CREDIT LIMIT PROCEDURES

PREPARED BY: Operations

VERSION: 1.1

DATE: 2 May 2014

DRAFT

This document is current to version 60 of the National Electricity Rules

Approved for distribution and use

Matt Zema
Chief Executive Officer

Date / /2014

Version Release History

Version	Date	Comments
1.0	29 January 2013	Initial Version
1.1	2 May 2014	Amendments to: • address any repeal of the Clean Energy Act 2011. • update section 10.2 for new entrants and deregistering participants to improve consistency with standard determination of credit support. • Make minor editorial and typographical corrections.

Important Notice

These Procedures are made by AEMO under clause 3.3.8 of the National Electricity Rules (Rules), and have effect only for the purposes set out in the Rules. The Rules and the National Electricity Law prevail over these Procedures to the extent of any inconsistency.

Contents

GLOSSARY

In this document, a word or phrase *in this style* has the same meaning as given to that term in the NER.

In this document, capitalised words or phrases or acronyms have the meaning set out opposite those words, phrases, or acronyms in the table below.

Unless the context otherwise requires, this document will be interpreted in accordance with Schedule 2 of the *National Electricity Law*.

TERM	MEANING
CEA	Clean Energy Act 2011
GST	Goods and Services Tax
LWPR	load weighted price ratio
OSL	*outstandings limit*
MCL	*maximum credit limit*
MLF	*marginal loss factor*
MNSP	*market network service provider*
NER	National Electricity Rules
PM	*prudential margin*
POE	*prudential probability of exceedance*
PRAF	Participant Risk Adjustment Factor specific to *Market Participant*
Procedures	*credit limit procedures*
RRP	*regional reference price*
VF	volatility factor
TA	*typical accrual*

1 Introduction

These are the c*redit limit procedures* (Procedures) made in accordance with clause 3.3.8 of the National Electricity Rules (NER) to establish the methodology by which the *Australian Energy Market Operator* (*AEMO*) will determine the *prudential settings* for each *Market Participant* so that the *prudential standard* is met for the *National Electricity Market* (*NEM*).

The *prudential settings* for a *Market Participant* comprise its *maximum credit limit* (MCL), outstandings limit (OSL) and *prudential margin* (PM). The MCL is the sum of the OSL and the PM.

The *prudential standard* means the value of the prudential probability of exceedance (POE), expressed as a percentage. The POE means the probability of a *Market Participant's* MCL being exceeded by its *outstandings* at the end of the *reaction period* following the *Market Participant* exceeding its OSL on any day and failing to rectify this breach. Clause 3.3.4A of the NER defines the *prudential standard* as 2%.

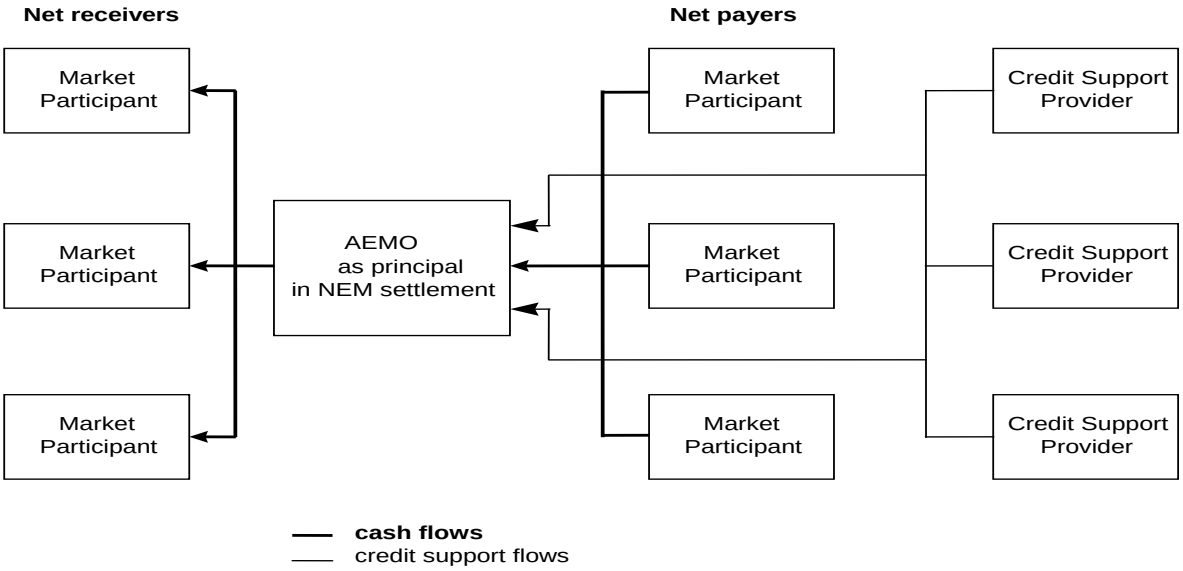
These Procedures apply to the determination of *prudential settings* effective from 28 November 2013.

