WEM Individual Reserve Capacity Requirement (IRCR) Calculations

Australian Energy Market Operator

Version Control

A major version change occurs when the WEM Rules or WEM Procedures require changes to the equations from a particular Trading Day onward.

A minor version change may occur for editorial changes, manifest errors or implementation changes that will apply to the same Trading Day period as dictated by the major version.

Version	Changes	Author(s)	Approver
1.0	Original publication effective 1 October 2017	AEMO	Manager, WA Market Operations
1.1	Consequential changes to TCNIA, TDNIA and NIMG in accordance with RC_2018_01 effective 1 October 2018	AEMO	Manager, WA Market Operations
1.2	Consequential changes in accordance with RC_2017_06 effective 1 June 2019	AEMO	Manager, WA Market Operations
1.3	Consequential changes to RR in accordance with RC Pricing Reforms 2019 effective 1 October 2019	AEMO	Manager, WA Market Operations
2.0	Publication consistent with WEM Reform Rules effective 1 October 2023	Lisa Laurie	Nicholas Nielsen

* Prior to version 2.0 the calculations were documented in a simplified spreadsheet rather than with set notation and mathematical equations.

Contents

1 Introduction

The purpose of this document is to:

- outline WEM Individual Reserve Capacity Requirement calculations as equations

- provide additional context or structure equations in such a way that assists in understanding

- outline the formulation of a system that could be used to perform both settlement and prudential functions

This document defines many variables that are used in equations. Each variable will have the following attributes stated to assist in understanding:

Attribute	Explanation	Example
Variable	The name of the variable	$STEMP\_G\_I$
Units	$\$$, $\{\}$, MW, MWh, $/MW, $/MWh, Flag, °C, MW/min, min	$/MWh
Scope (SC)	Tranche (T), Channel (CH), NMI (N), Contract(C), SESSM Award (SA), Essential System Service (E), Facility-Essential System Service (FE), Network Contingency (NC), Facility-Network Contingency (FNC), Capacity Credit Allocation (A), Separately Certified Component (SCC), Facility (F), Participant (P), Global (G)	G
Granularity (GR)	Dispatch Interval (DI), Trading Interval (I), Trading Day (D), Trading Week (W*), Trading Month (M), Capacity Year (CY), Financial Year (FY)	I
Rule	WEM Rule reference	6.9.7
Description	A description of the variable	STEM Clearing Price for Trading Interval i
Ref	Either the equation number where it is defined in this document, or 'I' to denote an input	I

* Trading Week granularity will include a numeric suffix that indicates on which day of the week the Trading Week commences on i.e. 0 = Sunday, 1 = Monday, ... 4 = Thursday etc. This suffix will be included where the granularity is used but not in the variable name e.g. $ESTIMATIONFlag\_G\_W(w)$ and not $ESTIMATIONFlag\_G\_W0(w)$.

Granularity has a strict hierarchy: a Capacity Year is comprised of Trading Months which are comprised of Trading Days which are comprised of Trading Intervals which are comprised of Dispatch Intervals. Some variables have no time component, for example, they relate purely to a contract. In this instances the granularity is denoted as X. These hierarchies are represented below:

- $DI \in I \in D \in M \in CY \in X$; or

- $DI \in I \in D \in M \in FY \in X$.

When defining a variable, it will always be defined for its granularity. For example, The variable $CS\_P\_M(p,m)$ is defined for a particular Trading Month m. It will only be defined by variables with a granularity of Trading Month or coarser. However, when the variable is used to define other equations it may be expressed using a granularity argument more fine than its defined granularity, for example $CS\_P\_M(p,i)$. When the variable is expressed like this, it is implicit that it refers to the Trading Month m, in which Trading Interval i falls.

2   Defined Terms, Sets and Associations

Defined terms are used throughout the rules. These defined terms often convey specific information, for example the term Scheduled Generator requires the facility to be registered with AEMO as outlined in the definition. Similarly, some specific calculations only apply, or are interpreted based on these defined terms. In the implementation, these defined terms are often represented as a set of Facilities (or Participants) that meet the definition of the defined term. Furthermore, there are often associations between defined terms within the rules, for example Facilities are associated to participants through registration.

This document defines all sets with the following conventions:

- The definition of each set variable is always Global.

- Subsets are defined by adding a scope argument. For example $SF(p, d)$ represents the subset of $SF(d)$ associated with participant p.

2.1   Participant Sets

Variable	Units	SC	GR	Rule	Description	Ref
MP_M(m)	{}	G	M	11	Set of Market Participants in Trading Month m	I

2.2   Facility Sets

2.2.1   Axiomatic Facility Sets in AEMO systems

Calculations defined in the rules depend on different sets of Facilities. The Facility sets outlined below are considered to be axiomatic, or the base sets, upon which all other sets will be created. These base sets are defined in terms of how AEMO's systems have been created. Sets which are calculated later are often sets of Facilities which are defined in the rules, and in these instances the rule reference is provided.

Variable	Units	SC	GR	Rule	Description	Ref
AGG(d)	{}	G	D		Set of all Aggregated Facilities in Trading Day d	I
NDL_MTR(d)	{}	G	D		Set of Non-Dispatchable Loads with interval meters that are not in WEMS in Trading Day d	I
NMI(d)	{}	G	D		Set of all connection points in Trading Day d	I
WEMS_DSP(d)	{}	G	D		Set of Facilities with a DSP WEMS Type in Trading Day d	I
WEMS_EG(d)	{}	G	D		Set of Facilities in WEMS that serve an Intermittent Load in Trading Day d	I
WEMS_FREG(d)	{}	G	D		Set of Facilities that are registered in WEMS in Trading Day d	I
WEMS_IL(d)	{}	G	D		Set of Facilities with a IL WEMS Type in Trading Day d	I
WEMS_IM(d)	{}	G	D		Set of Facilities with an intermittent load status in WEMS in Trading Day d	I
WEMS_N(d)	{}	G	D		Set of Facilities with a N WEMS Type in Trading Day d	I
WEMS_NDL(d)	{}	G	D		Set of Facilities with a NDL WEMS Type in Trading Day d	I
WEMS_NSF(d)	{}	G	D		Set of Facilities with a NSF WEMS Type in Trading Day d	I
WEMS_SF(d)	{}	G	D		Set of Facilities with a SF WEMS Type in Trading Day d	I
WEMS_SSF(d)	{}	G	D		Set of Facilities with a SSF WEMS Type in Trading Day d	I

2.2.2 Sets of Facility Types and Facility Classes

The following are Facility Technology Types [MR 2.29.1]:

- distribution system (DX)

- transmission system (TX)

- Intermittent Generating System (IG)

- Non-Intermittent Generating System (NIG)

- Electric Storage Resource (ESR)

- Load (LOAD)

The following are Facility Classes [MR 2.29.1A]:

- Network (NTWK)

- Scheduled Facility (SF)

- Semi-Scheduled Facility (SSF)

- Non-Scheduled Facility (NSF)

- Interruptible Load (IRL)

- Demand Side Programme (DSP)

These Facility Technology Types and Facility Classes are defined as follows.

