WEM Procedure: Network Access Quantity Model

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Version	Effective Date	Summary of Changes
1.0	1 March 2023	Procedure developed in accordance with clause 4.15.17 and 4.28C.15.
2.0	30 September 2024	WEM Procedure amended in accordance with AEPC_2024_07.

IMPORTANT NOTICE – EXPLANATORY NOTES

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1. Introduction

1.1. Purpose and scope

1.1.1. This WEM Procedure: Network Access Quantity Model (Procedure) is made in accordance with AEMO's functions under clause 2.1A.2(h) of the Wholesale Electricity Market Rules (WEM Rules).

1.1.2. The *Electricity Industry Act 2004* (WA), the WEM Regulations and the WEM Rules prevail over this Procedure to the extent of any inconsistency.

1.1.3. In this Procedure, where obligations are conferred on a Rule Participant, that Rule Participant must comply with the relevant obligations in accordance with clause 2.9.7A, 2.9.7D or 2.9.8 of the WEM Rules, as applicable.

1.1.4. The purpose of this Procedure is to document:

(a) the processes, methodologies, inputs, parameters and assumptions to be applied in the Network Access Quantity Model for modelling the prioritisation and determination of Network Access Quantities to Facilities under Appendix 3 of the WEM Rules **[Clause 4.15.17(a)]**;

(b) the processes to be followed by AEMO in determining the facility dispatch scenarios under clause 4.15.5 **[Clause 4.15.17(b)]**;

(c) the processes AEMO must follow when determining Network Access Quantities for a Reserve Capacity Cycle, including how Network Access Quantities are determined for Facilities **[Clause 4.15.17(c)]**;

(d) the processes to be followed by AEMO for publishing the information under clause 4.15.16 **[Clause 4.15.17(d)]**;

(e) without limiting any other provision of these WEM Rules, information that a Market Participant or Network Operator must provide to AEMO and the format it must be provided in, for the purposes of operating the Network Access Quantity Model and determining Network Access Quantities to Facilities under Appendix 3 of the WEM Rules **[Clause 4.15.17(e)]**;

(f) any other matters that AEMO reasonably deems relevant to performing its functions under section 4.15 **[clause 4.15.17(f)]**; and

(g) the process for the application of section 4.28C and the matters AEMO will have regard to in forming its opinion under clause 4.28C.1(d) **[Clause 4.28C.15]**.

1.1.5. Appendix A of this Procedure outlines the head of power clauses that this Procedure is made under, as well as other obligations of the WEM Rules covered in this Procedure.

1.2. Definitions

1.2.1. Terms defined in the *Electricity Industry Act 2004* (WA), the WEM Regulations and the WEM Rules have the same meanings in this Procedure unless the context requires otherwise.

1.2.2. The following definitions apply in this Procedure unless the context requires otherwise.

Table 1 Definitions

Term	Definition
Committed Status	Has the meaning given in the WEM Procedure: Declaration of Bilateral Trades.
Early CRC Facility	As defined in Appendix 3 of the WEM Rules.
Facility Dispatch Scenario (FDS)	A scenario representing how a NAQ Entity could be dispatched in times of peak demand.
Facility Upgrade	As defined in Appendix 3 of the WEM Rules.
FDS Batch	A subset of Facility Dispatch Scenarios from a FDS Set.
FDS Set	A group of Facility Dispatch Scenarios created for a specific Prioritisation Step.
Final Dispatch Value	The value associated with a NAQ Entity in a Facility Dispatch Scenario after the Network Access Quantity Model has solved and adjusted the NAQ Entity output, where required.
Initial Dispatch Value	The original value of a NAQ Entity in a Facility Dispatch Scenario.
Indicative NAQ Facility	As defined in Appendix 3 of the WEM Rules.
Individual FDS Outcome	The outcome determined for a NAQ Entity for a Facility Dispatch Scenario and used to determine the NAQ Result for a Prioritisation Step.
LHS	Means the left-hand side of a Constraint Equation.
NAQ Ceiling	The maximum preliminary Network Access Quantity for a Prioritisation Step, which is also the maximum MW value that a NAQ Entity can be dispatched to in a Facility Dispatch Scenario.
NAQ Entity	Means: • a Facility or Facility Upgrade component that has been assigned Certified Reserve Capacity for the relevant Reserve Capacity Cycle; or • a Facility that has been assigned Early Certified Reserve Capacity for the relevant Reserve Capacity Cycle or a future Reserve Capacity Cycle.
NAQ Entity Parameters	The NAQ Floor, NAQ Ceiling and Possible Dispatch Range determined for a NAQ Entity for a Prioritisation Step.
NAQ Facility	As defined in Appendix 3 of the WEM Rules.
NAQ Floor	The minimum MW value that a NAQ Entity's output can be constrained down to by the Network Access Quantity Model during a solve for a specific Prioritisation Step. This minimum MW value prevents the NAQ Result from reducing in subsequent Prioritisation Steps in accordance with the NAQ Rules in Appendix 3 of the WEM Rules.
NAQ Result	The Network Access Quantity value determined for a specific Prioritisation Step for a NAQ Entity. Depending on the NAQ Entity and Prioritisation Step, the NAQ Result may set the Preliminary Network Access Quantity, Indicative Network Access Quantity or Final Network Access Quantity.
NAQ Rules	As defined in Appendix 3 of the WEM Rules.
Total Network Constraint Cost Contribution	A variable determined for a NAQ Entity and for a specific Facility Dispatch Scenario, by adding each Network Constraint cost associated with an RCM Constraint Equation, multiplied by the NAQ Entity's coefficient .

Term	Definition
Overconstrained Scenario	A scenario where all of the requirements under paragraph 5.4.4 cannot simultaneously be satisfied.
Peak Demand	Means the demand value determined under clause 4.5.10(a)(iv) and used in the calculation of the Reserve Capacity Requirement for the relevant Capacity Year.
Possible Dispatch Range	The possible range of values at which a Scheduled Facility, Semi-Scheduled Facility or Demand Side Programme could be dispatched in a Facility Dispatch Scenario.
Preliminary Network Access Quantity	As defined in Appendix 3 of the WEM Rules.
Prioritisation Step	A step outlined in Part A or Part B of Appendix 3 of the WEM Rules that requires the Network Access Quantity Model to be run.
Proposed Status	Has the meaning given in the WEM Procedure: Declaration of Bilateral Trades.
Reserve Capacity Status	A status assigned to a Facility and used for the purposes of assigning Network Access Quantities in accordance with Appendix 3 of the WEM Rules. A Reserve Capacity Status is either Proposed Status, Committed Status or Commercial Operation.
RHS	Means the right-hand side of a Constraint Equation.
Wholesale Electricity Market System (WEMS)	An interface software system that AEMO uses to administer and operate the Wholesale Electricity Market.

1.3. Interpretation

1.3.1. The following principles of interpretation apply in this Procedure unless the context requires otherwise.

(a) Clauses 1.3 to 1.5 of the WEM Rules apply in this Procedure.

(b) References to time are references to Australian Western Standard Time.

(c) Terms that are capitalised, but not defined in this Procedure, have the meaning given in the WEM Rules.

(d) A reference to the WEM Rules or WEM Procedures includes any associated forms required or contemplated by the WEM Rules or WEM Procedures.

(e) Words expressed in the singular include the plural and vice versa.

(f) A reference to a paragraph refers to a paragraph of this Procedure.

(g) A reference to an appendix refers to an appendix of this Procedure.

(h) A reference to a clause refers to a clause or section of the WEM Rules.

(i) References to WEM Rules in this Procedure in bold and square brackets **[Clause XXX]** are included for convenience only, and do not form part of this Procedure.

(j) Text located in boxes and headed as **[E]X** in this Procedure is included by way of explanation only and does not form part of this Procedure. The Procedure prevails to the extent of any inconsistency with the explanatory notes contained within it.

(k) The body of this Procedure prevails to the extent of any inconsistency with the figures, diagrams, appendices, schedules, annexures or attachments contained within this document.

1.4. Related documents

1.4.1. The documents in Table 2 are associated with this Procedure.

Table 2 Related documents

Reference	Title	Location
WEM Procedure	WEM Procedure: Certification of Reserve Capacity	WEM Website
WEM Procedure	WEM Procedure: Declaration of Bilateral Trades	WEM Website
WEM Procedure	WEM Procedure: RCM Limit Advice Requirements	WEM Website

1.5. Communications and provision of information

1.5.1. All communications and provision of information by a Rule Participant to AEMO under this Procedure must be conducted via email, unless otherwise specified in this Procedure.

1.5.2. All communication and provision of information by AEMO to a Rule Participant under this Procedure will be conducted via either email or over a recorded phone line with the AEMO WEM Control Room, unless otherwise specified in this Procedure.

2. Timeframes

2.1.1. AEMO must commence the processes under this Procedure, as soon as practicable, following both the date and time outlined in clause 4.1.15, and the creation of the RCM Constraint Equations under clause 4.4B.4.

2.1.2. AEMO (in its sole discretion) may modify or extend a date or time in this Procedure, as a result of modifying or extending a date or time under clause 4.1.1C or to the extent permitted under the WEM Rules.

2.1.3. If AEMO extends a date or time under paragraph 2.1.2, then it must promptly publish on the WEM Website:

(a) notice of the modified or extended date or time; and

(b) the effective date or time of any modification or extension under paragraph 2.1.2.

3. Network Access Quantities for a Reserve Capacity Cycle

3.1.1. The processes AEMO will follow in determining Network Access Quantities for a Reserve Capacity Cycle are outlined in the steps in Appendix 3 of the WEM Rules and the applicable steps are identified in accordance with the circumstances of a Reserve Capacity Cycle, including, but not limited to, whether the capacity requirement can be met in that Reserve Capacity Cycle.

4. NAQ Entity parameters

4.1.1. The NAQ Ceiling determined under paragraph 4.2 and Possible Dispatch Range determined under paragraph 4.3 are used in the process of creating Facility Dispatch Scenarios under paragraphs 5.2 or 6.2.

