resources will have under the NAQ framework. The appropriate mechanism will be developed by ETIU in consultation with industry and presented to the Taskforce for endorsement as part of detailed design.
- The accreditation of DSM should be subject to a locational aspect.

6. Transitional arrangements

Market Rules to implement the NAQ framework are expected to be made by September 2020. However, there are other key elements that are necessary for the implementation of the framework, including:

- the design and implementation of ICT systems; and
- the network model for determining residual network capacity, including the development of constraint equations.

The application of the NAQ framework should also be considered in the context of the substantial changes occurring, or expected to occur, for the RCM. These include:

- implementation of the RCM pricing reforms;
- changes to outage management; and
- possible improvements to the RLM, following the ERA's recently completed review.

Several market participants have requested that the assignment of NAQ be deferred until these broader changes are implemented.

The ETIU will consult further with industry on the available options for the 2020 Capacity Cycle before seeking Taskforce endorsement of the preferred approach in March 2020.

Options include:

1. Deferring the current RCM timetable by up to six months. This will require the Market Rules to be amended to define the new timetable.
2. Deferring the assignment of NAQ until the 2021 Capacity Cycle, noting that the full set of system normal constraint equations (thermal and non-thermal) are not expected to be completed until mid-2021.
3. Assign NAQ as part of the 2020 Capacity Cycle, following AEMO's assignment of Capacity Credits under the existing timetable and process.

Each option will involve the use of Western Power's Constrained Access Entitlement process to determine and assign Capacity Credits to Constrained Access Facilities[35] in the 2020 Capacity Cycle. The Constrained Access Entitlement process is outlined in the Market Rules Appendix 11. A simplified description of the process is provided in Appendix B of this Information Paper.

> **Taskforce decision**
>
> ETIU to seek Taskforce endorsement of the recommended transitional approach in March 2020 following further consultation with industry.

[35] A Constrained Access Facility is defined in the Market Rules as a facility that is, or will be, subject to an Arrangement for Access entered into or amended after the day on which the Wholesale Electricity Market Amending Rules 2017 made under regulation 7(4) of the WEM Regulations come into effect, under which the facility is not entitled to unconstrained access to the relevant network for all of its capacity on and from the date and time specified in clause 4.1.11(b) for a Reserve Capacity Cycle.

Appendix A

Worked examples of the NAQ assignment process

A.1 Change in relevant level for intermittent facilities

	Figures in MW	Year 1				Year 2				Year 3		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
The relevant level for the intermittent facility: • goes down by 10 MW • then up by 15 MW Other facilities can use the NAQ that becomes available.	Incumbent wind farm	100	100	100	Option 1. No exception from the general rule. The annual relevant level is the facility's CRC for the purposes of NAQ. Relevant level and CRC are reduced by 10.	90	90	90	Relevant level and CRC increase to 115	115	90	90
					Option 2. Smoothing is required, Year-1 memory is applied. Relevant level and CRC are reduced by 10	90	90 10 NAQ held*	90	Relevant level and CRC increase to 115	115	100	100
	Option 1 provides the facility with no protection and assumes that the averaging effect of the RLM provides the best estimate of a facility's contribution to reliability each year. Option 2 provides the facility with protection (one year in the example, although this could be longer) and recognises the variability of renewable resources is outside the control of the facility. The extent of protection provided to intermittent facilities 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 (similar to a forced outage event for a thermal plant) could achieve the right balance, with a one-year protection superior to 3- and 5-year averages in simple modelling. * The ETIU will examine the potential for a temporary reassignment of NAQ to other facilities as part of detail design. This can help alleviate concerns that the RCR may not be achieved.											

A.2 Temporary reduction in facility performance

	Figures in MW	Year 1				Year 2				Year 3		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Facility experiences a temporary reduction in performance	Gas plant	50	50	50	Failure occurs but AEMO is satisfied the facility will return to operation in Year 3. CRC is not reduced.	50	50	50	Facility performance improves or the unit returns to service	50	50	50
	One of the facility's gas turbines fails temporarily but is brought back into service in the subsequent year. The facility pays refunds for the outage and does not surrender its NAQ. Note: If the facility has a high forced outage rate, AEMO may not assign Certified Reserve Capacity to the facility in Year 3.											