These Procedures may only be amended in accordance with clause 3.3.8 of the NER.

2 Credit Support in the NEM

AEMO's obligation to settle payments due to *Market Participants* in relation to a *billing period* is limited to the extent of funds received from *Market Participants* in respect of that *billing period* or provided under *credit support* arrangements. The relationship between *AEMO* and the *Market Participants* is illustrated in the following diagram:

SETTLEMENT OF NEM TRANSACTIONS:



If a *Market Participant* cannot satisfy the *acceptable credit criteria*, that *Market Participant* must provide *AEMO* with an unconditional guarantee in the form specified by *AEMO* from a *credit support* provider that meets the *acceptable credit criteria* for an amount that is greater than or equal to the *Market Participant's* MCL. *AEMO* may draw on the guarantee if payment is not cleared in time to meet a settlement deadline.

Any shortfall in *AEMO*'s recovery from any *Market Participant* in relation to a *billing period* is shared proportionally by *Market Participants* due payments in that billing cycle in accordance with clauses 3.15.22 and 3.15.23 of the NER.

3 Purpose and Requirements of Prudential Settings

3.1 Maximum Credit Limit

Confidence of the *Market Participants* in the financial settlement of spot electricity transactions is critical to the operation of the *NEM* and setting the spot market price (*regional reference price* or RRP).

The NER require *Market Participants* to provide *credit support* in the form of an unconditional guarantee from an approved financial institution to pay *AEMO* an amount up to a pre-determined value, which is the MCL.

The MCL is that amount which results in a 2% likelihood of a *Market Participant's credit support* being exceeded by its *outstandings* at the end of the *reaction period* following the *Market Participant* exceeding its OSL on any day, and failing to rectify this breach.

AEMO's processes for determining the MCL have been designed to take account of seasonal differences in RRPs, volatility and *Market Participants'* particular characteristics.

3.2 Outstandings Limit

The purpose of the OSL is to ensure that the NEM is not exposed to a prudential risk inconsistent with the *prudential standard* during the OSL time period (T_{OSL}), which is 35 days.

3.3 Prudential Margin

The purpose of the PM is to ensure that the NEM is not exposed to a prudential risk inconsistent with the *prudential standard* during the period of suspending a defaulting *Market Participant* from the *NEM* (the *reaction period,* T_{RP}, which is seven days).

3.4 NER Requirements for Prudential Settings

These Procedures are based on a number of components that *AEMO* must consider in determining *prudential settings*, as set out in clause 3.3.8(d) of the NER:

- The RRP for the region for which the *prudential settings* are being calculated.
- The time of year.
- The volatility of *load* and RRP for the *regions*.
- AEMO's estimate of the *generation* and *load* for each *Market Participant*.
- The relationship between average *load* and peak *load* for each *Market Participant*.
- Any prospective *reallocations* for the period being assessed.
- The correlation between *energy*, *reallocations,* and the RRP.
- The statistical distribution of any accrued amounts that may be owed to *AEMO*.
- The relevant time period for which the *prudential settings* are being calculated.
- Any other factors *AEMO* considers relevant having regard to the objective of the Procedures.

4 Meeting the *Prudential Standard*

4.1 Approach to Calculating the MCL

The MCL calculation takes into account:

- Expected *regional load* and RRPs.
- A measure of *regional* volatility consistent with the 2% POE target.
- *Market Participants'* expected *load*, *generation,* and *reallocations*.
- A *Market Participant's* load-weighted price applicable to their *load*, *generation* and *reallocations*.
- The relevant time period, in days.