4.1.2. The NAQ Floor determined under paragraph 4.2 is used by the Network Access Quantity Model under paragraphs 5.4 or 6.3 for the process of determining Network Access Quantities .

E[A] What is a NAQ Entity?

AEMO uses the concept of a NAQ Entity in the Network Access Quantity Model process. A NAQ Entity can represent either a Facility or a Facility Upgrade component.

The example in Table 3 shows a Facility comprised of multiple components. The Market Participant has applied for the certification of Reserve Capacity for the Electric Storage Resource (Facility_WF1_ESR_01) and Intermittent Generating System (Facility_WF1_IGS_01) components of the Facility. The Market Participant has also applied to upgrade the Intermittent Generating System component (Facility_WF1_IGS_01_UPG).

Table 3 Facility and components

Facility	Certified Reserve Capacity
Facility_WF1	70
Components	**Certified Reserve Capacity**
Facility_WF1_ESR_01	10
Facility_WF1_IGS_01	50
Facility_WF1_IGS_01_UPG	10

Two NAQ Entities will be created, as shown in Table 4, to represent the Facility (original Electric Storage Resource and Intermittent Generating System components) and the Facility Upgrade component (denoted by UPG) in the Network Access Quantity Model.

Table 4 NAQ Entity

NAQ Entity	Certified Reserve Capacity
N_Facility_WF1	60
N_Facility_WF1_IGS_01_UPG	10

4.2. NAQ Floor and NAQ Ceiling

4.2.1. AEMO must determine the NAQ Floor and NAQ Ceiling for every Prioritisation Step required for each NAQ Entity, prior to running the Network Access Quantity Model.

4.2.2. The NAQ Floor of a NAQ Entity, excluding an Early CRC Facility, equals:

(a) the Preliminary Network Access Quantity determined for the NAQ Entity in the previous Prioritisation Step; or

(b) zero, if:

(i) the NAQ Entity was not included in the previous Prioritisation Step; or

(ii) it is the first Prioritisation Step of Part A or Part B of Appendix 3 of the WEM Rules for the Reserve Capacity Cycle.

4.2.3. Subject to paragraph 4.2.5, AEMO must determine a NAQ Ceiling for each NAQ Entity, for each Prioritisation Step under Part A of Appendix 3 of the WEM Rules for each Reserve Capacity Cycle, excluding Early Certified Reserve Capacity, in accordance with Table 5.

Table 5 NAQ Ceiling for each Prioritisation Step of Part A Appendix 3 of the WEM Rules

Prioritisation Step	NAQ Ceiling
3A	Minimum (Network Access Quantity, Peak Certified Reserve Capacity)
3B	Minimum (Highest Network Access Quantity, Peak Certified Reserve Capacity)
3C	Peak Certified Reserve Capacity
4	Peak Certified Reserve Capacity
5	Peak Certified Reserve Capacity
6	Peak Certified Reserve Capacity
10(a) (Capacity Year +1)	Peak Certified Reserve Capacity
10(b) (Capacity Year +1)	Peak Certified Reserve Capacity
10(a) (Capacity Year +2)	Peak Certified Reserve Capacity
10(b) (Capacity Year +2)	Peak Certified Reserve Capacity

4.2.4. Subject to paragraph 4.2.5, AEMO must determine a NAQ Ceiling for each NAQ Entity, for each Prioritisation Step under Part B of Appendix 3 of the WEM Rules for each Reserve Capacity Cycle, excluding Early Certified Reserve Capacity, in accordance with Table 6.

Table 6 NAQ Ceiling for each Prioritisation Step of Part B Appendix 3 of the WEM Rules

Prioritisation Step	NAQ Ceiling
3A	Minimum (Network Access Quantity, Peak Certified Reserve Capacity)
3B	Minimum (Highest Network Access Quantity, Peak Certified Reserve Capacity)
3C	Peak Certified Reserve Capacity
4	Peak Certified Reserve Capacity
5	Peak Certified Reserve Capacity
6A	Peak Certified Reserve Capacity
6B	Peak Certified Reserve Capacity
10(a) (Capacity Year +1)	Peak Certified Reserve Capacity
10(b) (Capacity Year +1)	Peak Certified Reserve Capacity
10(a) (Capacity Year +2)	Peak Certified Reserve Capacity
10(b) (Capacity Year +2)	Peak Certified Reserve Capacity

4.2.5. Where a NAQ Entity is subject to a NCESS Contract but was not assigned Capacity Credits in the previous Reserve Capacity Cycle, AEMO must determine the NAQ Ceiling for each Prioritisation Step under Part A or Part B of Appendix 3 of the WEM Rules as the quantity of Peak Certified Reserve Capacity assigned for that Reserve Capacity Cycle.

4.2.6. Prioritisation Step 10(a) (Capacity Year +1) and 10(b) (Capacity Year +1) in Table 5 and Table 6 relate to Step 10(a) and Step 10(b) of Part A and Part B in Appendix 3 of the WEM Rules, respectively, and are only required if an Early CRC Facility has been assigned Early Certified Reserve Capacity for the relevant Capacity Year plus one.

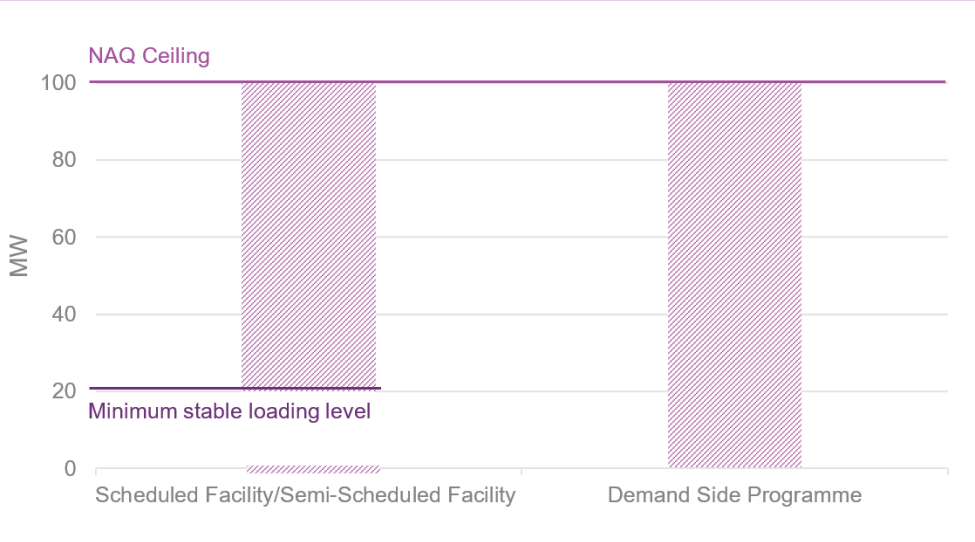
4.2.7. Prioritisation Step 10(a) (Capacity Year +2) and 10(b) (Capacity Year +2) in Table 5 and Table 6 relate to Step 10(a) and 10(b) of Part A and Part B in Appendix 3 of the WEM Rules, respectively, and are only required if an Early CRC Facility has been assigned Early CRC for the relevant Capacity Year plus two.

4.3. Possible Dispatch Range

E[A1] Possible Dispatch Range

Figure 1 shows an example of a Possible Dispatch Range for a Scheduled Facility, Semi-Scheduled Facility and Demand Side Programme. A NAQ Entity must be dispatched within its Possible Dispatch Range when determining the Initial Dispatch Value and Final Dispatch Value.

Figure 1 Possible Dispatch Range



4.3.1. AEMO must determine the Possible Dispatch Range for each NAQ Entity, for each Prioritisation Step, excluding a Non-Scheduled Facility as follows:

$$PossibleDispatchRange = \{0, [MinContRange, MaxContRange]\}$$

where these variables are defined in accordance with Table 7

Table 7 Variables used in the Possible Dispatch Range calculation

Variable	Definition
MinContRange	Minimum MW quantity, excluding zero, in which a NAQ Entity can be dispatched.
MaxContRange	Maximum MW quantity in which a NAQ Entity can be dispatched.

4.3.2. AEMO must set the variables of the Possible Dispatch Range for a NAQ Entity, in accordance with its Facility Class as outlined in Table 8.

Table 8 Variables that set the Possible Dispatch Range of a Scheduled Facility, Semi-Scheduled Facility and Demand Side Programme

Facility Class	MinContRange	MaxContRange
Scheduled Facility	Minimum stable loading level	NAQ Ceiling
Semi-Scheduled Facility	Minimum stable loading level	NAQ Ceiling
Demand Side Programme	Zero	NAQ Ceiling

4.3.3. AEMO may verify the minimum stable loading level provided by a Market Participant for a NAQ Entity under clause 4.10.1(dB) against Standing Data, where applicable.

4.3.4. Subject to paragraph 4.3.5, in determining the Possible Dispatch Range for a NAQ Entity, AEMO may use:

(a) the minimum stable loading level provided under clause 4.10.1(dB); or

(b) the minimum stable loading level recorded in Standing Data, where AEMO considers, at its discretion, this is more reflective of the Facility's expected capability.

4.3.5. The minimum stable loading level for a NAQ Entity that is a Facility Upgrade component is zero.

5. Determining Network Access Quantities if the sum of NAQ Entities' NAQ Ceilings exceeds Peak Demand

5.1.1. When prioritising and determining Network Access Quantities under clause 4.15 and Appendix 3 of the WEM Rules, for each Prioritisation Step, if the sum of the NAQ Ceilings associated with NAQ Entities' assessed in the relevant Prioritisation Step is greater than Peak Demand (an excess), AEMO must:

(a) determine Facility Dispatch Scenarios for the Prioritisation Step in accordance with paragraph 5.2; and

(b) determine Network Access Quantities for the Prioritisation Step in accordance with paragraph 5.4.