A.3 Facility performance degrades over time

	Figures in MW	Year 1				Year 10				Year 15		
	Facility	CRC	NAQ	CC		CRC	NAQ	CC		CRC	NAQ	CC
Facility performance degrades over time and the facility experiences a high rate of forced outages.	Coal plant	100	100	100	Facility's performance has degraded over time and the facility is experiencing a high forced outage rate.	70	70	70	Facility invests in maintenance which is completed five years later, however other facilities have since entered as limited NAQ (10) is available.	100	80	80
	A facility that has surrendered NAQ because of poor performance and that subsequently improves performance and is assigned a higher Certified Reserve Capacity will compete with other facilities for the NAQ that was forfeited. The facility is not granted a priority over other facilities.											

A.4 Changes in network capacity.

<table>
<tr><th></th><th>Figures in MW</th><th colspan="3">Year 1</th><th></th><th colspan="3">Year 2</th><th></th><th colspan="3">Year + X</th></tr>
<tr><td></td><td>Facility</td><td>CRC</td><td>NAQ</td><td>CC</td><td></td><td>CRC</td><td>NAQ</td><td>CC</td><td></td><td>CRC</td><td>NAQ</td><td>CC</td></tr>
<tr><td rowspan="3">Network capacity of 180.
A transformer reaches end of life with no planned replacement.</td><td>Gen A</td><td>120</td><td>100</td><td>100</td><td rowspan="2">Transformer retirement means a permanent reduction in network capacity of 40.</td><td>120</td><td>77.8
Pro-rata</td><td>77.8</td><td rowspan="2">Network is subsequently augmented, increasing network capacity by 60.</td><td>120</td><td>110</td><td>110</td></tr>
<tr><td>Gen B</td><td>80</td><td>80</td><td>80</td><td>80</td><td>62.2
Pro-rata</td><td>62.2</td><td>80</td><td>80</td><td>80</td></tr>
<tr><td colspan="9"></td><td>Gen C (new entrant)</td><td>30</td><td>10</td><td>10</td></tr>
<tr><td colspan="12">The impacted parties share the reduction on a pro-rata basis and receive priority over new facilities for NAQ if network capacity is subsequently increased. Their priority is capped to the amount of NAQ in the year before the reduction occurred (in this case Year 1). Where facility performance supports a higher NAQ, the facility will compete for available NAQ with other facilities. In this example, Gen A competes for the additional 20 NAQ with Gen C, a new entrant, and this example assumes both generators contribute equally to congestion and so the network model assigns them each 10 NAQ.</td></tr>
</table>

A.5 Prioritisation order for Proposed Facilities

	Figures in MW					
	Facility	CRC	Min CC	NAQ available	NAQ assigned	CC assigned
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 (market price) Did not submit an EOI	50	50	50	50	50
	Facility 2 (market price) Did not submit an EOI	40	40	40	40	40
	Facility 3 (market 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 RCR. Facilities are selected for NAQ in the following order: Facility 1 (largest facility). Minimum CC requirement achieved – assign NAQ. RCR not achieved. Facility 3 (EOI is the differentiating factor). Minimum CC requirement not achieved – do not assign NAQ. RCR not achieved. Facility 2. Minimum CC requirement achieved – assign NAQ. RCR achieved. Facility 4. Not considered as RCR achieved.					

A.6 Alternative prioritisation order for Proposed Facilities (Availability Quotient)

Scenario 12	Figures in MW					
	Facility	CRC	Min CC	NAQ available	NAQ assigned	CC assigned
Run all Proposed Facilities through the network capacity model. Use amended prioritisation order to select the facility for NAQ. 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 (market price) EQ = 0.8 Did not submit an EOI	50	50	40	0	0
	Facility 2 (market price) EQ = 0.7 Did not submit an EOI	40	25	28	28	28
	Facility 3 (market 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 RCR. 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 assign NAQ. RCR not achieved. Facility 3 (EOI is the differentiating factor). Minimum CC requirement not achieved – do not assign NAQ. RCR not achieved. Facility 2. Minimum CC requirement achieved – assign NAQ. RCR not achieved. Facility 4 is then considered in the network model. Facility 4. Minimum CC requirement achieved – assign NAQ. RCR achieved.					

Appendix B

Constrained Access Entitlement - Appendix 11 Market Rules

A simplified description of the process outlined in Appendix 11 of the Market Rules is provided below.

Gather inputs and assumptions

Inputs from AEMO include:

- AEMO's forecast Peak Demand;
- the list of facilities, including Constrained Access Facilities for which AEMO wants Western Power to calculate CAE; and
- Previously assigned Capacity Credits, Relevant Levels (for new facilities), maximum sent out capacity from each facility at 41 degrees Celsius.