$$DSP(d) = WEMS\_FREG(d) \cap WEMS\_DSP(d) \tag{1}$$

$$SF(d) = WEMS\_FREG(d) \cap WEMS\_SF(d) \tag{2}$$

$$SSF(d) = WEMS\_FREG(d) \cap WEMS\_SSF(d) \tag{3}$$

$$NSF(d) = WEMS\_FREG(d) \cap WEMS\_NSF(d) \tag{4}$$

$$IRL(d) = WEMS\_FREG(d) \cap WEMS\_IL(d) \tag{5}$$

$$NDL\_WEMS(d) = WEMS\_FREG(d) \cap WEMS\_NDL(d) \tag{6}$$

$$NOTIONAL(d) = \{NOTIONAL\} \tag{7}$$

$$NTWK(d) = WEMS\_FREG(d) \cap WEMS\_N(d) \tag{8}$$

Variable	Units	SC	GR	Rule	Description	Ref
DSP(d)	{}	G	D	11	Set of Demand Side Programmes in Trading Day d	(1)
SF(d)	{}	G	D	11	Set of Scheduled Facilities in Trading Day d	(2)
SSF(d)	{}	G	D	11	Set of Semi-Scheduled Facilities in Trading Day d	(3)
NSF(d)	{}	G	D	11	Set of Non-Scheduled Facilities in Trading Day d	(4)
IRL(d)	{}	G	D	11	Set of Interruptible Loads in Trading Day d	(5)
NDL_WEMS(d)	{}	G	D		Set of Non-Dispatchable Loads in WEMS registration in Trading Day d	(6)
NOTIONAL(d)	{}	G	D	11	Set containing the Notional Wholesale Meter	(7)

Variable	Units	SC	GR	Rule	Description	Ref
NTWK(d)	{}	G	D	11	Set of Networks in Trading Day d.	(8)
WEMS_DSP(d)	{}	G	D		Set of Facilities with a DSP WEMS Type in Trading Day d	I
WEMS_FREG(d)	{}	G	D		Set of Facilities that are registered in WEMS in Trading Day d	I
WEMS_IL(d)	{}	G	D		Set of Facilities with a IL WEMS Type in Trading Day d	I
WEMS_N(d)	{}	G	D		Set of Facilities with a N WEMS Type in Trading Day d	I
WEMS_NDL(d)	{}	G	D		Set of Facilities with a NDL WEMS Type in Trading Day d	I
WEMS_NSF(d)	{}	G	D		Set of Facilities with a NSF WEMS Type in Trading Day d	I
WEMS_SF(d)	{}	G	D		Set of Facilities with a SF WEMS Type in Trading Day d	I
WEMS_SSF(d)	{}	G	D		Set of Facilities with a SSF WEMS Type in Trading Day d	I

2.2.3 Other Facility Sets

Additional sets of Facilities are required by the rules and are defined below. Where a Facility is measured by a single interval meter then the Facility is used in the set e.g. $Typical\_REGF(d)$. Where a Facility is measured by more than one interval meter then each interval meter is used in the set e.g. $AGGNMI(d)$.

$$IRCRF(d) = Typical\_NDL(d) \cup NOTIONAL(d) \cup IML(d) \cup AGGNMI(d) \cup (Typical\_REGF \cap \overline{AGG(d)}) \quad (9)$$

$$Typical\_NDL(d) = NDL\_MTR(d) \cup NDL\_WEMSNMI(d) \quad (10)$$

$$NDL(d) = NDL\_WEMS(d) \cup NDL\_MTR(d) \cup NOTIONAL(d) \quad (11)$$

$$IML(d) = ((IRL(d) \cup NDL\_WEMS(d)) \cap WEMS\_IM(d) \quad (12)$$

$$Typical\_REGF(d) = (SF(d) \cup SSF(d) \cup NSF(d)) \cap \overline{EG(i)} \quad (13)$$

$$EG(d) = WEMS\_FREG(d) \cap WEMS\_EG(d) \quad (14)$$

$$NDL\_WEMSNMI(d) = \bigcup_{f \in NDL\_WEMS(d) \cap \overline{IML(d)}} NMI(f, d) \quad (15)$$

$$AGGNMI(d) = \bigcup_{f \in AGG(d)} NMI(f, d) \quad (16)$$

Variable	Units	SC	GR	Rule	Description	Ref
IRCRF(d)	{}	G	D	App 5	Set of Facilities in Trading Day d for which AEMO must determine an Individual Reserve Capacity Requirement	(9)
Typical_NDL(d)	{}	G	D		Set containing NDLs, excluding both the Notional Wholesale Meter and any NDLs that are Intermittent Loads for Trading Day d.	(10)
NDL(d)	{}	G	D	11	Set of Non-Dispatchable Loads in Trading Day d	(11)
IML(d)	{}	G	D	2.30B.1	Set of Loads which have an Intermittent Load component in Trading Day d	(12)

Variable	Units	SC	GR	Rule	Description	Ref
Typical_REGF(d)	{}	G	D		Set containing SFs, SSFs and NSFs, excluding any associated with an Intermittent Load for Trading Day d	(13)
EG(d)	{}	G	D	2.30B.2(a)	Set of Registered Facilities that serve an Intermittent Load locally in Trading Day d	(14)
NDL_WEMSNMI(d)	{}	G	D		Set of connection points which comprise a Non-Dispatchable Load in WEMS registration, excluding any NDLs that are Intermittent Loads in Trading Day d	(15)
AGGNMI(d)	{}	G	D	2.30.5	Set of connection points which comprise an Aggregated Facility in Trading Day d	(16)
AGG(d)	{}	G	D		Set of all Aggregated Facilities in Trading Day d	I
D_M(m)	{}	G	M		Set of Trading Days in Trading Month m	I
IRL(d)	{}	G	D	11	Set of Interruptible Loads in Trading Day d	(5)
NDL_MTR(d)	{}	G	D		Set of Non-Dispatchable Loads with interval meters that are not in WEMS in Trading Day d	I
NDL_WEMS(d)	{}	G	D		Set of Non-Dispatchable Loads in WEMS registration in Trading Day d	(6)
NMI(d)	{}	G	D		Set of all connection points in Trading Day d	I
NOTIONAL(d)	{}	G	D	11	Set containing the Notional Wholesale Meter	(7)
NSF(d)	{}	G	D	11	Set of Non-Scheduled Facilities in Trading Day d	(4)
SF(d)	{}	G	D	11	Set of Scheduled Facilities in Trading Day d	(2)
SSF(d)	{}	G	D	11	Set of Semi-Scheduled Facilities in Trading Day d	(3)
WEMS_EG(d)	{}	G	D		Set of Facilities in WEMS that serve an Intermittent Load in Trading Day d	I
WEMS_FREG(d)	{}	G	D		Set of Facilities that are registered in WEMS in Trading Day d	I
WEMS_IM(d)	{}	G	D		Set of Facilities with an intermittent load status in WEMS in Trading Day d	I

2.2.4 Monthly Facility Sets

Additional monthly sets of Facilities are required by the rules and are defined below.