5.2. Facility Dispatch Scenarios

5.2.1. AEMO will use the following process to create each Facility Dispatch Scenario:

(a) Set the Initial Dispatch Value of all Non-Scheduled Facilities to the NAQ Ceiling, as indicated by clause 4.15.9(d).

(b) Organise all remaining NAQ Entities in the relevant Prioritisation Step in a random order.

(c) Dispatch each NAQ Entity based on the random order created under paragraph 5.2.1(b) up to its MaxContRange (as described in Table 7). For each NAQ Entity dispatched, check if the sum of all Initial Dispatch Values determined in paragraphs 5.2.1(a) and (c) is less than Peak Demand:

(i) if true, calculate the difference between the sum of all Initial Dispatch Values and Peak Demand and Check if the difference is greater than or equal to the MaxContRange of the next NAQ Entity:

(1) if true, set the Initial Dispatch Value of the next NAQ Entity to its MaxContRange; or

(2) if false, check if the difference is greater than the MinContRange (as described in Table 7) of the next NAQ Entity:

(A) if true, set the Initial Dispatch Value of the next NAQ Entity to equal the difference; or

(B) if false, set the Initial Dispatch Value of the next NAQ Entity to its MinContRange, randomly select a NAQ Entity that was previously dispatched to its MaxContRange, and reduce that randomly selected NAQ Entity's Initial Dispatch Value (but not below its MinContRange) to meet Peak Demand; or

(ii) if false, set the Initial Dispatch Value of all remaining NAQ Entities to zero.

E[B] Creation of Facility Dispatch Scenarios

The process of creating Facility Dispatch Scenarios largely ignores Facility Class, Facility Technology Types and a merit order, besides specific requirements for a Non-Scheduled Facility outlined in paragraph 5.2.1(a).

AEMO's objective is for each NAQ Entity to have a relatively equal opportunity to be dispatched at its NAQ Ceiling. The actual number of Facility Dispatch Scenarios where a NAQ Entity's Initial Dispatch Value equals the NAQ Ceiling will vary between NAQ Entities due to size.

E[C] Initial Dispatch Values

AEMO sets the Initial Dispatch Value for a NAQ Entity, that is either a Scheduled Facility, Semi-Scheduled Facility or Demand Side Programme, within the Possible Dispatch Range by following the process in paragraph 5.2.1(c).

E[D] Peak Demand

In each Facility Dispatch Scenario, the sum of all relevant NAQ Entities' Initial Dispatch Values equals Peak Demand.

5.2.2. Each Facility Dispatch Scenario will only include NAQ Entities assessed in the relevant Prioritisation Step.

5.2.3. AEMO will create a unique identifier for each Facility Dispatch Scenario based on an ordered series of the following components, each separated by an underscore:

(a) "FDS"

(b) the last 2 digits of the relevant Reserve Capacity Cycle (e.g. 22)

(c) the Prioritisation Step (e.g. 3A)

(d) the Prioritisation Step sub-step (known as a version) represented as a letter (e.g. a)

(e) the FDS index which is a sequential number (e.g. 1)

E[E] Naming an FDS

The following shows an example of a FDS identifier that conforms with the naming convention:

FDS_23_3B_a_150

5.3. FDS Set Creation

5.3.1. AEMO will create a FDS Set for each required Prioritisation Step.

5.3.2. AEMO will assign a unique identifier to each FDS Set based on an ordered series of the following components, each separated by an underscore:

(a) "FDS"

(b) the last 2 digits of the relevant Reserve Capacity Cycle (e.g. 22)

(c) the Prioritisation Step (e.g. 3A)

(d) the Prioritisation Step sub-step (known as a version) represented as a letter (e.g. a)

E[E1] Naming an FDS Set

The following shows an example of an FDS Set identifier that conforms with the naming convention:

FDS_23_3B_a

E[E2] Example FDS Set

E[E1] is an example of an FDS Set created for Prioritisation Step 3A for the 2023 Reserve Capacity Cycle. There are three NAQ Entities, all of which have a MaxContRange of 20 MW. The Peak Demand is 30 MW. Three Facility Dispatch Scenarios have been created.

Table 9 Example FDS Set

FDS Set	FDS	NAQ Entity	Initial Dispatch Value
FDS_23_3A_a	FDS_23_3A_a_1	NaqEntity1	0
		NaqEntity2	10
		NaqEntity3	20
	FDS_23_3A_a_2	NaqEntity1	20
		NaqEntity2	0
		NaqEntity3	10
	FDS_23_3A_a_3	NaqEntity1	10
		NaqEntity2	20
		NaqEntity3	0

5.4. Network Access Quantity Model

5.4.1. The Network Access Quantity Model must consider:

(a) Peak Demand;

(b) the relevant NAQ Entity Parameters for that Prioritisation Step;

(c) the relevant FDS Set for that Prioritisation Step; and

(d) relevant RCM Constraint Equations.

5.4.2. In accordance with the principle in clause 4.15.9(a), the objective of a solve by the Network Access Quantity Model is to minimise the total change between the NAQ Entities' Initial Dispatch Values and Final Dispatch Values.

5.4.3. The Network Access Quantity Model will solve the Facility Dispatch Scenarios from the relevant FDS Set under paragraph 5.4.1(c) subject to the inputs under paragraph 5.4.1(a), 5.4.1(b) and 5.4.1(d) for each required Prioritisation Step, adjusting the NAQ Entities' values (subject to paragraphs 5.4.4, 5.4.5 and 5.4.6), to determine a Final Dispatch Value for each NAQ Entity.

5.4.4. Subject to paragraph 5.4.5, during the solve of a Facility Dispatch Scenario:

(a) all RCM Constraint Equations must be satisfied;

(b) the sum of the NAQ Entities' Final Dispatch Values must equal Peak Demand;

(c) if a NAQ Entity's Initial Dispatch Value is above the NAQ Floor, the NAQ Entity's Final Dispatch Value cannot be dispatched below the NAQ Floor;

(d) if the NAQ Entity's Initial Dispatch Value is below the NAQ Floor, the NAQ Entity's Final Dispatch Value cannot be dispatched below the Initial Dispatch Value;

(e) the Final Dispatch Value must be within the NAQ Entity's Possible Dispatch Range; and

(f) the Final Dispatch Value of a Non-Scheduled Facility must equal the NAQ Ceiling.

5.4.5. During the solve of a Facility Dispatch Scenario, if AEMO determines that there is an Overconstrained Scenario, paragraphs 5.4.4(c) and 5.4.4(d) do not apply, and:

(a) if a NAQ Entity's Initial Dispatch Value is above the NAQ Floor, the NAQ Entity's Final Dispatch Value may be dispatched below the NAQ Floor;

(b) if the NAQ Entity's Initial Dispatch Value is below the NAQ Floor, the NAQ Entity's Final Dispatch Value may be dispatched below the Initial Dispatch Value.

E[F] Network Access Quantity Model solve

Below is an example of a simple Network Access Quantity Model solve.

There are four NAQ Entities and one RCM Constraint Equation included in the Prioritisation Step. The example below in Table 10 demonstrates how one Facility Dispatch Scenario is solved subject to the one RCM Constraint Equation.

Table 10 Example of how a Facility Dispatch Scenario is solved in the Network Access Quantity Model

Network Access Quantity Model

Objective: Minimise the total change between the NAQ Entities' Initial Dispatch Values and Final Dispatch Values

Peak Demand = 1100 MW

NAQ Entity Parameters

	Minimum stable loading level	NAQ Ceiling	NAQ Floor	Facility Class
GenA	0	400	0	SF
GenB	0	300	0	SF
GenC	0	500	0	SSF
GenD	0	50	0	NSF

Facility Dispatch Scenario

	Initial Dispatch Value
GenA	250
GenB	300
GenC	500

GenD	50

RCM Constraint Equation

The Constraint Equation below is an example of a simple RCM Constraint Equation. The LHS terms include the NAQ Entities that can respond to dispatch instructions (GenA, GenB, GenC) and, therefore, can be controlled by the Network Access Quantity Model. The RHS terms include all other terms that cannot be controlled by the Network Access Quantity Model, such as the Peak Demand and Non-Scheduled Facilities (GenD). Each term on both the LHS and RHS of an RCM Constraint Equation has a unique coefficient. The coefficient provides a measure of the relative impact of each term on the Network Constraint.

$$0.7*GENB + 0.5*GENC - 0.8*GENA \leq 0.05*Demand + 0.7*GenD$$

To solve the Facility Dispatch Scenario, the Initial Dispatch Values are substituted into the Constraint Equation below to test whether the requirements of the RCM Constraint Equation have been met.

$$0.7*300 + 0.5*500 - 0.8*250 \leq 0.05*1100 + 0.7*50$$

$$260>90$$

The conditions of the above RCM Constraint Equation have been violated as the LHS is not less than or equal to the RHS. Therefore, the Network Access Quantity Model will adjust the NAQ Entities' values (on the LHS), while minimising the total changes made and subject to the conditions in paragraph 5.3.5 (further examples below).