Assumptions include:

- all major transmission network elements are in service, except those which are normally configured to be out of service under peak demand conditions.

Model dispatch scenarios to identify constraints

Generation dispatch scenarios are determined for the purpose of identifying network constraints for the Constrained Access Facilities (Constraint Identification Dispatch Scenarios).

Generation facilities are dispatched to meet Peak Demand with the following considerations:

- Use generation schedules (determined by Western Power) to identify all relevant network constraints;
- the output of the generation facilities are limited, as applicable, to the Declared Sent Out Capacity (DSOC), previously assigned Capacity Credits, or the maximum sent out capacity from each facility at 41 degrees Celsius; and
- The number of scenarios must ensure that all relevant network thermal constraints are identified.

Model facility output to identify the Constrained Access Entitlement

Vary generation outputs probabilistically within defined limits for the purposes of determining the Constrained Access Entitlement for Constrained Access Facilities.

Generation facilities are dispatched to meet Peak Demand with the following considerations:

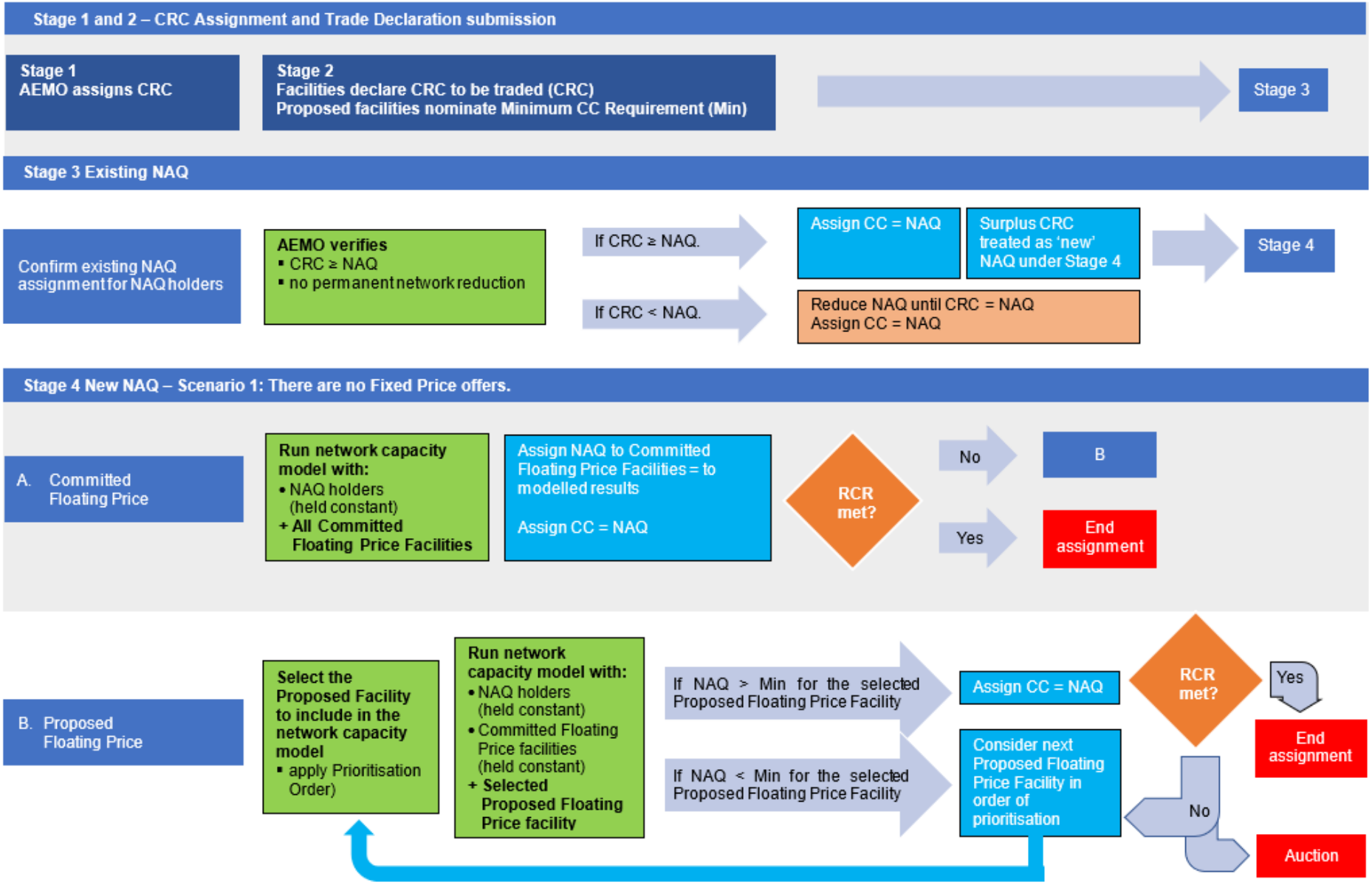
- a specified merit order;
- variations in the output of all Scheduled Generators are made according to a probabilistic model and limited, as applicable, to the most recently assigned Capacity Credits, the maximum sent out capacity from each facility at 41 degrees Celsius, or the likely output at Peak Demand;
- variations in the output of all Non-Scheduled Generators that are not Constrained Access Facilities are according to a probabilistic model and limited, where applicable, to the most recently assigned Capacity Credits, the maximum sent out capacity from each facility at 41 degrees Celsius, or the likely output at Peak Demand; and
- the output of all Constrained Access Facilities is limited, as applicable, to the most recently assigned Capacity Credits, or the Relevant Level, unless a Constrained Access Facility is required to operate at a lower level due to network constraints.