In undertaking these calculations, there are:

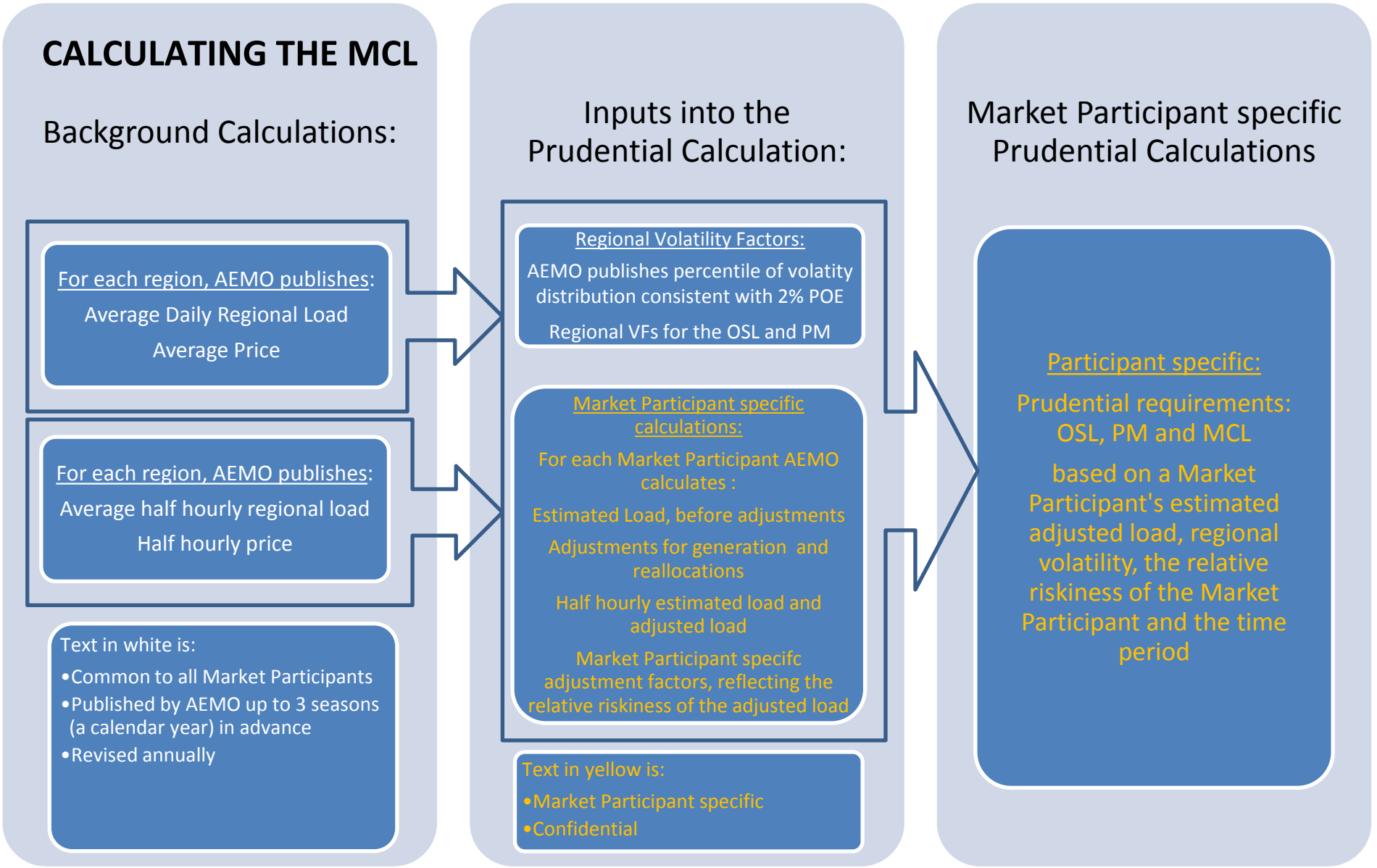
- A number of *regional* calculations that establish the *regional* inputs into the calculation of a *Market Participant's* OSL and PM.
- A number of *regional* calculations, common to all *Market Participants*, that are used in the calculation of an individual *Market Participant's* OSL and PM.
- A number of *Market Participant* specific calculations that result in a *Market Participant's* OSL and PM.