The optimal solution following the solve is

$$0.7*186.667 + 0.5*500 - 0.8*363.333 \leq 0.05*1100 + 0.7*50$$

$$90\leq90$$

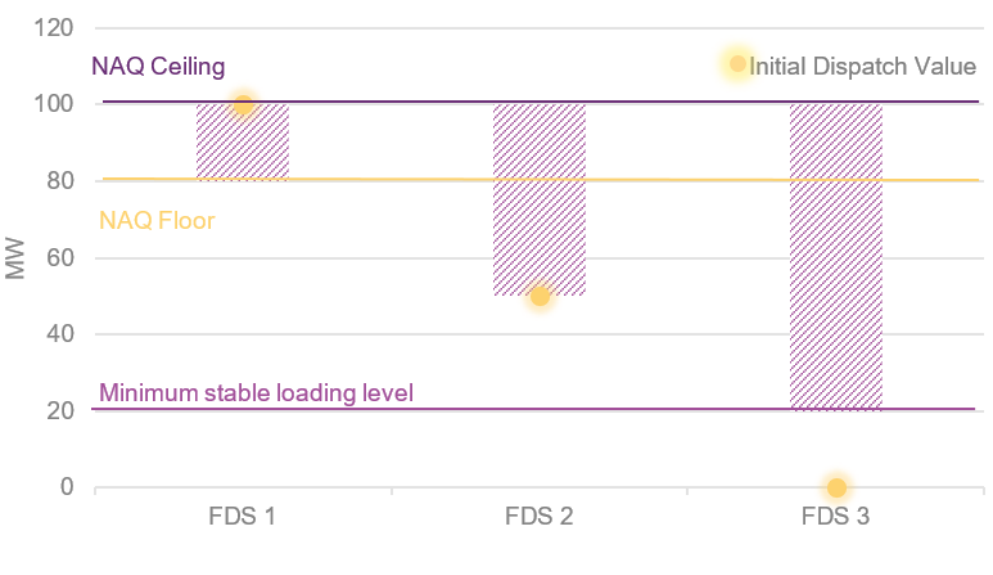
Optimal Solution

	GenA	GenB	GenC	GenD
Initial Dispatch Value	250	300	500	50

Final Dispatch Value	363.334	186.666	500	50
Total change	+113.334	-113.334	0	0

During the solve, the Network Access Quantity Model can only adjust the NAQ Entities' values (excluding Non-Scheduled Facilities) within a specific range (see paragraph 5.4.4(c), 5.4.4(d) and 5.4.4(e)). Below in Figure 2 are examples of the range within which the values can be adjusted during a solve.

Figure 2 Range within which the Initial Dispatch Value can be adjusted by the Network Access Quantity Model



In FDS 1, the Initial Dispatch Value is above the NAQ Floor. Therefore the Final Dispatch Value can only be adjusted between the Initial Dispatch Value and the NAQ Floor, but not below the NAQ Floor.

In FDS 2, the Initial Dispatch Value is below the NAQ Floor. Therefore the Final Dispatch Value can only be adjusted between the Initial Dispatch Value and the NAQ Ceiling, it cannot be adjusted below the Initial Dispatch Value.

In FDS 3, the Initial Dispatch Value is zero. Therefore the Final Dispatch Value can only be adjusted within the Possible Dispatch Range (minimum stable loading level and NAQ Ceiling).

5.4.6. Subject to the requirements in paragraph 5.4.4, the Network Access Quantity Model will adjust the Final Dispatch Values in proportion to the Initial Dispatch Values of all NAQ Entities with the same coefficient ('tie-break logic'), where:

(a) two or more NAQ Entities have the same coefficient (measure of relative impact) in a RCM Constraint Equation; and

(b) the Network Access Quantity Model is required to adjust the Final Dispatch Values to solve the Facility Dispatch Scenario.

E[G] Tie-breaking logic

During a solve of a Facility Dispatch Scenario, if an RCM Constraint Equation is violated, the Network Access Quantity Model will adjust the NAQ Entities' output until the conditions of all RCM Constraint Equations have been met. The objective of the Network Access Quantity Model is to minimise the total change between the NAQ Entities' Initial Dispatch Values and Final Dispatch Values. The Network Access Quantity Model will, therefore, prioritise the adjustment of the NAQ Entity with the largest coefficient. The coefficient is the measure of the relative impact of the NAQ Entity's output on the Network Constraint. For example, if the coefficient of a NAQ Entity on the LHS is 1, that NAQ Entity will have twice the impact on the management of the Network Constraint when compared with another NAQ Entity on the LHS with a coefficient of 0.5.

It is possible for multiple NAQ Entities to have the same coefficient in an RCM Constraint Equation. In a tie break situation, the Network Access Quantity Model will adjust all NAQ Entities with the same coefficient in proportion to their Initial Dispatch Value.

$$\frac{\boldsymbol{Final\ Dispatch_A}}{\boldsymbol{Initial\ Dispatch_A}} = \frac{\boldsymbol{Final\ Dispatch_B}}{\boldsymbol{Initial\ Dispatch_B}}$$

A simple example is provided below in Table 11

Table 11 Example of how the Network Access Quantity Model resolves a tie-break

Network Access Quantity Model

Objective: Minimise the total change between the NAQ Entities' Initial Dispatch Values and Final Dispatch Values

Peak Demand = 300 MW

NAQ Entity Parameters

	Minimum stable loading level	NAQ Ceiling	NAQ Floor
GenA	0	200	15
GenB	0	100	0
GenC	0	150	0
GenD	0	70	0

Facility Dispatch Scenario

	Initial Dispatch Value
GenA	20
GenB	100
GenC	150
GenD	30

Constraints

Solve the Facility Dispatch Scenario subject to the conditions in paragraph 5.4.4, including the following RCM Constraint Equation:

$$2*GENA + 2*GENB + 2*GENC \leq 480$$

$$2*20+2*100+2*150 \leq 480$$

$$540>480$$

To meet the requirements of the RCM Constraint Equation, the Network Access Quantity Model could reduce the values of either GenA, GenB or GenC. Given all NAQ Entities have the same coefficient, there is a tie-break. The Network Access Quantity Model will reduce all NAQ Entities in proportion to their Initial Dispatch Value.

The optimal solution following the solve is:

$$2*17.778+2*88.889+2*133.333 \leq 480$$

$$480\leq480$$

Optimal Solution

	GenA	GenB	GenC	GenD
Initial Dispatch Value	20	100	150	30
Coefficient	2	2	2	NA
Final Dispatch Value	17.778	88.889	133.333	60

Tie-break logic	$\frac{17.778}{20} = 0.889$	$\frac{88.889}{100} = 0.889$	$\frac{133.333}{150} = 0.889$	NA

5.4.7. The Network Access Quantity Model must solve a minimum of 40,000 Facility Dispatch Scenarios for each Prioritisation Step.

5.4.8. The Network Access Quantity Model may solve a maximum of 100,000 Facility Dispatch Scenarios for each Prioritisation Step.

5.4.9. For the purposes of paragraphs 5.4.11(b) and 5.4.11(c), AEMO will calculate the NAQ Entity's Total Network Constraint Cost Contribution.

5.4.10. For the purposes of paragraph 5, AEMO will determine the Individual FDS Outcome for each NAQ Entity for each Facility Dispatch Scenario in accordance with paragraph 5.4.11.

5.4.11. Where the Final Dispatch Value:

(a) equals the Initial Dispatch Value, the Individual FDS Outcome is the NAQ Ceiling;

(b) is less than the Initial Dispatch Value and the NAQ Entity's Total Network Constraint Cost Contribution is negative, the Individual FDS Outcome is the Final Dispatch Value;

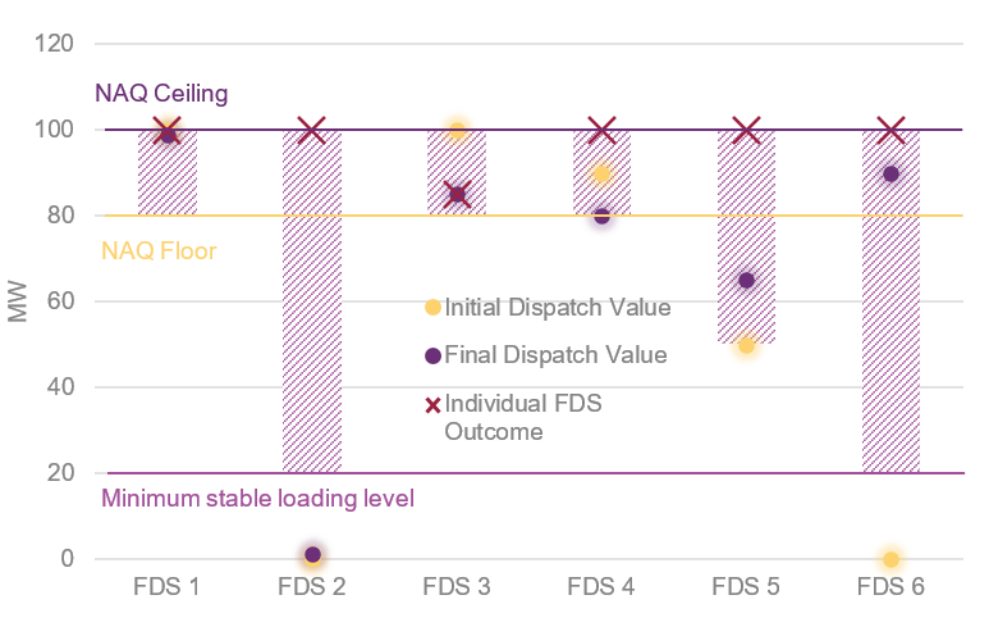
(c) is less than the Initial Dispatch Value and the NAQ Entity's Total Network Constraint Cost Contribution is either positive or neutral, the Individual FDS Outcome is the NAQ Ceiling; and

(d) is greater than the Initial Dispatch Value, the Individual FDS Outcome is the NAQ Ceiling.

E[H] Individual FDS Outcome

Figure 3 below shows examples of how AEMO will determine the Individual FDS Outcome.

Figure 3 How to determine the Individual FDS Outcome



Benefit-of-the-doubt

In FDS 1 and FDS 2, the Final Dispatch Value equals the Initial Dispatch Value, this indicates that the NAQ Entity's output was not required to be adjusted to solve the Facility Dispatch Scenario. The NAQ Entity receives the 'benefit-of-the-doubt' and the Individual FDS Outcome equals the NAQ Ceiling. It is assumed that the NAQ Entity would have been able to operate at its NAQ Ceiling, regardless of whether it was dispatched at its NAQ Ceiling.

In FDS 5 and FDS 6, the Final Dispatch Value is greater than the Initial Dispatch Value, this indicates that the increased output of the NAQ Entity relieved Network congestion (had an overall positive impact on congestion) or assisted in meeting the supply-demand balance. The NAQ Entity is given the benefit-of-the-doubt and the Individual FDS Outcome equals the NAQ Ceiling.