$$IRCRF\_M(m) = \bigcup_{d \in D\_M(m)} IRCRF(d) \tag{17}$$

$$Legacy\_IML\_M(m) = \bigcup_{d \in D\_M(m)} Legacy\_IML(d) \tag{18}$$

$$Typical\_REGF\_M(m) = \bigcup_{d \in D\_M(m)} Typical\_REGF(d) \tag{19}$$

$$AGG\_M(m) = \bigcup_{d \in D\_M(m)} AGG(d) \tag{20}$$

$$IML\_M(m) = \bigcup_{d \in D\_M(m)} IML(d) \tag{21}$$

$$Typical\_NDL\_M(m) = \bigcup_{d \in D\_M(m)} Typical\_NDL(d) \tag{22}$$

$$AGGNMI\_M(m) = \bigcup_{d \in D\_M(m)} AGGNMI(d) \tag{23}$$

Variable	Units	SC	GR	Rule	Description	Ref
IRCRF_M(m)	{}	G	M	App 5	Set of Facilities in Trading Month m for which AEMO must determine an Individual Reserve Capacity Requirement	(17)
Legacy_IML_M(m)	{}	G	M	1.48.2	Set of Intermittent Loads that were treated by AEMO as an Intermittent Load on the day before New WEM Commencement Day, and continue to retain this status in Trading Month m	(18)
Typical_REGF_M(m)	{}	G	M		Set containing SFs, SSFs and NSFs, excluding any associated with an Intermittent Load in Trading Month m	(19)
AGG_M(m)	{}	G	M		Set of all Aggregated Facilities in Trading Month m	(20)
IML_M(m)	{}	G	M	2.30B.1	Set of Loads which have an Intermittent Load component in Trading Month m	(21)
Typical_NDL_M(m)	{}	G	M		Set containing NDLs, excluding both the Notional Wholesale Meter and any NDLs that are Intermittent Loads in Trading Month m	(22)
AGGNMI_M(m)	{}	G	M	2.30.5	Set of connection points which comprise an Aggregated Facility in Trading Month m	(23)
AGG(d)	{}	G	D		Set of all Aggregated Facilities in Trading Day d	I
AGGNMI(d)	{}	G	D	2.30.5	Set of connection points which comprise an Aggregated Facility in Trading Day d	(16)
D_M(m)	{}	G	M		Set of Trading Days in Trading Month m	I
IML(d)	{}	G	D	2.30B.1	Set of Loads which have an Intermittent Load component in Trading Day d	(12)
IRCRF(d)	{}	G	D	App 5	Set of Facilities in Trading Day d for which AEMO must determine an Individual Reserve Capacity Requirement	(9)
Legacy_IML(d)	{}	G	D	1.48.2	Set of Intermittent Loads that were treated by AEMO as an Intermittent Load on the day before New WEM Commencement Day, and continue to retain this status on Trading Day d	I
Typical_NDL(d)	{}	G	D		Set containing NDLs, excluding both the Notional Wholesale Meter and any NDLs that are Intermittent Loads for Trading Day d.	(10)
Typical_REGF(d)	{}	G	D		Set containing SFs, SSFs and NSFs, excluding any associated with an Intermittent Load for Trading Day d	(13)

2.3 Other Sets

$$NTDLmeters(m) = \{\ f \in IRCRF\_M(m) : TDL\_Flag(f,m) = 0 \text{ and } NewMeter\_Flag(f,m) = 0\ \} \tag{24}$$

$$newNTDLmeters(m) = \{\ f \in IRCRF\_M(m) : TDL\_Flag(f,m) = 0 \text{ and } NewMeter\_Flag(f,m) = 1\ \} \tag{25}$$

$$TDLmeters(m) = \{\ f \in IRCRF\_M(m) : TDL\_Flag(f, m) = 1$$
$$\text{and } (NewMeter\_Flag(f, m) = 0 \text{ or } f = NOTIONAL) \text{ and } OwnershipShare(f, p, m) > 0\ \} \tag{26}$$

$$newTDLmeters(m) \tag{27}$$
$$= \{\ f \in IRCRF\_M(m) : TDL\_Flag(f, m) = 1 \text{ and } (NewMeter\_Flag(f, m) = 1 \text{ or } f = NOTIONAL)\ \}$$

$$NMmeters(m) \tag{28}$$
$$= \{\ f \in IRCRF\_M(m) : TDL\_Flag(f, m) = 1 \text{ and } NewMeter\_Flag(f, m) = 1 \text{ and } ExNotional\_Flag(f, m) = 1)\ \}$$

$$IMLmeters(m) = \{\ f \in Legacy\_IML\_M(m) : ILMAXLD(f, m) \neq NULL\ \} \tag{29}$$

Variable	Units	SC	GR	Rule	Description	Ref
NTDLmeters(m)	{}	G	M		Set of all interval meters measuring Non-Temperature Dependent Load in Trading Month m	(24)
newNTDLmeters(m)	{}	G	M		Set of all new interval meters measuring Non-Temperature Dependent Load in Trading Month m	(25)
TDLmeters(m)	{}	G	M		Set of all interval meters measuring Temperature Dependent Load in Trading Month m	(26)
newTDLmeters(m)	{}	G	M		Set of all new interval meters measuring Temperature Dependent Load in Trading Month m	(27)
NMmeters(m)	{}	G	M		Set of all new interval meters measuring consumption in Trading Month m that were previously measured by the Notional Wholesale Meter in the preceding Capacity Year's Hot Season	(28)
IMLmeters(m)	{}	G	M	App 4A	Set of Intermittent Loads in Trading Month m for which AEMO must determine an Individual Intermittent Load Reserve Capacity Requirement	(29)
ExNotional_Flag(f, m)	Flag	F	M	App 5 Step 7	Flag that is 1 if the interval meter that measures Facility f in Trading Month m was previously measured by the Notional Wholesale Meter, and 0 otherwise	(37)
ILMAXLD(f, m)	{}	F	M	clause 4.28.8(c)	Nominated load level for Intermittent Load f to apply for Trading Month m	I
IRCRF_M(m)	{}	G	M	App 5	Set of Facilities in Trading Month m for which AEMO must determine an Individual Reserve Capacity Requirement	(17)
Legacy_IML_M(m)	{}	G	M	1.48.2	Set of Intermittent Loads that were treated by AEMO as an Intermittent Load on the day before New WEM Commencement Day, and continue to retain this status in Trading Month m	(18)
NewMeter_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f was not registered with AEMO for all of the 12 Peak SWIS Trading Intervals for the preceding Capacity Year of Trading Month m (considered 'New'), and 0 otherwise (considered 'Existing')	(36)
OwnershipShare(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Facility f was registered to Market Participant p	(71)

Variable	Units	SC	GR	Rule	Description	Ref
TDL_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f measures Temperature Dependent Load (considered 'TDL') in Trading Month m, and 0 otherwise (considered Non-Temperature Dependent Load or 'NTDL')	I

3 Preliminary Calculations

3.1 Invocation

The following table outlines the invocation for the high-level calculations.

Variable	Scope Set	Granularity Invocation
$MEDIAN4(f, m)$	$\forall f \in IRCRF\_M(m)$	M
$MEDIAN12(f, cy)$	$\forall f \in IRCRF\_M(m)$	M
$NewMeter\_Flag(f, m)$	$\forall f \in IRCRF\_M(m)$	M
$ExNotional\_Flag(f, m)$	$\forall f \in IRCRF\_M(m)$	M

3.2 Median Values

The median value of the metered consumption for an interval meter during the Peak SWIS Trading Intervals is fundamental to the Individual Reserve Capacity Requirement (IRCR) calculations.

Median values of the metered consumption are calculated for interval meters measuring:

- Non-Dispatchable Loads (excluding those represented by the Notional Wholesale Meter);

- Notional Wholesale Meter;

- A Facility containing an Intermittent Load, that is and continues to be deemed an Intermittent Load under clause 1.48.2;

- A Facility containing an Intermittent Load, for which an application was approved under clause 2.30B.6 on or after the New WEM Commencement Day;

- A Scheduled Facility, Semi-Scheduled Facility or Non-Scheduled Facility not containing an Intermittent Load; and

- An Aggregated Facility.