The diagram below provides a high-level schematic of the relationship between the *regional* calculations and the calculation of a *Market Participant's* OSL and PM.

There are also a number of elements common to the calculation for all *Market Participants* in all *regions*, which include:

- The seasonal calendar used for the three identified seasons – summer, winter, and shoulder.
- The time periods used in the OSL and the PM.
- Where appropriate, goods and services tax (GST).

This section 4 lists the elements in each part of the MCL calculation, while the specific equations are discussed in sections 5 to 9 of these Procedures.


CALCULATING THE MCL
Background Calculations:
For each region, AEMO publishes:
Average Daily Regional Load
Average Price
For each region, AEMO publishes:
Average half hourly regional load
Half hourly price
Text in white is:
•Common to all Market Participants
•Published by AEMO up to 3 seasons (a calendar year) in advance
•Revised annually
Inputs into the Prudential Calculation:
Regional Volatility Factors:
AEMO publishes percentile of volatity distribution consistent with 2% POE
Regional VFs for the OSL and PM
Market Participant specific calculations:
For each Market Participant AEMO calculates :
Estimated Load, before adjustments
Adjustments for generation and reallocations
Half hourly estimated load and adjusted load
Market Participant specifc adjustment factors, reflecting the relative riskiness of the adjusted load
Text in yellow is:
•Market Participant specific
•Confidential
Market Participant specific Prudential Calculations
Participant specific:
Prudential requirements: OSL, PM and MCL
based on a Market Participant's estimated adjusted load, regional volatility, the relative riskiness of the Market Participant and the time period

4.2 Statistical Approach to the Development of these Procedures

The Procedures have been designed to:

- Take account of all the available data, using all the RRP and *load* data available for each of the *regions* of the NEM.
- Smooth changes in *Market Participants'* required MCLs from one season to the corresponding season in the following year resulting from one-off changes to average RRPs and *regional* volatility, while responding to longer-term trend changes.
- Provide for *Market Participant* specific factors to be taken into account where these characteristics differ from those of the *region*.

AEMO intends that the application of the Procedures will meet the *prudential standard* on average over time, with no systematic or persistent bias in the estimated MCL for any category of *Market Participants*. Given the nature of the estimation process and the information used in calculating these Procedures – both of which are backwards looking – from time to time it can be expected that the *prudential standard* may not be met or may be exceeded. While *AEMO* is required to publish an annual report of the performance of these Procedures in meeting the *prudential standard* (Clause 3.3.8(f) of the NER), several years' experience of operating the Procedures will be required before a detailed evaluation of their performance can be undertaken.

4.2.1 Approach to calculating the level of volatility consistent with a 2% POE

4.2.1.1 Regional inputs used in the volatility factor calculation

The historical *regional load*, RRP and the relevant time period are used to calculate the level of total *outstandings* for a given *region*, without adjusting for *generation* or *reallocations*.

Estimated *regional load* and estimated RRP are calculated on a seasonal basis, using an exponential weighted moving average process that considers all available data for the relevant season. This approach considers the seasonal data as a continuous series over the entire period for which data is available.

The level of OSL and PM required to meet a 2% POE for each *region* is assessed against the historical *regional outstandings.* The OSL and PM requirements are determined with regard to estimated *regional loads*, estimated *regional* RRPs, estimated volatility factors (VFs) for the PM and OSL and the appropriate time periods (T_{OSL},T_{RP}).

4.2.1.2 Calculating the appropriate level of volatility

The distribution from one day to the next in the level of *outstandings* (volatility) is used to establish the point on that distribution consistent with a 2% POE for a given *region*. The point on the distribution consistent with a 2% POE differs by *region*.

AEMO publishes its calculation of the percentile of the volatility distribution consistent with a 2% POE for each *region* annually in advance.