In FDS 4, the Final Dispatch Value is less than the Initial Dispatch. Therefore, the determination of the Individual FDS Outcome depends on the NAQ Entity's total contribution to Network congestion. In this example, the NAQ Entity is deemed to have an overall positive impact, or no impact on Network congestion. It is assumed that the reduction in the NAQ Entity's output was only required to meet the supply-demand balance. The NAQ Entity is given the benefit-of-the-doubt and the Individual FDS Outcome equals the NAQ Ceiling.

Constrained down

In FDS 3, the Final Dispatch Value is less than the Initial Dispatch Value, and the NAQ Entity is deemed to have an overall negative impact on congestion. Constraining the NAQ Entity's output was necessary in order to relieve congestion. Therefore, the Individual FDS Outcome equals the Final Dispatch Value.

Refer to E[I] for further information on how AEMO determines a NAQ Entity's contribution to congestion.

E[I] NAQ Entity Network Constraint cost contribution

AEMO calculates a NAQ Entity's Network Constraint cost contribution, which measures a NAQ Entity's contribution to Network congestion in a specific RCM Constraint Equation. If the NAQ Entity's Network cost contribution is negative, the NAQ Entity is negatively contributing to Network congestion

It is possible for a NAQ Entity to have a positive contribution to one Network Constraint and a negative contribution to another. Therefore, we measure the NAQ Entity's Total Network Constraint Cost Contribution. A simplified example, which only includes one RCM Constraint Equation is provided below in Table 12. In a normal scenario, there are likely to be many RCM Constraint Equations.

Table 12 Example of how the NAQ Entity Network Constraint cost contribution impacts the Individual FDS Outcome

Network Access Quantity Model

Objective: Minimise the total change between the NAQ Entities' Initial Dispatch Values and Final Dispatch Values

Peak Demand = 1100 MW

NAQ Entity Parameters

	Minimum stable loading level	NAQ Ceiling	NAQ Floor
GenA	0	400	0
GenB	0	300	0
GenC	0	500	0

Facility Dispatch Scenario

	Initial Dispatch Value
GenA	300
GenB	300
GenC	500

Constraints

The Network Access Quantity Model solves the Facility Dispatch Scenario subject to the conditions in paragraph 5.4.4, including the following RCM Constraint Equation:

$$0.7*GENB + 0.5*GENC - 0.8*GENA \leq 90$$

Optimal Solution

	GenA	GenB	GenC
Initial Dispatch Value	300	300	500
Final Dispatch Value	386.667	213.333	500
Final Dispatch ≥Initial Dispatch	True	False	True
Individual FDS Outcome	NAQ Ceiling	Subject to the NAQ Entity's total Network cost contribution	NAQ Ceiling

Total Network Cost Contribution

	Network Constraint cost	NAQ Entity coefficient			NAQ Entity Network cost contribution		
		GenA	GenB	GenC	GenA	GenB	GenC
RCMCE1	-1.333	-0.8	0.7	0.5	1.067	-0.933	-0.667
NAQ Entity Total Network Cost contribution					1.067	-0.933	-0.667
Positive or negative cost contribution					positive	negative	negative
Individual FDS Outcome					NAQ Ceiling	Final Dispatch Value	NAQ Ceiling

5.4.12. AEMO will calculate the 5th percentile of all Individual FDS Outcomes determined for that Prioritisation Step for each NAQ Entity for each Prioritisation Step in accordance with clause 4.15.9(c).

5.4.13. Subject to paragraph 5.4.16, the 5th percentile determined under paragraph 5.4.12 must converge to a precision of 0.1 MW.

5.4.14. For the purposes of achieving convergence, the Network Access Quantity Model will:

(a) Create an FDS Batch using a subset of Facility Dispatch Scenarios from the relevant FDS Set;

(b) solve the first FDS Batch;

(c) calculate the 5th percentile values of all individual FDS Outcomes for all NAQ Entities based on all Facility Dispatch Scenarios solved;

(d) create a second FDS Batch by using the next subset of Facility Dispatch Scenarios from the relevant FDS Set

(e) solve the second FDS Batch;

(f) calculate the 5th percentile values of all individual FDS Outcomes for all NAQ Entities based on all Facility Dispatch Scenarios solved; and

(g) subtract the 5th percentile values under paragraph 5.4.14(c) from the 5th percentile values calculated under paragraph 5.4.14(f) for all NAQ Entities to determine if the values have converged;

(h) Where the 5th percentile values of all individual FDS Outcomes have not converged for all NAQ Entities, create and solve a new FDS Batch and calculate the 5th percentile values including all previously solved Facility Dispatch Scenarios, then compare these values to the 5th percentile previously calculated under paragraph 5.4.14(f) to determine if the values have converged.

5.4.15. AEMO will repeat the process under paragraph 5.4.14(h) until the values have converged to the precision required under paragraph 5.4.13.

5.4.16. Where the 5th percentile values do not converge in accordance with the precision required under paragraph 5.4.13, the 5th percentile will be calculated from the maximum number of Facility Dispatch Scenarios that may be solved under paragraph 5.4.8.

5.4.17. Where the 5th percentile determined under paragraph 5.4.12 is below the NAQ Entity's NAQ Floor, AEMO will determine the NAQ Result to be the NAQ Floor.

E[J] Overconstrained Scenarios

In a FDS Set, if there are a number of Overconstrained Scenarios where AEMO is required to ignore the NAQ Entity's NAQ Floor, in accordance with paragraph 5.4.5, when solving a Facility Dispatch Scenario, it is possible that the 5th percentile determined under paragraph 5.4.12 may be below the NAQ Entity's NAQ Floor. This is not permitted under the NAQ Rules, therefore, AEMO will determine the NAQ Entity's NAQ Result in accordance with 5.4.17..

5.4.18. Subject to paragraph 5.4.17, the NAQ Result is the 5th percentile determined under paragraph 5.4.12.

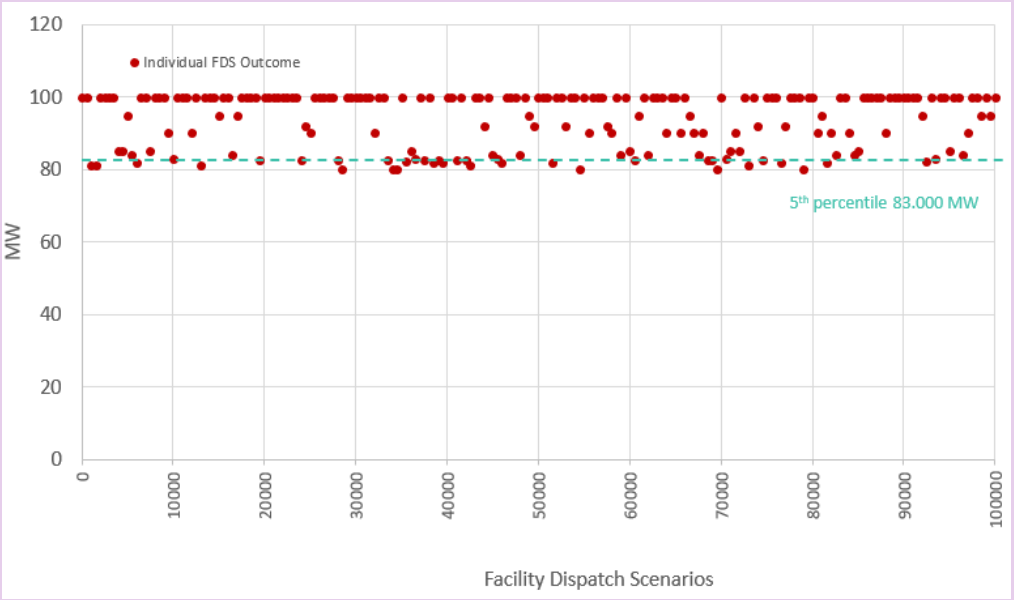
5.4.19. In accordance with clause 4.15.10, the NAQ Result will be expressed to a precision of 0.001 MW.

E[K] 5th percentile Facility Dispatch Scenario calculation

An example of how AEMO calculates the 5th percentile Facility Dispatch Scenario is provided in Figure 4.

In this example, the Network Access Quantity Model has solved 100,000 Facility Dispatch Scenarios. Figure 4 shows the Individual FDS Outcome from the 100,000 Facility Dispatch Scenarios for one NAQ Entity. The 5th percentile Facility Dispatch Scenario calculated from all Individual FDS Outcomes equals 83.000 MW. This means in 95% of the Facility Dispatch Scenarios, the NAQ Entity achieved an Individual FDS Outcome equal to or greater than 83.000 MW.