In order to determine these median values the following information is required:

- Peak SWIS Trading Intervals;

- Sent Out Metered Schedule quantities;

- Directions issued under clause 7.7.5 in respect of an Electric Storage Resource; and

- Facility category.

Where a Facility is measured by a single interval meter then the Sent Out Metered Schedule value for the Facility is used e.g. $Typical\_REGF\_M(m)$ and $IML\_M(m)$. Where a Facility is measured by more than one interval meter, then the Sent Out Metered Schedule for each interval meter is used e.g. $Typical\_NDL\_M(m)$ and $AGGNMI\_M(m)$.

$MEDIAN4(f, m)$ (30)

$$
= \begin{cases}
\underset{i \in 4PEAKS(m-3)}{Median}\left(MCSOMS\_F\_I(f, i)\right) & \text{if } f \in NOTIONAL(m) \cup (Typical\_REGF\_M(m) \cap \overline{AGG\_M(m)}) \\
\underset{i \in 4PEAKS(m-3)}{Median}\left(MCSOMSEL\_F\_I(f, i)\right) & \text{else if } f \in IML\_M(m) \\
\underset{i \in 4PEAKS(m-3)}{Median}\left(MCSOMS\_N\_I(f, i)\right) & \text{else if } f \in Typical\_NDL\_M(m) \cup AGGNMI\_M(m) \\
0 & \text{otherwise}
\end{cases}
$$

$MEDIAN12(f, m)$ (31)

$$
= \begin{cases}
\underset{i \in 12PEAKS(CY(m)-1)}{Median}\left(MCSOMS\_F\_I(f, i)\right) & \text{if } f \in NOTIONAL(m) \cup (Typical\_REGF\_M(m) \cap \overline{AGG\_M(m)}) \\
\underset{i \in 12PEAKS(CY(m)-1)}{Median}\left(MCSOMSEL\_F\_I(f, i)\right) & \text{else if } f \in IML\_M(m) \\
\underset{i \in 12PEAKS(CY(m)-1)}{Median}\left(MCSOMS\_N\_I(f, i)\right) & \text{else if } f \in Typical\_NDL\_M(m) \cup AGGNMI\_M(m) \\
0 & \text{otherwise}
\end{cases}
$$

$$MCSOMS\_F\_I(f,i) = \begin{cases} (-1 \times Min(0, SOMS\_F\_I(f,i)) & \text{if } ESRDirectionFlag\_F\_I(f,i) = 0 \\ 0 & \text{otherwise} \end{cases} \quad (32)$$

$$MCSOMSEL\_F\_I(f,i) = \begin{cases} (-1 \times Min(0, SOMSEL\_F\_I(f,i)) & \text{if } ESRDirectionFlag\_F\_I(f,i) = 0 \\ 0 & \text{otherwise} \end{cases} \quad (33)$$

$$MCSOMS\_N\_I(f,i) = \begin{cases} (-1 \times Min(0, MeterData\_N\_I(f,i)) & \text{if } ESRDirectionFlag\_F\_I(f,i) = 0 \\ 0 & \text{otherwise} \end{cases} \quad (34)$$

$$ESRDirectionFlag\_F\_I(f,i) = \begin{cases} 1 & \text{if } \exists di \in DI(i) : ESRDirectionFlag\_F\_DI(f,di) = 1 \\ 0 & \text{otherwise} \end{cases} \quad (35)$$

Variable	Units	SC	GR	Rule	Description	Ref
MEDIAN4(f, m)	MWh	F	M	App 5	Median value of the metered consumption during the 4 Peak SWIS Trading Intervals for Facility f in Trading Month m-3	(30)
MEDIAN12(f, m)	MWh	F	M	App 5	Median value of the metered consumption during the 12 Peak SWIS Trading Intervals for Facility f of the preceding Capacity Year of Trading Month m	(31)
MCSOMS_F_I(f, i)	MWh	F	I	App 5	Metered consumption for Facility f in Trading Interval i	(32)
MCSOMSEL_F_I(f, i)	MWh	F	I	App 5	Metered consumption for the embedded load associated with Facility f in Trading Interval i	(33)
MCSOMS_N_I(n, i)	MWh	N	I		Metered consumption for NMI n in Trading Interval i	(34)
ESRDirectionFlag_F_I(f, i)	Flag	F	D	App 5	Flag that is 1 if AEMO issued a direction under clause 7.7.5 in respect of an Electric Storage Resource f in Trading Interval i, and 0 otherwise	(35)
4PEAKS(m)	{}	G	M		Set of 4 Peak SWIS Trading Intervals in Trading Month m	I
12PEAKS(cy)	{}	G	CY		Set of 12 Peak SWIS Trading Intervals in Capacity Year cy	I
AGG_M(m)	{}	G	M	2.30.5	Set of accepted Aggregated Facilities in Trading Month m	(20)
AGGNMI_M(m)	{}	G	M	2.30.5	Set of connection points which comprise an Aggregated Facility in Trading Month m	(23)
DI(i)	{}	G	I		Set of Dispatch Intervals in Trading Interval i	I
ESRDirectionFlag_F_DI(f, di)	Flag	F	D	7.7.5	Flag that is 1 if AEMO issued a direction under clause 7.7.5 in respect of an Electric Storage Resource f in Dispatch Interval di, and 0 otherwise	I
IML_M(m)	{}	G	M	11	Set of Loads which have an Intermittent Load component in Trading Month m	(21)
MeterData_N_I(n, i)	MWh	N	I		Non-loss adjusted energy quantity for NMI n in Trading Interval i	I
NOTIONAL(m)	{}	G	M	11	Set containing the Notional Wholesale Meter in Trading Month m	(7)
SOMS_F_I(f, i)	MWh	F	I		Sent Out Metered Schedule for Facility f in Trading Interval i	I

Variable	Units	SC	GR	Rule	Description	Ref
SOMSEL_F_I(f, i)	MWh	F	I		Sent Out Metered Schedule for the embedded load associated with Facility f in Trading Interval i	I
Typical_NDL_M(m)	{}	G	M	11	Set containing NDLs, excluding both the Notional Wholesale Meter and any NDLs that are Intermittent Loads for Trading Month m	(22)
Typical_REGF_M(m)	{}	G	M		Set containing SFs, SSFs and NSFs, excluding any associated with an Intermittent Load in Trading Month m	(19)

3.3 New Meters

AEMO must determine the interval meters that were registered with AEMO for all of the 12 Peak SWIS Trading Intervals. All other interval meters are considered New Meters. The function Min(12PEAKS(CY(m)-1)) is used to represent the earliest of the 12 Peak SWIS Trading Intervals in the preceding Capacity Year to Trading Month m.

$$
NewMeter\_Flag(f,m) = \begin{cases}
0 & \text{if } f \in NOTIONAL(m) \cup (Typical\_REGF\_M(m) \cap \overline{AGG\_M(m)}) \\
& \text{and } SOMSNullFlag\_F\_I(f, Min(12PEAKS(CY(m)-1))) = 0 \\
\\
0 & \text{else if } f \in IML\_M(m) \\
& \text{and } SOMSELNullFlag\_F\_I(f, Min(12PEAKS(CY(m)-1))) = 0 \\
\\
0 & \text{else if } f \in Typical\_NDL\_M(m) \cup AGGNMI\_M(m) \\
& \text{and } MeterDataNullFlag\_N\_I(f, Min(12PEAKS(CY(m)-1))) = 0 \\
\\
1 & \text{otherwise}
\end{cases}
\tag{36}
$$