4.2.2 Approach to calculating OSL and PM

The approach to calculating a *Market Participant's* OSL and PM considers:

- Regional parameters such as estimated RRP and estimated volatility.
- An estimate of a *Market Participant's* future *load*, *generation* and *reallocations*.
- A *Market Participant's* specific characteristics, through the use of a load-weighted price ratio (LWPR) for *load*, *generation* and *reallocations*.
    - The LWPR is based on the *Market Participant's* expected half hourly-profile for *load* (adjusted for MLFs), *generation* (adjusted for MLFs), or *reallocations* as appropriate, as well as expected *regional* half-hourly RRPs.

- The LWPR is expressed as an index relative to the expected half hourly RRP, where a value greater than one indicates that a *Market Participant's* load-weighted price is higher than that for the *region*.

4.3 Parameters used in these Procedures

4.3.1 Elements common to all regions

4.3.1.1 Season definitions

There are three seasons used for all *regions*:

- Summer, which is the period beginning 1 December and ending 31 March.
- Winter, which is the period beginning 1 May and ending 31 August.
- Shoulder, which is the month of April; and the period from 1 September to 30 November.

Unless explicitly stated, all factors and calculated items are performed for each season.

4.3.1.2 *Outstandings Limit* Time Period (T_{OSL}) and *Reaction Period* Time Period (T_{RP})

The OSL time period (T_{OSL}) is the typical number of trading days used to calculate a *Market Participant*'s OSL. It has two components, namely:

- The *billing period*, which is defined as seven days.
- The *payment period*, which is estimated to be 28 days.

Accordingly, the OSL time period (T_{OSL}) is 35 days.

The *reaction period* time period (T_{RP}) is seven days.

4.3.1.3 Goods and Services Tax rate (GST)

The GST rate is the value of the GST which is applicable for the three month period following the date of the OSL and PM calculation.

GST applies to *energy* purchases and sales in the NEM. Accordingly, the OSL and PM calculation allows for the additional liability due to GST on the value of *AEMO*'s estimate of *energy* trading. As *reallocation transaction* amounts do not attract GST, it is not applied to the *reallocation* elements of the calculation.

4.3.2 Regional level calculations

The parameters resulting from the *regional* level calculations are identical for all *Market Participant*s. *AEMO* publishes the seasonal parameters in advance for all *regions*.

4.3.2.1 Calculations used in determining VF for the OSL ($VFOSL_R$) and the PM ($VFPM_R$)

Regional level parameters are calculated for each season:

- Estimated average RRP for the *region* (P_R).
- Estimated average daily *regional load* (ERL_R).

These parameters are used to derive the Outstandings Limit Volatility Factor ($VFOSL_R$) and the Prudential Margin Volatility Factor ($VFPM_R$). The $VFOSL_R$ and the $VFPM_R$ are derived from the distribution of the estimated *load* (ERL_R) and estimated RRP (P_R) and are set at a level to ensure that, for each *region*, the *prudential standard* is met.

4.3.2.2 Calculations used in determining a *Market Participant*'s OSL and PM

Regional level parameters calculated for each season:

- Estimated half-hourly RRP ($P_{HH,R}$) for the *region*.
- Estimated capped average half-hourly RRP for the *region* for cap value C ($P_{HH,R,C}$).
- Estimated average half-hourly *regional load* ($ERL_{HH,R}$).

These parameters are used to adjust a *Market Participant's* characteristics for its behaviour relative to that of the relevant *region*. These parameters are the same for all *Market Participant*s in a given *region*.

4.3.3 Market Participant specific calculations

The calculation of a *Market Participant*'s OSL considers:

- The *Market Participant's* trading behaviour in the *NEM*, including *energy* purchases (EL_R), *generation* sales (EG_R) and *reallocation* (RC_R, RCS_R, $RCC_{R,C}$ where the *Market Participant* is the credit party and RD_R, RDS_R, $RDC_{R,C}$ where the *Market Participant* is the debit party) (refer to section 9.4.5).
- Swap *reallocations*, valued at the difference between the strike price (PCS_R) and the VF adjusted average RRP.
- Cap *reallocations*. Floor *reallocations* are not included in the calculation.
- The relationship between *regional load* and the *Market Participant's* MLF adjusted *load*, expressed in a Participant Risk Adjustment Factor ($PRAF_{L,R}$) that adjusts the OSL and PM to reflect the *Market Participant's* relative risk of their *load*.
- The relationship between *regional load* and the *Market Participant's* MLF adjusted *generation*, expressed in a Participant Risk Adjustment Factor ($PRAF_{G,R}$) that adjusts the OSL and PM to reflect the *Market Participant's* relative risk of their *generation*.
- The relationship between *regional load* and the *Market Participant's* net energy and swap *reallocations*, expressed in a Participant Risk Adjustment Factor ($PRAF_{R,R}$) that adjusts the OSL and PM to reflect the *Market Participant's* relative risk of their swap and energy *reallocations*.
- The relationship between *regional load* and the *Market Participant's* net cap *reallocations*, expressed in a Participant Risk Adjustment Factor ($PRAF_{R,R,C}$) that adjusts the OSL and PM to reflect the *Market Participant's* relative risk of their cap *reallocations.*
- The distribution of credit and debit amounts across *regions*. In cases where there is more credit amount than debit amount in a given region, the OSL reduction attributable to the credit in excess of the debit amount (up to the amount of the total of debit amount in excess of credit amount in each of the other *regions*) is calculated without the VF. This approach is based on an assumption that high prices are not correlated across *regions*.

The methodology to determine a PM for each *Market Participant* is based on similar components to the OSL, with the following key differences:

- In determining the PM, the procedure excludes a *Market Participant's*:
  - Quantity and pattern of *trading amounts* where the estimate of the aggregate of all *trading amounts* for the period being assessed is a positive amount.
  - Quantity and pattern of *reallocation* amounts where the estimate of the aggregate of all *reallocation* amounts for the period being assessed is a positive amount.
- The PM is always assessed over a period equal to the *reaction period* (T_{RP}, defined as seven days).

4.3.4 General calculation principles for OSL and PM

A scaling factor is used to account for GST.

After adjustments to a *Market Participant's* estimated *load*, *generation* and *reallocations*, a *Market Participant's* OSL is calculated as a function of:

- The *Market Participant's* estimated *load, generation,* and *reallocations.*
- The estimated RRP, adjusted by a PRAF specific to that *Market Participant.*
- The VF for the OSL applicable to the relevant *region* ($VFOSL_R$).
- GST.
- The OSL time period (T_{OSL}), which is 35 days.

A *Market Participant's* PM is calculated on a similar basis, using parameters specific to the *reaction period*, T_{RP}.

The OSL may be negative but no less so than the absolute value of the PM. The PM may not be less than zero. Rounding is applied to the OSL and PM to eliminate insignificant changes and to simplify the management of credit support.

5 The Outstandings Limit Calculation

The OSL Calculation is represented by:

$$OSL = \Sigma_R \, MAX(OSL_{R,I} , OSL_{R,U})$$

$$OSL_{R,U} = (VEL_R + VRD_R + RD\$_R) \times T_{OSL} \quad \text{(OSL increased by debit)}$$
$$- (VEG_R + VRC_R + RC\$_R) \times T_{OSL} \quad \text{(OSL decreased by credit)}$$

$$OSL_{R,I} = (VEL_R + VRD_R) \times T_{OSL} / VFOSL_R$$
$$- (VEG_R + VRC_R) \times T_{OSL} / VFOSL_R$$
$$+ (RD\$_R - RC\$_R) \times T_{OSL}$$

$$VEL_R = EL_R \times P_R \times PRAF_{L,R} \times VFOSL_R \times (GST + 1) \quad \text{(value of } \textit{energy load}\text{)}$$

$$VEG_R = EG_R \times P_R \times PRAF_{G,R} \times VFOSL_R \times (GST + 1) \quad \text{(value of } \textit{energy generation}\text{)}$$

$$VRD_R = RD_R \times P_R \times PRAF_{R,R} \times VFOSL_R \quad \text{(value of debit } \textit{energy reallocations}\text{)}$$
$$+ RDS_R \times (P_R \times PRAF_{R,R} \times VFOSL_R - PDS_R) \quad \text{(value of debit swap } \textit{reallocations}\text{)}$$
$$+ \Sigma_C [RDC_{R,C} \times$$
$$(P_R \times PRAF_{R,R} \times VFOSL_R - P_R \times PRAF_{R,R,C} \times VFOSL_R)] \quad \text{(value of debit cap } \textit{reallocations}\text{)}$$