Figure 4 How to determine the 5th percentile

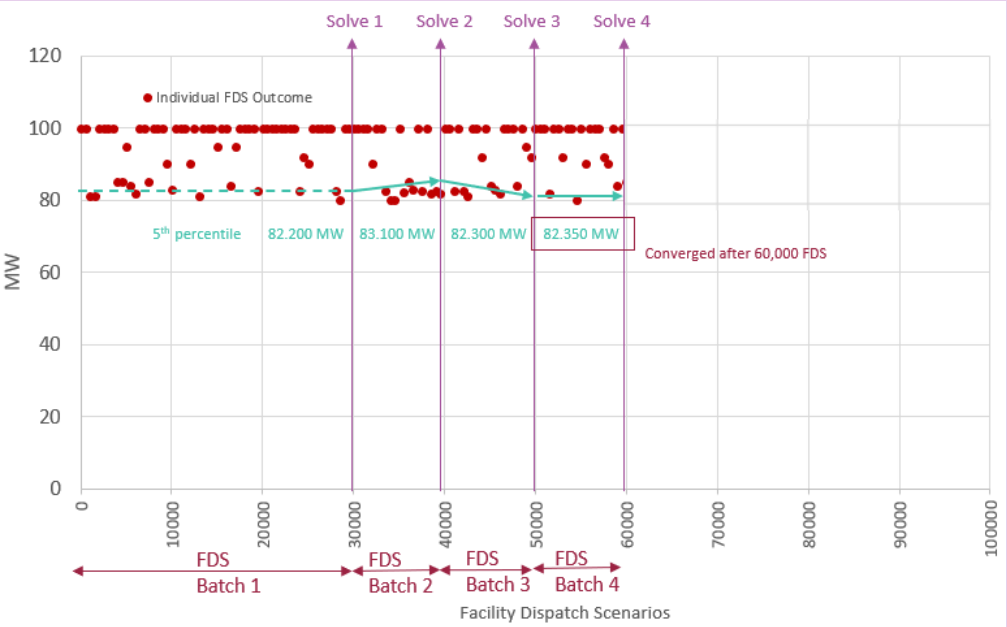


E[K1] Convergence

An example of how convergence is calculated is provided in Figure 5. In this example, the Network Access Quantity Model solves the first FDS Batch, comprised of 30,000 Facility Dispatch Scenarios. The 5th percentile Facility Dispatch Scenario value that is calculated from the solve ofthe first FDS Batch equals 82.200 MW. The

second FDS Batch, comprised of 10,000 Facility Dispatch Scenarios, is solved and the 5th percentile Facility Dispatch Scenario value, equalling 83.100 MW, is recalculated. Given the 5th percentile Facility Dispatch Scenario value has changed by more than 0.1 MW, the 5th percentile value has not converged. It is not until the fourth FDS Batch that the 5th percentile Facility Dispatch Scenario changes by less than 0.1 MW. Assuming the 5th percentile Facility Dispatch Scenario values for all NAQ Entities have converged, the 5th percentile Facility Dispatch Scenario value determined for this NAQ Entity for this Prioritisation Step equals 82.350 MW.

Figure 5 How convergence is calculated



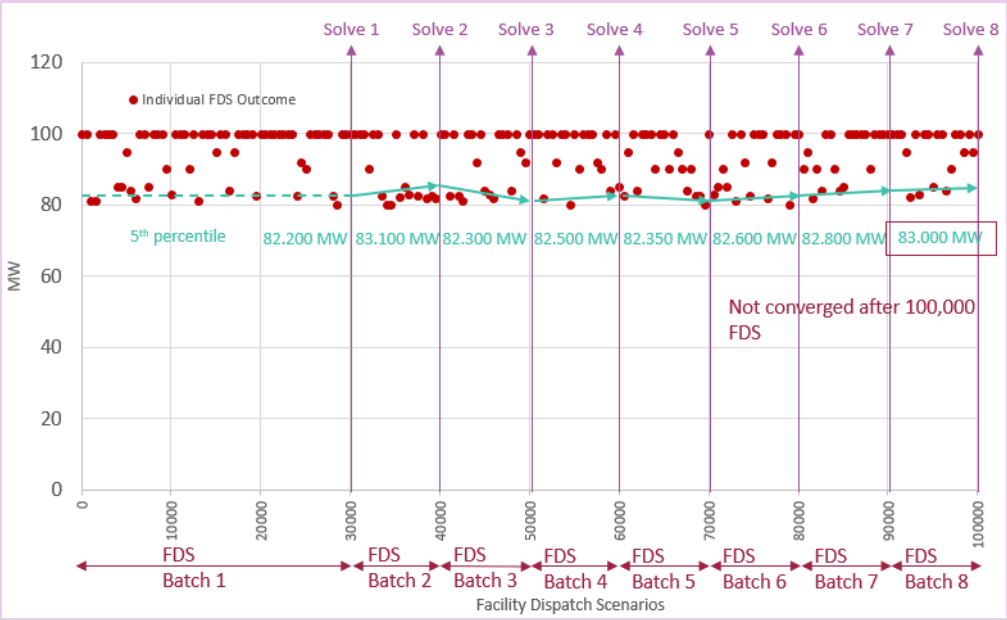
E[L] Where the Network Access Quantity Model does not converge

Although AEMO expects it unlikely to occur, it is possible that the Network Access Quantity Model may not converge, despite solving a large number of Facility Dispatch Scenarios. In accordance with paragraph 5.4.16, where this occurs, the 5th percentile Facility Dispatch Scenario value will be calculated from the maximum number of Facility Dispatch Scenarios that may be solved under paragraph 5.4.8.

An example of this can be found in Figure 6. In this example, despite the Network Access Quantity Model solving 100,000 Facility Dispatch Scenarios, the 5th percentile Facility Dispatch Scenario value consistently changes by more than 0.1 MW after solving each FDS Batch.

AEMO's Network Access Quantity Model simulations have shown that in the unlikely event that this occurs, running more than 100,000 Facility Dispatch Scenarios is also unlikely to achieve convergence. Therefore, AEMO will use the 5th percentile Facility Dispatch Scenario value calculated after solving the maximum number of Facility Dispatch Scenarios permitted under paragraph 5.4.8. In the Figure 6 example, the 5th percentile Facility Dispatch Scenario value is 83.000 MW.

Figure 6 Where the Network Access Quantity Model does not converge


Solve 1
Solve 2
Solve 3
Solve 4
Solve 5
Solve 6
Solve 7
Solve 8
120
100
80
60
40
20
0
MW
Individual FDS Outcome
5th percentile
82.200 MW
83.100 MW
82.300 MW
82.500 MW
82.350 MW
82.600 MW
82.800 MW
83.000 MW
Not converged after 100,000 FDS
0
10000
20000
30000
40000
50000
60000
70000
80000
90000
100000
FDS Batch 1
FDS Batch 2
FDS Batch 3
FDS Batch 4
FDS Batch 5
FDS Batch 6
FDS Batch 7
FDS Batch 8
Facility Dispatch Scenarios

6. Determining Network Access Quantities if the sum of NAQ Entities' NAQ Ceilings is less than or equal to Peak Demand

6.1.1. When prioritising and determining Network Access Quantities under clause 4.15 and Appendix 3 of the WEM Rules, for each Prioritisation Step, if the sum of the NAQ Ceilings associated with NAQ Entities assessed under the relevant Prioritisation Step is less than or equal to Peak Demand (a shortfall), AEMO will:

(a) determine a Facility Dispatch Scenario for the Prioritisation Step in accordance with paragraph 6.2; and

(b) determine the NAQ Result for each NAQ Entity for the Prioritisation Step in accordance with paragraph 6.3.

6.2. Facility Dispatch Scenarios

6.2.1. AEMO will create one Facility Dispatch Scenario for each Prioritisation Step, which includes all NAQ Entities assessed under the relevant Prioritisation Step.

6.2.2. The Initial Dispatch Value for each NAQ Entity must equal the NAQ Ceiling for that NAQ Entity.

6.2.3. AEMO will create a unique identifier for the Facility Dispatch Scenario created under paragraph 6.2.1, in accordance with paragraph 5.2.3.

6.3. Network Access Quantity Model

6.3.1. The Network Access Quantity Model must consider:

(a) the relevant NAQ Entity Parameters for that Prioritisation Step;

(b) the relevant Facility Dispatch Scenario for that Prioritisation Step; and

(c) relevant RCM Constraint Equations.

6.3.2. In accordance with the principles in clause 4.15.9(a), the objective of a solve by the Network Access Quantity Model is to minimise the total change between the NAQ Entities' Initial Dispatch Value and Final Dispatch Value.

6.3.3. The Network Access Quantity Model will solve the Facility Dispatch Scenario under paragraph 6.3.1(b), subject to the inputs under paragraph 6.3.1(a) and 6.3.1(c) for each required Prioritisation Step, adjusting the NAQ Entities' values (subject to the requirements in paragraph 6.3.4, 6.3.5 and 6.3.6), to determine a Final Dispatch Value for each NAQ Entity.

6.3.4. Subject to paragraph 6.3.5, during the solve of the Facility Dispatch Scenario:

(a) all RCM Constraint Equations must be satisfied;

(b) if a NAQ Entity's Initial Dispatch Value is above the NAQ Floor, the NAQ Entity's Final Dispatch Value cannot be dispatched below the NAQ Floor;

(c) if the NAQ Entity's Initial Dispatch Value is below the NAQ Floor, the NAQ Entity's Final Dispatch Value cannot be dispatched below the Initial Dispatch Value;

(d) the Final Dispatch Value must be within the NAQ Entity's Possible Dispatch Range; and

(e) the Final Dispatch Value of a Non-Scheduled Facility must equal the NAQ Ceiling.

6.3.5. During the solve of a Facility Dispatch Scenario, if AEMO determines that there is an Overconstrained Scenario, paragraphs 6.3.4(b) and 6.3.4(c)do not apply, and:

(a) if a NAQ Entity's Initial Dispatch Value is above the NAQ Floor, the NAQ Entity's Final Dispatch Value may be dispatched below the NAQ Floor;

(b) if the NAQ Entity's Initial Dispatch Value is below the NAQ Floor, the NAQ Entity's Final Dispatch Value may be dispatched below the Initial Dispatch Value.

6.3.6. Subject to the requirements in paragraph 6.3.4, the Network Access Quantity Model will adjust the Final Dispatch Values in proportion to the Initial Dispatch Values of all NAQ Entities with the same coefficient ('tie-break logic'), where:

(a) two or more NAQ Entities have the same coefficient (measure of relative impact) in a RCM Constraint Equation; and

(b) the Network Access Quantity Model is required to adjust the Final Dispatch Values to solve the Facility Dispatch Scenario.

6.3.7. For the purposes of paragraph 6, AEMO will determine an Individual FDS Outcome for each NAQ Entity for the Facility Dispatch Scenario in accordance with paragraph 6.3.8.