Variable	Units	SC	GR	Rule	Description	Ref
NewMeter_Flag(f, m)	Flag	F	M	App 5 Step 2, 3, 5 and 11	Flag that is 1 if the Facility f was not registered with AEMO for all of the 12 Peak SWIS Trading Intervals for the preceding Capacity Year of Trading Month m (considered 'New'), and 0 otherwise (considered 'Existing')	(36)
12PEAKS(cy)	{}	G	CY		Set of 12 Peak SWIS Trading Intervals in Capacity Year cy	I
AGG_M(m)	{}	G	M	2.30.5	Set of accepted Aggregated Facilities in Trading Month m	(20)
AGGNMI_M(m)	{}	G	M	2.30.5	Set of connection points which comprise an Aggregated Facility in Trading Month m	(23)
MeterDataNullFlag_N_I(n, i)	Flag	N	I		Flag that is 1 when the Non-loss adjusted energy quantity is unavailable for NMI n in Trading Interval i, and 0 otherwise	I
SOMSNullFlag_F_I(f, i)	Flag	F	I		Flag that is 1 when the Sent Out Metered Schedule is unavailable for Facility f in Trading Interval i, and 0 otherwise	I
SOMSELNullFlag_F_I(f, i)	Flag	F	I		Flag that is 1 when the Sent Out Metered Schedule is unavailable for the embedded load associated with Facility f in Trading Interval i, and 0 otherwise	I

Variable	Units	SC	GR	Rule	Description	Ref
Typical_NDL_M(m)	{}	G	M	11	Set containing NDLs, excluding both the Notional Wholesale Meter and any NDLs that are Intermittent Loads for Trading Month m	(22)
Typical_REGF_M(m)	{}	G	M		Set containing SFs, SSFs and NSFs, excluding any associated with an Intermittent Load in Trading Month m	(19)

3.4 Previous Notional Meters

AEMO must determine the interval meters that were previously non-interval meters that were measured by the Notional Wholesale Meter during the preceding Hot Season.

$$
\begin{aligned}
&ExNotional\_Flag(f, m) \\
&= \begin{cases} 1 & \text{for NewMeter\_Flag(f, m) =1 and } f \in NDL\_MTR\_MIN12PEAKS(WPGENER, m) \\ 0 & \text{otherwise} \end{cases}
\end{aligned} \tag{37}
$$

Variable	Units	SC	GR	Rule	Description	Ref
ExNotional_Flag(f, m)	Flag	F	M	App 5 Step 7	Flag that is 1 if the interval meter that measures Facility f in Trading Month m was previously measured by the Notional Wholesale Meter, and 0 otherwise	(37)
NDL_MTR_MIN12PEAKS(d){}		G	D		Set of Non-Dispatchable Loads with interval meters that are not in WEMS in the earliest 12 Peak SWIS Trading Interval for the preceding Capacity Year of Trading Month m	I
NewMeter_Flag(f, m)	Flag	F	M	App 5 Step 2, 3, 5 and 11	Flag that is 1 if the Facility f was not registered with AEMO for all of the 12 Peak SWIS Trading Intervals for the preceding Capacity Year of Trading Month m (considered 'New'), and 0 otherwise (considered 'Existing')	(36)

3.5 Ownership

AEMO must determine the number of full Trading Days an interval meter was registered to a Market Participant in the relevant Trading Month.

$$
OwnershipDays(p, f, m) = \sum_{d \in M(d)} OwnershipFlag\_PF\_D(p, f, d) \tag{38}
$$

$$
OwnershipFlag\_PF\_D(p, f, d) = \begin{cases} 1 & \text{for } f \in IRCRF(p, d) \\ 0 & \text{otherwise} \end{cases} \tag{39}
$$

Variable	Units	SC	GR	Rule	Description	Ref
OwnershipDays(p, f, m)		F	M	App 5 Step 6	The number of full Trading Days the Facility f was registered to Market Participant p in Trading Month m	(38)
OwnershipFlag_PF_D(p, f, d)	Flag	F	D	App 5 Step 6	Flag that is 1 if the Facility f was registered to Market Participant p in Trading Day d, and 0 otherwise	(39)
IRCRF(d)	{}	G	D	App 5	Set of Facilities in Trading Day d for which AEMO must determine an Individual Reserve Capacity Requirement	(9)

4 Calculations

AEMO must perform the steps in Appendix 5 of the WEM Rules to determine the Indicative Individual Reserve Capacity Requirements, Individual Reserve Capacity Requirements or revised Individual Reserve Capacity Requirements for a Trading Month.

IRCR values are calculated for:

- Interval meters measuring Non-Temperature Dependent Loads that were registered with AEMO for all of the 12 Peak SWIS Trading Intervals

- Interval meters measuring Temperature Dependent Loads (excluding those represented by the Notional Wholesale Meter) that were registered with AEMO for all of the 12 Peak SWIS Trading Intervals

- Notional Wholesale Meter

- Intermittent Loads

- New interval meters measuring Non-Temperature Dependent Loads that were not registered with AEMO during one or more of the 12 Peak SWIS Trading Intervals but were registered by the end of the relevant Trading Month

- New interval meters measuring Temperature Dependent Loads (excluding those represented by the Notional Wholesale Meter) that were not registered with AEMO during one or more of the 12 Peak SWIS Trading Intervals but were registered by the end of the relevant Trading Month

- New Notional Wholesale Meter

In order to determine the IRCR values the following information is required:

- Peak SWIS Trading Intervals

- Median value of the metered consumption during the Peak SWIS Trading Intervals

- Non-Temperature Dependent Load (NTDL) status

- New or existing status

- Intermittent Load status

- Number of full Trading Days an interval meter was registered to a Market Participant in the relevant Trading Month

This formulation uses *median value divided by 0.5* rather than *double the median value* to represent the conversion from MWh to MW, where 0.5 is the fraction of a 30 minute Trading Interval in an hour.

4.1 Invocation

The following table outlines the invocation for the high-level calculations.

Variable	Scope Set	Granularity Invocation
$IRCR(p,m)$	$\forall p \in MP\_M(m)$	M
$IRCRC(f,m)$	$\forall f \in IRCRF\_M(m)$	M

4.2 IRCR

$$IRCR(p,m) = IRCR\_X(p,m) \times TOTAL\_R(m) \tag{40}$$

Variable	Units	SC	GR	Rule	Description	Ref
IRCR(p, m)	MW	P	M	App 5 Step 10A	Individual Reserve Capacity Requirement for Market Participant p in Trading Month m	(40)
IRCR_X(p, m)	MW	P	M	App 5 Step 9	Total Individual Reserve Capacity Requirement contribution for Market Participant p in Trading Month m	(49)
TOTAL_R(m)		G	M	App 5 Step 10	Total Ratio for Trading Month m	(42)

4.3 Individual Reserve Capacity Requirement Contribution

This step applies to an individual metered Associated Load.