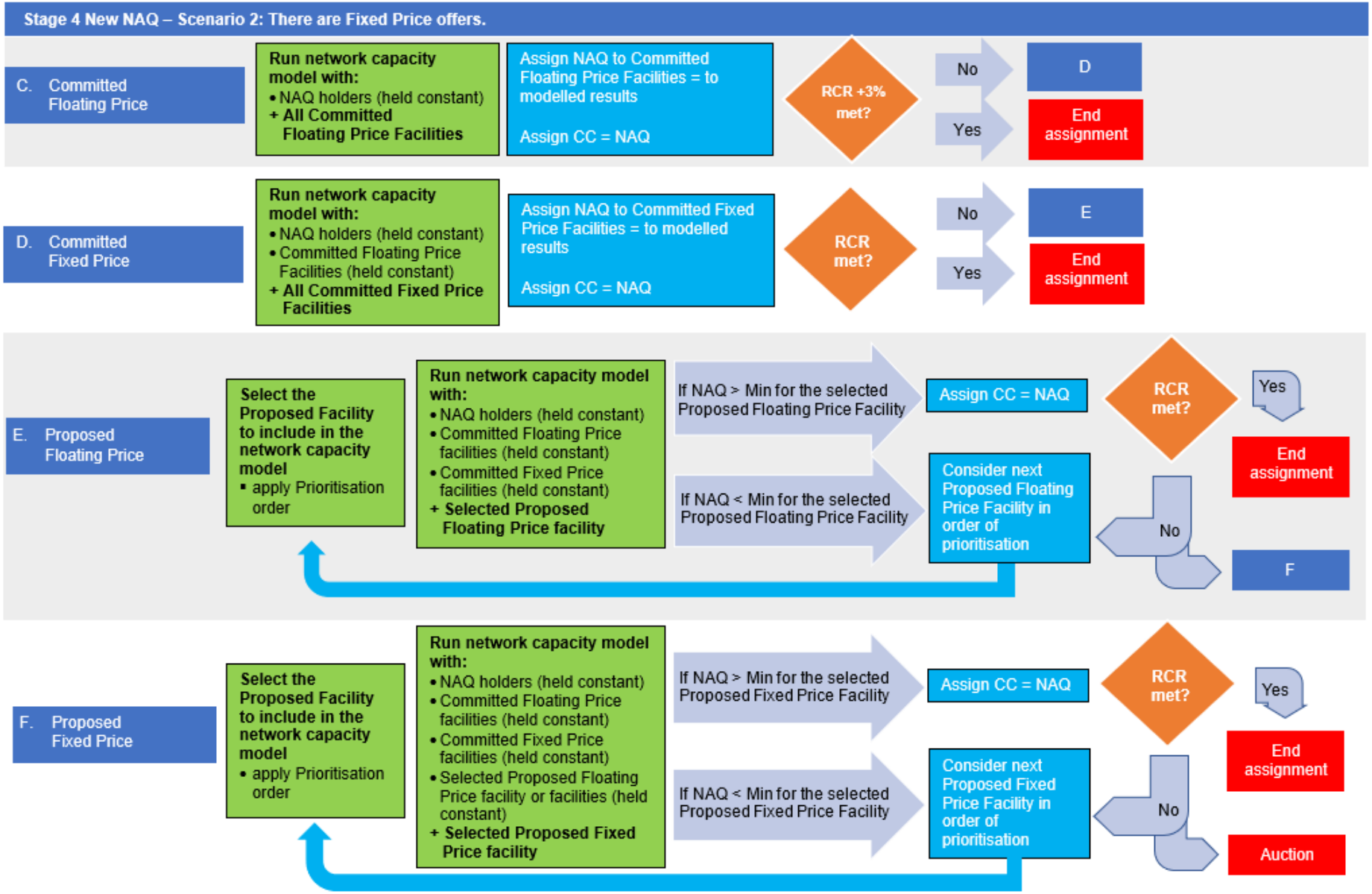
Determine Constrained Access Entitlement