6.3.8. Where the Final Dispatch Value:

(a) equals the Initial Dispatch Value, the Individual FDS Outcome is the NAQ Ceiling;

(b) is less than the Initial Dispatch Value and the NAQ Entity's total Network cost contribution is negative, the Individual FDS Outcome is the Final Dispatch Value;

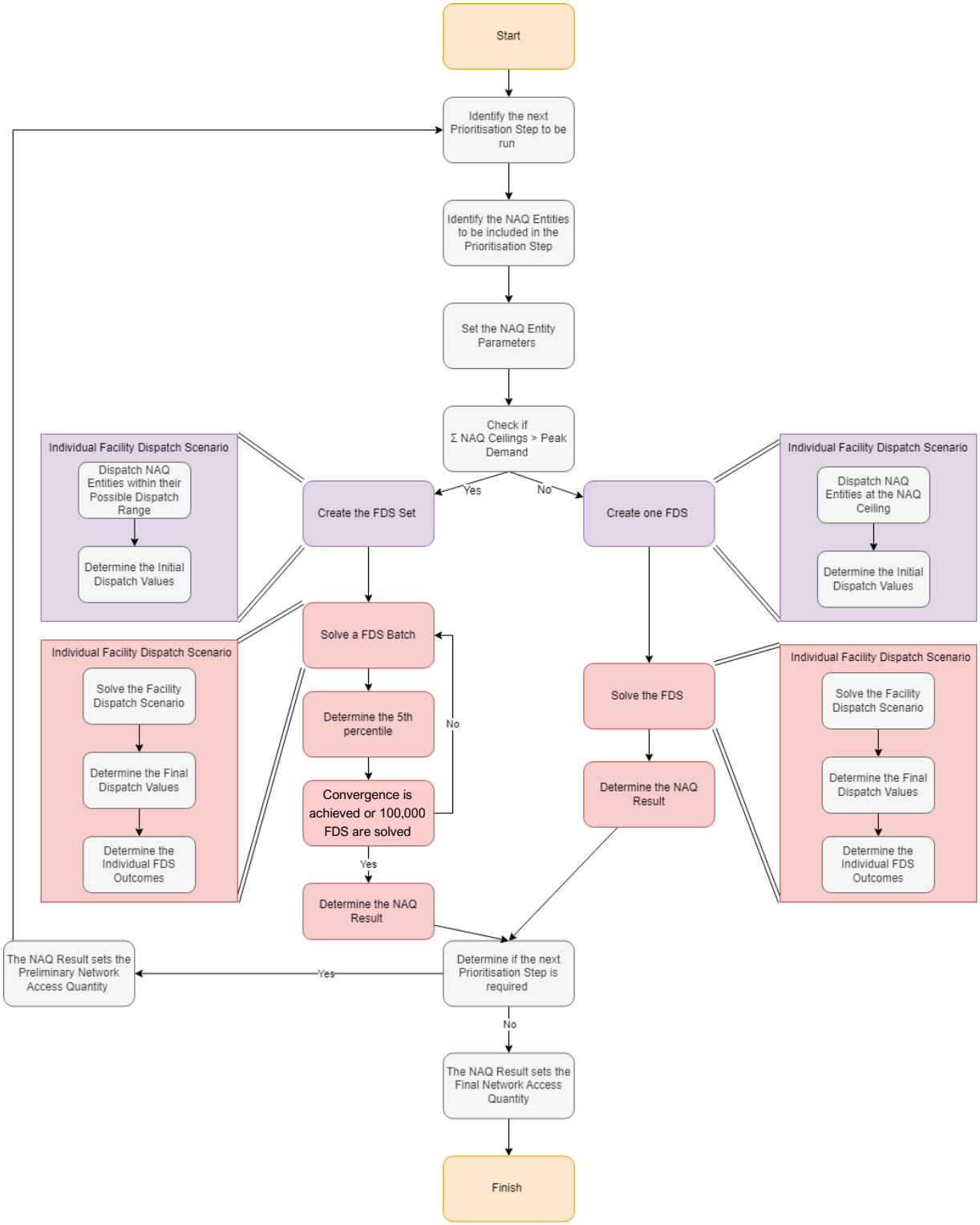
(c) is less than the Initial Dispatch Value and the NAQ Entity's total Network cost contribution is either positive or neutral, the Individual FDS Outcome is the NAQ Ceiling; and

(d) is greater than the Initial Dispatch Value, the Individual FDS Outcome is the NAQ Ceiling.

6.3.9. AEMO will determine a NAQ Result for each NAQ Entity for each Prioritisation Step.

6.3.10. The NAQ Result must equal the Individual FDS Outcome, unless the Individual FDS Outcome is below the NAQ Floor, in which case, the NAQ Result equals the NAQ Floor.

Figure 7 Network Access Quantity process flowchart[1]



[1] Excludes additional processes relating to Early Certified Reserve Capacity.

7. Information requests

7.1.1. For the purposes of clause 4.15.17(e), Market Participants and Network Operators must provide all information required under AEMO's WEM Procedures and in the format specified under those WEM Procedures for the purposes of operating the Network Access Quantity Model and determining Network Access Quantities for Facilities under Appendix 3 of the WEM Rules.

8. Assignment of Network Access Quantities

8.1.1. For all Facilities that are not Early CRC Facilities, the NAQ Result sets the:

(a) Preliminary Network Access Quantity of a NAQ Entity for all Prioritisation Steps which are not the final Prioritisation Step; and

(b) Final Network Access Quantity of a NAQ Entity for the final Prioritisation Step required.

9. Notifications regarding Network Access Quantities

9.1.1. In accordance with clause 4.15.11, AEMO will notify Market Participants of the Network Access Quantity determined for each Facility by the date and time specified in clause 4.1.16A. The notification to Market Participants may be provided through WEMS or by another means determined by AEMO.

10. Publication of information

10.1.1. In accordance with clauses 4.15.16 and 4.28C.7D, AEMO must publish the following information on the WEM Website by the date and time specified in clause 4.1.16A(d) for the relevant Reserve Capacity Cycle:

(a) the Network Access Quantity Model Inputs;

(b) the Network Access Quantity determined for each Facility under paragraph 8.1.1(b) or 11.2.3(b);

(c) the Indicative Network Access Quantity or revised Indicative Network Access Quantity determined for each Facility under paragraph 11.2.1; and

(d) the Highest Network Access Quantity.

10.1.2. AEMO must publish the following Network Access Quantity Model Inputs in accordance with paragraph 10.1.1(a):

(a) List of NAQ Entities included in each required Prioritisation Step.

(b) For each NAQ Entity:

(i) the Facility Class and Facility Technology Type

(ii) Capability Class

(iii) Minimum Capacity Credits Quantity of a Proposed Status NAQ Entity

(iv) Reserve Capacity Status

(v) for each Prioritisation Step, the NAQ Entity Parameters

(c) Whether a NAQ Entity is a Candidate Fixed Price Facility.

(d) Whether a NAQ Entity is a Network Augmentation Funding Facility.

10.1.3. AEMO must publish the information listed under paragraph 10.1.1, excluding information mentioned in paragraphs 10.1.5 and 10.1.6, on the WEM Website in the format of a csv file or spreadsheet.

10.1.4. AEMO may publish the Network Access Quantity Model outcomes on the WEM Website by the date and time specified in clause 4.1.16A(d) for the relevant Reserve Capacity Cycle, which may include, for each NAQ Entity for each Prioritisation Step the:

(a) Initial Dispatch Value;

(b) Final Dispatch Value;

(c) Individual FDS Outcome; and

(d) 5th percentile value.

10.1.5. AEMO will publish RCM Limit Advice in accordance with the WEM Procedure: RCM Limit Advice Requirements.

10.1.6. AEMO will publish the RCM Constraint Equations in accordance with the WEM Procedure: RCM Constraint Formulation.

11. Early Certified Reserve Capacity

11.1. NAQ Floor and NAQ Ceiling

11.1.1. The NAQ Floor of a NAQ Entity that is a new Early CRC Facility, which has not been assigned either a Preliminary Network Access Quantity or an Indicative Network Access Quantity in a previous Reserve Capacity Cycle, equals:

(a) the Preliminary Network Access Quantity determined in the previous Prioritisation Step; or

(b) zero, if:

(i) the NAQ Entity was not included in the previous Prioritisation Step; or

(ii) the NAQ Entity was assigned an Indicative Network Access Quantity in the previous Prioritisation Step.

11.1.2. The NAQ Ceiling of a NAQ Entity that is a new Early CRC Facility, which has not been assigned either a Preliminary Network Access Quantity or an Indicative Network Access Quantity in a previous Reserve Capacity Cycle, for each Prioritisation Step is the quantity of Early Certified Reserve Capacity assigned.

11.1.3. The NAQ Floor of an Indicative NAQ Facility, for each Prioritisation Step is zero.

11.1.4. The NAQ Ceiling of an Indicative NAQ Facility equals:

(a) the minimum of the Indicative Network Access Quantity and the Early Certified Reserve Capacity, for the first Prioritisation Step of Part A or Part B Appendix 3 of the WEM Rules for the Reserve Capacity Cycle; or

(b) the assigned quantity of Early Certified Reserve Capacity for all subsequent Prioritisation Steps.

11.1.5. The NAQ Floor of a NAQ Entity, which is both a Early CRC Facility and a NAQ Facility, equals:

(a) zero, if it is the first Prioritisation Step of Part A or Part B of Appendix 3 of the WEM Rules for the Reserve Capacity Cycle; or

(b) the Preliminary Network Access Quantity determined in the previous Prioritisation Step.

11.1.6. The NAQ Ceiling of a NAQ Entity, which is both an Early CRC Facility and a NAQ Facility, equals:

(a) the minimum of the Indicative Network Access Quantity and the Early Certified Reserve Capacity, for the first Prioritisation Step of Part A or Part B of Appendix 3 of the WEM Rules for the Reserve Capacity Cycle; or

(b) the assigned quantity of Early Certified Reserve Capacity for all subsequent Prioritisation Steps.

11.1.7. The NAQ Ceiling of a NAQ Entity, which is an Early CRC Facility, a NAQ Facility and a Network Augmentation Funding Facility, equals:

(a) the minimum of the Preliminary Network Access Quantity determined in a previous Reserve Capacity Cycle and the Early Certified Reserve Capacity, for the first Prioritisation Step of Part A or Part B of Appendix 3 of the WEM Rules for the Reserve Capacity Cycle; or

(b) the assigned quantity of Early Certified Reserve Capacity for all subsequent Prioritisation Steps.