$IRCRC(f, m)$

$$= \begin{cases} NMTDCR(f,m) \times TOTAL\_R(m) & \text{for } NewMeter\_Flag(f,m) = 1 \text{ and } TDL\_Flag(f,m) = 1 \\ NMNTCR(f,m) \times TOTAL\_R(m) & \text{for } NewMeter\_Flag(f,m) = 1 \text{ and } TDL\_Flag(f,m) = 0 \\ TDL(f,m) \times TDL\_R(m) \times TOTAL\_R(m) & \text{for } NewMeter\_Flag(f,m) = 0 \text{ and } TDL\_Flag(f,m) = 1 \\ NTDL(f,m) \times NTDL\_R(m) \times TOTAL\_R(m) & \text{for } NewMeter\_Flag(f,m) = 0 \text{ and } TDL\_Flag(f,m) = 0 \\ 0 & \text{otherwise} \end{cases}$$

$$\tag{41}$$

Variable	Units	SC	GR	Rule	Description	Ref
IRCRC(f, m)	MW	F	M	App 5 Step 11	Individual Reserve Capacity Requirement Contribution of Associated Load f in Trading Month m	(41)
NewMeter_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f was not registered with AEMO for all of the 12 Peak SWIS Trading Intervals for the preceding Capacity Year of Trading Month m (considered 'New'), and 0 otherwise (considered 'Existing')	(36)
NMNTCR(f, m)	MW	F	M	App 5 Step 5	Contribution to the system peak load of the new Facility f measuring Non-Temperature Dependent Load in Trading Month m	(64)
NMTDCR(f, m)	MW	F	M	App 5 Step 5	Contribution to the system peak load of the new Facility f measuring Temperature Dependent Load in Trading Month m	(66)
NTDL(f, m)	MW	F	M	App 5 Step 2	Contribution to the system peak load of Facility f measuring Non-Temperature Dependent Load during the preceding Hot Season of Trading Month m	(53)
NTDL_R(m)		G	M	App 5 Step 8A	NTDL ratio for Trading Month m	(51)
TDL(f, m)	MW	F	M	App 5 Step 3	Contribution to the system peak load of Facility f (excluding the Notional Wholesale Meter) measuring Temperature Dependent Load during the preceding Hot Season of Trading Month m	(60)
TDL_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f measures Temperature Dependent Load (considered 'TDL') in Trading Month m, and 0 otherwise (considered Non-Temperature Dependent Load or 'NTDL')	I
TDL_R(m)		G	M	App 5 Step 8C	TDL ratio for Trading Month m	(55)
TOTAL_R(m)		G	M	App 5 Step 10	Total Ratio for Trading Month m	(42)

4.4 Total Ratio

$$TOTAL\_R(m) = \frac{RR(m)}{TTIRCR\_Y(m)} \tag{42}$$

$$TTIRCR\_Y(m) = \sum_{p \in MP\_M(m)} IRCR\_X(p, m) \tag{43}$$

Variable	Units	SC	GR	Rule	Description	Ref
TOTAL_R(m)		G	M	App 5 Step 10	Total Ratio for Trading Month m	(42)
TTIRCR_Y(m)	MW	G	M	App 5 Step 10	Total Individual Reserve Capacity Requirement contribution for Trading Month m	(43)
IRCR_X(p, m)	MW	P	M	App 5 Step 9	Total Individual Reserve Capacity Requirement contribution for Market Participant p in Trading Month m	(49)
MP_M(m)	{}	G	M	11	Set of Market Participants in Trading Month m	I
RR(m)	MW	G	M	App 5 Step 1	Reserve Capacity Requirement for Trading Month m	(74)

4.5 Individual Intermittent Load Reserve Capacity Requirement

The Individual Intermittent Load Reserve Capacity Requirement is only to be determined for Intermittent Loads that are and continue to be deemed to be Intermittent Loads under MR 1.48.2 (i.e. grandfathered).

$$TPILRCR(p,m) = \sum_{f \in IMLmeters(p,m)} \Big(IILRCR(f,m) \times OwnershipShareIL(f,p,m) \Big) \tag{44}$$

$$OwnershipShareIL(f,p,m) = \frac{OwnershipDaysIL(f,p,m)}{TDOMIL(m)} \tag{45}$$

$$IILRCR(f,m) = \begin{cases} ILMAXLD(f,m) \times RM(m) & \text{for } InOperation\_Flag(f,m) = 1 \\ 0 & \text{otherwise} \end{cases} \tag{46}$$

$$InOperation\_Flag(f,m) = \begin{cases} 1 & \text{for } ILMAXLD(f,m) > 0 \\ 0 & \text{otherwise} \end{cases} \tag{47}$$

$$RM(m) = -1 + \frac{RCR(m)}{FL\_RCR(m)} \tag{48}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPILRCR(p, m)	MW	P	M	App 5 Step 8	Intermittent Load Reserve Capacity Requirement for Market Participant p in Trading Month m	(44)
OwnershipShareIL(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Intermittent Load f was registered to Market Participant p	(45)
IILRCR(f, m)	MW	F	M	App 5 Step 4	Individual Intermittent Load Reserve Capacity Requirement for Facility f in Trading Month m	(46)
InOperation_Flag(f, m)	Flag	F	M	App 4A	Flag that is 1 if the Intermittent Load f is registered and operating during Trading Month m, and 0 otherwise	(47)
RM(m)	MW	G	M	App 4A	Reserve Margin for the Reserve Capacity Cycle of Trading Month m	(48)
FL_RCR(cy)	MW	G	CY	App 5 Step 1	Peak demand associated with the Reserve Capacity requirement for Capacity Year cy	I
ILMAXLD(f, m)	MW	F	M	App 4A	The nominated load level for the Intermittent Load f to apply for Trading Month m	I
IMLmeters(m)	{}	G	M	2.30B.1	Set of Loads which have an Intermittent Load component in Trading Month m	(29)

Variable	Units	SC	GR	Rule	Description	Ref
OwnershipDaysIL(f, p, m)		FP	M	App 5 Step 6	Number of full Trading Days the Intermittent Load f was registered to Market Participant p in Trading Month m	I
RCR(cy)	MW	G	CY	App 5 Step 1	Reserve Capacity Requirement for Capacity Year cy	I
TDOMIL(m)		G	M	App 5 Step 6	Total days in Trading Month m	I

4.6 IRCR excluding Total Ratio

$$IRCR\_X(p,m) = TPILRCR(p,m) + TPNTDLCR(p,m) + TPTDLCR(p,m) \\ + TPNMNTCR(p,m) + TPNMTDCR(p,m) \tag{49}$$

Variable	Units	SC	GR	Rule	Description	Ref
IRCR_X(p, m)	MW	P	M	App 5 Step 9	Total Individual Reserve Capacity Requirement contribution for Market Participant p in Trading Month m	(49)
TPILRCR(p, m)	MW	P	M	App 5 Step 8	Intermittent Load Reserve Capacity Requirement for Market Participant p in Trading Month m	(44)
TPNTDLCR(p, m)	MW	P	M	App 5 Step 8B	Non-Temperature Dependent Load reserve capacity requirement for Market Participant p in Trading Month m	(50)
TPTDLCR(p, m)	MW	P	M	App 5 Step 8D	Temperature Dependent Load reserve capacity requirement for Market Participant p in Trading Month m	(54)
TPNMNTCR(p, m)	MW	P	M	App 5 Step 9	Total new Non-Temperature Dependent Load contribution for Market Participant p in Trading Month m	(63)
TPNMTDCR(p, m)	MW	P	M	App 5 Step 9	Total new Temperature Dependent Load contribution for Market Participant p in Trading Month m	(65)