The Constrained Access Entitlement is determined as the MW level of network access expected to be available to the Constrained Access Facility for at least 95% of the generation dispatch scenarios.

Appendix C

NAQ Assignment Process


Stage 1 and 2 – CRC Assignment and Trade Declaration submission
Stage 1
AEMO assigns CRC
Stage 2
Facilities declare CRC to be traded (CRC)
Proposed facilities nominate Minimum CC Requirement (Min)
Stage 3
Stage 3 Existing NAQ
Confirm existing NAQ assignment for NAQ holders
AEMO verifies
▪ CRC ≥ NAQ
▪ no permanent network reduction
If CRC ≥ NAQ.
If CRC < NAQ.
Assign CC = NAQ
Surplus CRC treated as 'new' NAQ under Stage 4
Reduce NAQ until CRC = NAQ
Assign CC = NAQ
Stage 4
Stage 4 New NAQ – Scenario 1: There are no Fixed Price offers.
A. Committed Floating Price
Run network capacity model with:
• NAQ holders (held constant)
+ All Committed Floating Price Facilities
Assign NAQ to Committed Floating Price Facilities = to modelled results
Assign CC = NAQ
RCR met?
No
Yes
B
End assignment
B. Proposed Floating Price
Select the Proposed Facility to include in the network capacity model
▪ apply Prioritisation Order)
Run network capacity model with:
• NAQ holders (held constant)
• Committed Floating Price facilities (held constant)
+ Selected Proposed Floating Price facility
If NAQ > Min for the selected Proposed Floating Price Facility
If NAQ < Min for the selected Proposed Floating Price Facility
Assign CC = NAQ
Consider next Proposed Floating Price Facility in order of prioritisation
RCR met?
Yes
End assignment
No
Auction


Stage 4 New NAQ – Scenario 2: There are Fixed Price offers.
C. Committed Floating Price
Run network capacity model with:
• NAQ holders (held constant)
+ All Committed Floating Price Facilities
Assign NAQ to Committed Floating Price Facilities = to modelled results
Assign CC = NAQ
RCR +3% met?
No
Yes
D
End assignment
D. Committed Fixed Price
Run network capacity model with:
• NAQ holders (held constant)
• Committed Floating Price Facilities (held constant)
+ All Committed Fixed Price Facilities
Assign NAQ to Committed Fixed Price Facilities = to modelled results
Assign CC = NAQ
RCR met?
No
Yes
E
End assignment
E. Proposed Floating Price
Select the Proposed Facility to include in the network capacity model
▪ apply Prioritisation order
Run network capacity model with:
• NAQ holders (held constant)
• Committed Floating Price facilities (held constant)
• Committed Fixed Price facilities (held constant)
+ Selected Proposed Floating Price facility
If NAQ > Min for the selected Proposed Floating Price Facility
Assign CC = NAQ
RCR met?
Yes
End assignment
If NAQ < Min for the selected Proposed Floating Price Facility
Consider next Proposed Floating Price Facility in order of prioritisation
No
F
F. Proposed Fixed Price
Select the Proposed Facility to include in the network capacity model
• apply Prioritisation order
Run network capacity model with:
• NAQ holders (held constant)
• Committed Floating Price facilities (held constant)
• Committed Fixed Price facilities (held constant)
• Selected Proposed Floating Price facility or facilities (held constant)
+ Selected Proposed Fixed Price facility
If NAQ > Min for the selected Proposed Fixed Price Facility
Assign CC = NAQ
RCR met?
Yes
End assignment
If NAQ < Min for the selected Proposed Fixed Price Facility
Consider next Proposed Fixed Price Facility in order of prioritisation
No
Auction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