11.2. Assignment and notification of Network Access Quantities

11.2.1. In accordance with clause 4.28C.7A, clause 4.28C.7AA and Appendix 3 of the WEM Rules, the NAQ Result of an Early CRC Facility, which is not a NAQ Facility or a Network Augmentation Funding Facility, sets the Indicative Network Access Quantity.

11.2.2. The NAQ Result for an Early CRC Facility, which is also a Network Augmentation Funding Facility, but not a NAQ Facility, sets the Preliminary Network Access Quantity.

11.2.3. The NAQ Result for an Early CRC Facility, which is also a NAQ Facility, sets the:

(a) Preliminary Network Access Quantity for all Prioritisation Steps, excluding the final Prioritisation Step in Part A or Part B of Appendix 3 of the WEM Rules; and

(b) Final Network Access Quantity for the final Prioritisation Step required.

11.2.4. AEMO will provide the notification required under clauses 4.28C.7B and 4.28C.7C with respect to the Indicative Network Access Quantity or revised Indicative Network Access Quantity, as applicable, determined for each Early CRC Facility, through WEMS or by another means determined by AEMO.

11.2.5. In accordance with clause 4.28C.8A, if a Market Participant does not comply with clause 4.28C.8, the Indicative Network Access Quantity will lapse, and the Facility will not be considered an Early CRC Facility or an Indicative NAQ Facility for the purposes of Appendix 3 of the WEM Rules in any subsequent Reserve Capacity Cycles.

E[M] Early Certified Reserve Capacity and Indicative NAQ Facility example

Below is an example of an Early CRC Facility, which is not a Network Augmentation Funding Facility. Note: the scenario below assumes the normal timeframes from clause 4.1 and assumes Part A of Appendix 3 of the WEM Rules is followed.

Scenario

A Market Participant applies for Early Certified Reserve Capacity for a Facility in January 2024 for the 2026 Reserve Capacity Cycle (2028-29 Capacity Year). The Facility is assigned Early Certified Reserve Capacity in August 2024 as part of the 2024 Certified Reserve Capacity assignment process (see clause 4.28C.7).

Network Access Quantity Model (2024 Reserve Capacity Cycle)

The Facility is included in the Network Access Quantity determination process for the 2024 Reserve Capacity Cycle (which assigns Capacity Credits for the 2026-27 Capacity Year) and is included in the following Prioritisation Step.

Prioritisation Step	NAQ Ceiling	NAQ Floor
10(b) (2028-29 Capacity Year)	Early Certified Reserve Capacity	Zero

The Facility is assigned an Indicative Network Access Quantity in September 2024.

Network Access Quantity Model (2025 Reserve Capacity Cycle)

The Indicative NAQ Facility is included in the Network Access Quantity determination process for the 2025 Reserve Capacity Cycle (which assigns Capacity

Credits for the 2027-28 Capacity Year) and is included in the following Prioritisation Steps (assume Part A Appendix 3 of the WEM Rules).

Prioritisation Step	NAQ Ceiling	NAQ Floor
3A	Minimum (Indicative Network Access Quantity, Early Certified Reserve Capacity)	Zero
3B	Early Certified Reserve Capacity	Zero
3C	Early Certified Reserve Capacity	Zero
4	Early Certified Reserve Capacity	Zero
5*	Early Certified Reserve Capacity	Zero
6*	Early Certified Reserve Capacity	Zero
10(a) (2028-29 Capacity Year)^	Early Certified Reserve Capacity	Zero
10(b) (2028-29 Capacity Year)^	Early Certified Reserve Capacity	Zero
10(a) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Zero
10(b) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Zero

* These steps are only run if required to meet the capacity requirement (as described in Appendix 3 of the WEM Rules)
^These steps are only run if additional Early CRC Facilities apply for either the 2028-29 or 2029-30 Capacity Years.

The Indicative Network Access Quantity may be adjusted in each Prioritisation Step. The previous Indicative Network Access Quantity will be revised to the adjusted Indicative Network Access Quantity determined in the final Prioritisation Step. AEMO will advise the Market Participant of the revised Indicative Network Access Quantity in October 2025. Given an Indicative NAQ Facility is not protected by a NAQ Floor, the adjusted Indicative Network Access Quantity may be lower than what was assigned in the 2024 Reserve Capacity Cycle.

Network Access Quantity Model (2026 Reserve Capacity Cycle)

The Early CRC Facility is now considered a NAQ Facility, as this is the Reserve Capacity Cycle in which the Facility will first deliver Reserve Capacity (no longer referred to as an Indicative NAQ Facility). The Facility is included in the Network Access Quantity determination process for the 2026 Reserve Capacity Cycle (which assigns Capacity Credits for the 2028-29 Capacity Year) and is included in the following Prioritisation Steps (assume Part A Appendix 3 of the WEM Rules).

Prioritisation Step	NAQ Ceiling	NAQ Floor
3A	Minimum (Indicative Network Access Quantity, Early Certified Reserve Capacity)	Zero
3B	Early Certified Reserve Capacity	Preliminary NAQ
3C	Early Certified Reserve Capacity	Preliminary NAQ

4	Early Certified Reserve Capacity	Preliminary NAQ
5*	Early Certified Reserve Capacity	Preliminary NAQ
6*	Early Certified Reserve Capacity	Preliminary NAQ
10(a) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(b) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(a) (2030-31 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(b) (2030-31 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ

* These steps are only run if required to meet the capacity requirement (as described in Appendix 3 of the WEM Rules).
^These steps are only run if additional Early CRC Facilities apply for either the 2029-30 or 2030-31 Capacity Years.

The Preliminary Network Access Quantity is determined in the first Prioritisation Step and may be adjusted but cannot be reduced in subsequent Prioritisation Steps. The Facility is assigned a Final Network Access Quantity based on the Preliminary Network Access Quantity achieved in the final Prioritisation Step. The Facility is assigned Capacity Credits based on the Final Network Access Quantity. AEMO will advise the Market Participant of the assignment of Capacity Credits in September 2026.

E[M1] Early Certified Reserve Capacity and Network Augmentation Funding Facility example

Below is an example of an Early CRC Facility, which is also a Network Augmentation Funding Facility. Note: the scenario below assumes the normal timeframes from clause 4.1 and assumes Part A of Appendix 3 of the WEM Rules is followed.

Scenario

A Market Participant applies for Early Certified Reserve Capacity for a Facility in January 2024 for the 2026 Reserve Capacity Cycle (2028-29 Capacity Year). The Facility meets the requirements of a Network Augmentation Funding Facility. The Facility is assigned Early Certified Reserve Capacity in August 2024 as part of the 2024 Certified Reserve Capacity assignment process (see clause 4.28C.7).

Network Access Quantity Model (2024 Reserve Capacity Cycle)

The Facility is included in the Network Access Quantity determination process for the 2024 Reserve Capacity Cycle (which assigns Capacity Credits for the 2026-27 Capacity Year) and is included in the following Prioritisation Steps with the applicable Constraint Set, which reflects the Network Augmentation Works.

Prioritisation Step	NAQ Ceiling	NAQ Floor
10(a) (2028-29 Capacity Year)	Early Certified Reserve Capacity	Zero
10(b) (2028-29 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ

^This step is only run if an additional Early CRC Facility, which is not a Network Augmentation Funding Facility, applies for the 2028-29 Capacity Year.

The Facility is assigned a Preliminary Network Access Quantity in September 2024.

Network Access Quantity Model (2025 Reserve Capacity Cycle)

The Facility is not included in the Network Access Quantity determination process for the 2025 Reserve Capacity Cycle.

Network Access Quantity Model (2026 Reserve Capacity Cycle)

The Early CRC Facility is now considered a NAQ Facility, as this is the Reserve Capacity Cycle in which the Facility will first deliver Reserve Capacity. The Facility is included in the Network Access Quantity determination process for the 2026 Reserve Capacity Cycle (which assigns Capacity Credits for the 2028-29 Capacity Year) and is included in the following Prioritisation Steps (assume Part A Appendix 3 of the WEM Rules).

Prioritisation Step	NAQ Ceiling	NAQ Floor
3A	Minimum (Preliminary NAQ, Early Certified Reserve Capacity)	Zero
3B	Early Certified Reserve Capacity	Preliminary NAQ
3C	Early Certified Reserve Capacity	Preliminary NAQ
4	Early Certified Reserve Capacity	Preliminary NAQ
5*	Early Certified Reserve Capacity	Preliminary NAQ
6*	Early Certified Reserve Capacity	Preliminary NAQ
10(a) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(b) (2029-30 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(a) (2030-31 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ
10(b) (2030-31 Capacity Year)^	Early Certified Reserve Capacity	Preliminary NAQ

* These steps are only run if required to meet the capacity requirement (as described in Appendix 3 of the WEM Rules).
^These steps are only run if additional Early CRC Facilities apply for either the 2029-30 or 2030-31 Capacity Years.

The Preliminary Network Access Quantity is determined in the first Prioritisation Step and may be adjusted, but cannot be reduced, in subsequent Prioritisation Steps. The Facility is assigned a Final Network Access Quantity based on the Preliminary Network Access Quantity achieved in the final Prioritisation Step. The Facility is assigned Capacity Credits based on the Final Network Access Quantity. AEMO will advise the Market Participant of the assignment of Capacity Credits in September 2026.

Appendix A. Relevant clauses of the WEM Rules

Table 13 details:

(a) the head of power clauses in the WEM Rules under which the Procedure has been developed; and

(b) each clause in the WEM Rules requiring an obligation, process or requirement be documented in a WEM Procedure, where the obligation, process or requirement has been documented in this Procedure.

Table 13 Relevant clauses of the WEM Rules

Clause
4.15.17(a)
4.15.17(b)
4.15.17(c)
4.15.17(d)
4.15.17(e)
4.15.17(f)
4.28C.15