4.7 Existing NTDL Reserve Capacity Requirement

$$TPNTDLCR(p,m) = TPNTDL(p,m) \times NTDL\_R(m) \tag{50}$$

4.7.1 NTDL Ratio

$$NTDL\_R(m) = \frac{NRR(m)}{FL(m)} \tag{51}$$

4.7.2 Existing NTDL Contribution

$$TPNTDL(p,m) = \sum_{f \in NTDLmeters(m)} \left(NTDL(f,m) \times OwnershipShare(f,p,m) \right) \tag{52}$$

$$NTDL(f,m) = \begin{cases} \dfrac{MEDIAN12(f,m)}{0.5} & \text{for } TDL\_Flag(f,m) = 0 \\ 0 & \text{otherwise} \end{cases} \tag{53}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPNTDLCR(p, m)	MW	P	M	App 5 Step 8B	Non-Temperature Dependent Load reserve capacity requirement for Market Participant p in Trading Month m	(50)

Variable	Units	SC	GR	Rule	Description	Ref
NTDL_R(m)		G	M	App 5 Step 8A	NTDL ratio for Trading Month m	(51)
TPNTDL(p, m)	MW	P	M	App 5 Step 8B	Total Non-Temperature Dependent Load contribution for Market Participant p in Trading Month m	(52)
NTDL(f, m)	MW	F	M	App 5 Step 2	Contribution to the system peak load of Facility f measuring Non-Temperature Dependent Load during the preceding Hot Season of Trading Month m	(53)
FL(m)	MW	G	M	App 5 Step 1	Peak demand associated with the Reserve Capacity requirement for Trading Month m	(75)
MEDIAN12(f, m)	MWh	F	M	App 5	Median value of the metered consumption for Facility f during the 12 Peak SWIS Trading Intervals of the preceding Capacity Year of Trading Month m	(31)
NRR(m)	MW	G	M	App 5 Step 8A	Net Reserve Capacity Requirement for Trading Month m	(72)
NTDLmeters(m)	{}	G	M		Set of all interval meters measuring Non-Temperature Dependent Load in Trading Month m	(24)
OwnershipShare(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Facility f was registered to Market Participant p	(71)
TDL_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f measures Temperature Dependent Load (considered 'TDL') in Trading Month m, and 0 otherwise (considered Non-Temperature Dependent Load or 'NTDL')	I
TPILRCR(p, m)	MW	P	M	App 5 Step 8	Intermittent Load Reserve Capacity Requirement for Market Participant p in Trading Month m	(44)
TTILRCR(m)	MW	G	M	App 5 Step 8A	Intermittent Load Reserve Capacity Requirement for Trading Month m	(73)

4.8 Existing TDL Reserve Capacity Requirement

$$TPTDLCR(p, m) = TPTDL(p, m) \times TDL\_R(m) \tag{54}$$

4.8.1 TDL Ratio

$$TDL\_R(m) = \begin{cases} \dfrac{NRR(m) - TTNTDLCR(m)}{TTIMTDL(m)} & \text{for } TTIMTDL(m) \neq 0 \\ 0 & \text{otherwise} \end{cases} \tag{55}$$

$$TTNTDLCR(m) = \sum_{p \in MP\_M(m)} TPNTDLCR(p, m) \tag{56}$$

$$TTIMTDL(m) = \sum_{p \in MP\_M(m)} TPTDL(p, m) \tag{57}$$

4.8.2 Existing TDL Contribution

$$TPTDL(p, m) = \sum_{f \in TDLmeters(m)} \left(MTDL(f, m) \times OwnershipShare(f, p, m) \right) \tag{58}$$

$$MTDL(f,m) = \begin{cases} NOMTDLCR(f,m) & \text{for } f = NOTIONAL \\ TDL(f,m) & \text{otherwise} \end{cases} \tag{59}$$

$$TDL(f,m) = \begin{cases} \dfrac{MEDIAN12(f,m)}{0.5} & \text{for } TDL\_Flag(f,m) = 1 \\ 0 & \text{otherwise} \end{cases} \tag{60}$$

4.8.3 Existing Notional Contribution

This step applies to non-interval meters that were measured by the Notional Wholesale Meter in the preceding Hot Season but are now measured by interval meters in the relevant Trading Month.

$$NOMTDLCR(f,m) = TDL(NOTIONAL,m) - TTNMDED(m) \tag{61}$$

$$TTNMDED(m) = \sum_{f \in NMmeters(m)} \left(NMTDCR(f,m) \times \sum_{p \in MP\_M(m)} OwnershipShare(f,p,m) \right) \tag{62}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPTDLCR(p, m)	MW	P	M	App 5 Step 8D	Temperature Dependent Load reserve capacity requirement for Market Participant p in Trading Month m	(54)
TDL_R(m)		G	M	App 5 Step 8C	TDL ratio for Trading Month m	(55)
TTNTDLCR(m)	MW	G	M	App 5 Step 8C	Non-Temperature Dependent Load reserve capacity requirement for Trading Month m	(56)
TTIMTDL(m)	MW	G	M	App 5 Step 8C	Temperature Dependent Load reserve capacity requirement (including the Notional Wholesale Meter) for Trading Month m	(57)
TPTDL(p, m)	MW	P	M	App 5 Step 8C	Total Temperature Dependent Load contribution for Market Participant p in Trading Month m	(58)
MTDL(f, m)	MW	F	M	App 5 Step 8C	Temperature Dependent Load contribution for Facility f in Trading Month m	(59)
TDL(f, m)	MW	F	M	App 5 Step 3	Contribution to the system peak load of Facility f measuring Temperature Dependent Load during the preceding Hot Season of Trading Month m	(60)
NOMTDLCR(f, m)	MW	F	M	App 5 Step 7	Contribution to the system peak load of Notional Wholesale Meter f during the preceding Hot Season of Trading Month m	(61)
TTNMDED(m)	MW	G	M	App 5 Step 7	Total contribution from new interval meters in Trading Month m that were measured by the Notional Wholesale Meter in the preceding Capacity Year's Hot Season	(62)
MEDIAN12(f, m)	MWh	F	M	App 5	Median value of the metered consumption for Facility f during the 12 Peak SWIS Trading Intervals of the preceding Capacity Year of Trading Month m	(31)
MP_M(m)	{}	G	M	11	Set of Market Participants in Trading Month m	I
NMmeters(m)	{}	G	M		Set of all new interval meters measuring consumption in Trading Month m that were previously measured by the Notional Wholesale Meter in the preceding Capacity Year's Hot Season	(28)

Variable	Units	SC	GR	Rule	Description	Ref
NMTDCR(f, m)	MW	F	M	App 5 Step 5	Contribution to the system peak load of the new Facility f measuring Temperature Dependent Load in Trading Month m	(66)
NRR(m)	MW	G	M	App 5 Step 8A	Net Reserve Capacity Requirement for Trading Month m	(72)
OwnershipShare(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Facility f was registered to Market Participant p	(71)
TDL_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f measures Temperature Dependent Load (considered 'TDL') in Trading Month m, and 0 otherwise (considered Non-Temperature Dependent Load or 'NTDL')	I
TDLmeters(m)	{}	G	M		Set of all interval meters measuring Temperature Dependent Load in Trading Month m	(26)
TPNTDLCR(p, m)	MW	P	M	App 5 Step 8B	Non-Temperature Dependent Load reserve capacity requirement for Market Participant p in Trading Month m	(50)

4.9   New NTDL Contribution

This step applies to interval meters measuring Non-Temperature Dependent Load that were not registered with AEMO during one or more of the 12 Peak SWIS Trading Intervals, but which were registered by the end of the relevant Trading month.

$$TPNMNTCR(p,m) = \sum_{f \in newNTDLmeters(m)} \Big(NMNTCR(f,m) \times OwnershipShare(f,p,m) \Big) \tag{63}$$

$$NMNTCR(f,m) = \begin{cases} 1.1 \times \dfrac{MEDIAN4(f,m)}{0.5} & \text{for } TDL\_Flag(f,m) = 0 \\ 0 & \text{otherwise} \end{cases} \tag{64}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPNMNTCR(p, m)	MW	P	M	App 5 Step 9	Total new Non-Temperature Dependent Load contribution for Market Participant p in Trading Month m	(63)
NMNTCR(f, m)	MW	F	M	App 5 Step 5	Contribution to the system peak load of the new Facility f measuring Non-Temperature Dependent Load in Trading Month m	(64)
MEDIAN4(f, m)	MWh	F	M	App 5	Median value of the metered consumption for Facility f during the 4 Peak SWIS Trading Intervals of Trading Month m-3	(30)
newNTDLmeters(m)	{}	G	M		Set of all new interval meters measuring Non-Temperature Dependent Load in Trading Month m	(25)
NTDLmeters(m)	{}	G	M		Set of all interval meters measuring Non-Temperature Dependent Load in Trading Month m	(24)

4.10   New TDL Contribution

This step applies to interval meters measuring Temperature Dependent Load that were not registered with AEMO during one or more of the 12 Peak SWIS Trading Intervals, but which were registered by the end of the relevant Trading month.

$$TPNMTDCR(p,m) = \sum_{f \in newTDLmeters(p,m)} \Big(NMTDCR(f,m) \times OwnershipShare(f,p,m) \Big) \tag{65}$$

$NMTDCR(f,m)$
$$= \begin{cases} 1.3 \times TPTDNNWM(f,m) & \text{for } f = NOTIONAL \\ 0 & \text{for } f \neq NOTIONAL \text{ and } (NewMeter\_Flag(f,m) = 0 \text{ or } TDL\_Flag(f,m) = 0) \\ 1.3 \times \dfrac{MEDIAN4(f,m)}{0.5} & \text{otherwise} \end{cases}$$

$$\tag{66}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPNMTDCR(p, m)	MW	P	M	App 5 Step 9	Total new Temperature Dependent Load contribution for Market Participant p in Trading Month m	(65)
NMTDCR(f, m)	MW	F	M	App 5 Step 5	Contribution to the system peak load of the new Facility f measuring Temperature Dependent Load in Trading Month m	(66)
MEDIAN4(f, m)	MWh	F	M	App 5	Median value of the metered consumption for Facility f during the 4 Peak SWIS Trading Intervals of Trading Month m-3	(30)
NewMeter_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f was not registered with AEMO for all of the 12 Peak SWIS Trading Intervals for the preceding Capacity Year of Trading Month m (considered 'New'), and 0 otherwise (considered 'Existing')	(36)
newTDLmeters(m)	{}	G	M		Set of all new interval meters measuring Temperature Dependent Load in Trading Month m	(27)
OwnershipShare(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Facility f was registered to Market Participant p	(71)
TDL_Flag(f, m)	Flag	F	M	App 5	Flag that is 1 if the Facility f measures Temperature Dependent Load (considered 'TDL') in Trading Month m, and 0 otherwise (considered Non-Temperature Dependent Load or 'NTDL')	I
TPTDNNWM(f, m)	MW	G	M	App 5 Step 5A	Contribution to the system peak load of the new Notional Wholesale Meter f in Trading Month m (New Notional Wholesale Meter)	(67)

4.11   New Notional Contribution

This step applies to non-interval or accumulation meters that contribute to the new Notional Wholesale Meter.

$$TPTDNNWM(f,m) = NIMG(m) \times ANIM(m) \tag{67}$$

$$ANIM(m) = \frac{MNWM(NOTIONAL,m)}{TNIA(m)} \tag{68}$$

$$MNWM(f,m) = \frac{MEDIAN4(NOTIONAL,m)}{0.5} \tag{69}$$

$$NIMG(m) = TCNIA(m) - TDNIA(m) \tag{70}$$

Variable	Units	SC	GR	Rule	Description	Ref
TPTDNNWM(f, m)	MW	G	M	App 5 Step 5A	Contribution to the system peak load of the new Notional Wholesale Meter f in Trading Month m (New Notional Wholesale Meter)	(67)
ANIM(m)	MW/Meter	G	M	App 5 Step 5A	Average Non-Interval Meter in Trading Month m	(68)
MNWM(f, m)	MW	F	M	App 5 Step 5A	Median value of the metered consumption for Notional Wholesale Meter f during the 4 Peak SWIS Trading Intervals of Trading Month m-3 (Median Notional Wholesale Meter)	(69)
NIMG(m)		G	M	App 5 Step 5A	Non-Interval Meter Growth in Trading Month m	(70)
MEDIAN4(f, m)	MWh	F	M	App 5	Median value of the metered consumption for Facility f during the 4 Peak SWIS Trading Intervals of Trading Month m-3	(30)
TCNIA(m)		G	M	App 5 Step 5A	Number of non-interval or accumulation meters connected between the end of the preceding Hot Season and the end of Trading Month m-3	I
TDNIA(m)		G	M	App 5 Step 5A	Number of non-interval or accumulation meters disconnected between the end of the preceding Hot Season and the end of Trading Month m-3	I
TNIA(m)		G	M	App 5 Step 5A	Number of non-interval or accumulation meters that existed at the end of Trading Month m-3	I

4.12 Ownership Share

$$OwnershipShare(f, p, m) = \frac{OwnershipDays(f, p, m)}{TDOM(m)} \tag{71}$$

Variable	Units	SC	GR	Rule	Description	Ref
OwnershipShare(f, p, m)		FP	M	App 5 Step 6	Fraction of Trading Month m for which Facility f was registered to Market Participant p	(71)
OwnershipDays(f, p, m)		FP	M	App 5 Step 6	Number of full Trading Days the Facility f was registered to Market Participant p in Trading Month m	(38)
TDOM(m)		G	M	App 5 Step 6	Total days in Trading Month m	I

4.13 Targets

$$NRR(m) = RR(m) - TTILRCR(m) \tag{72}$$

$$TTILRCR(m) = \sum_{p \in MP\_M(m)} TPILRCR(p, m) \tag{73}$$

$$RR(m) = Min(RCR(m), TACC(m)) \tag{74}$$

$$FL(m) = FL\_RCR(m) \times \frac{RR(m)}{RCR(m)} \tag{75}$$

Variable	Units	SC	GR	Rule	Description	Ref
NRR(m)	MW	G	M	App 5 Step 8A	Net Reserve Capacity Requirement for Trading Month m	(72)
TTILRCR(m)	MW	G	M	App 5 Step 8A	Intermittent Load Reserve Capacity Requirement for Trading Month m	(73)
RR(m)	MW	G	M	App 5 Step 1	Reserve Capacity Requirement for Trading Month m	(74)
FL(m)	MW	G	M	App 5 Step 1	Peak demand associated with the Reserve Capacity requirement for Trading Month m	(75)
FL_RCR(cy)	MW	G	CY	App 5 Step 1	Peak demand associated with the Reserve Capacity requirement for Capacity Year cy	I
MP_M(m)	{}	G	M	11	Set of Market Participants in Trading Month m	I
RCR(cy)	MW	G	CY	App 5 Step 1	Reserve Capacity Requirement for Capacity Year cy	I
TACC(m)	MW	G	M	App 5 Step 1	Total number of Capacity Credits assigned for Trading Month m	I
TPILRCR(p, m)	MW	P	M	App 5 Step 8	Intermittent Load Reserve Capacity Requirement for Market Participant p in Trading Month m	(44)