$$VRC_R = RC_R \times P_R \times PRAF_{R,R} \times VFOSL_R \quad \text{(value of credit } \textit{energy}\text{ reallocations)}$$
$$+ RCS_R \times (P_R \times PRAF_{R,R} \times VFOSL_R - PCS_R) \quad \text{(value of credit swap } \textit{reallocations}\text{)}$$
$$+ \Sigma_C [RCC_{R,C} \times$$
$$(P_R \times PRAF_{R,R} \times VFOSL_R - P_R \times PRAF_{R,R,C} \times VFOSL_R)] \quad \text{(value of credit cap } \textit{reallocations}\text{)}$$

where:

Regional Parameters:

GST	Represents the applicable rate for the Goods and Services Tax.
P_R	Represents *AEMO's* estimate of the average future RRP for each *region* R.
T_{OSL}	Is the OSL time period, which is 35 days.
$VFOSL_R$	Is a volatility factor, which is a scaling factor specific to the OSL used to achieve the *prudential standard* for each *region* R.

Market Participant Specific Parameters:

$OSL_{R,U}$	Represents the *regional* OSL with full allowance for *regional* volatility.
$OSL_{R,I}$	Represents the *regional* OSL with no allowance for *regional* volatility.
VEL_R	Represents the value of *load* for a *Market Participant* in *region* R.
VEG_R	Represents the value of *generation* for a *Market Participant* in *region* R.
VRD_R	Represents the value of debit energy *reallocations* for a *Market Participant* in *region* R.
VRC_R	Represents the value of credit energy *reallocations* for a *Market Participant* in *region* R.
$PRAF_{L,R}$	Is a Participant Risk Adjustment Factor (*load*) used to adjust the OSL and PM for a *Market Participant* to reflect their relative *load* risk and achieve the *prudential standard* in *region* R for the *Market Participant*.

$PRAF_{G,R}$	Is a Participant Risk Adjustment Factor (*generation*) used to adjust the OSL and PM for a participant to reflect their relative *generation* risk and achieve the *prudential standard* in *region* R for the *Market Participant*.
$PRAF_{R,R}$	Is a Participant Risk Adjustment Factor (energy and swap reallocations) used to adjust the OSL and PM for a *Market Participant* to reflect their relative energy and swap reallocation risk and achieve the *prudential standard* in *region* R for the *Market Participant*.
$PRAF_{R,R,C}$	Is a Participant Risk Adjustment Factor (cap reallocations) for a cap value of C used to adjust the OSL and *PM* for a *Market Participant* to reflect their relative risk of cap *reallocations* and achieve the *prudential standard* in *region* R for the *Market Participant*.
EL_R	Represents *AEMO*'s estimate of the *Market Participant's* average daily *load* in *region* R.
EG_R	Represents *AEMO*'s estimate of the *Market Participant's* average daily *generation* in *region* R.
RC_R	Represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RD_R	Represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
RCS_R	Represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RDS_R	Represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
PCS_R	Represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the credit party in *region* R.
PDS_R	Represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
$RCC_{R,C}$	Represents the average daily *energy* of prospective (ex ante) cap *reallocation transactions* for which the *Market Participant* is the credit party, for a cap value C in *region* R.
$RDC_{R,C}$	Represents the average daily *energy* of prospective (ex ante) cap reallocation transactions for which the *Market Participant* is the debit party, for a cap value C in *region* R.
$RC\$_R$	Represents the average daily dollar amount of prospective (ex ante) dollar *reallocation transactions* for which the *Market Participant* is the credit party, in *region* R.
$RD\$_R$	Represents the average daily dollar amount of prospective (ex ante) dollar *reallocation transactions* for which the *Market Participant* is the debit party, in *region* R.

The calculated value is rounded in accordance with section 10.1.

Detailed definitions of each term are provided in section 9.

6 The Prudential Margin Calculation

The PM calculation is represented by:

$$\mathbf{PM = MAX\left[\Sigma_R\,(PM_{R,E}),0\right] + MAX\left[\Sigma_R\,(PM_{R,R}),0\right]}$$

$$PM_{R,E} = MAX\left[\,(VEL_R - VEG_R) \times T_{RP},\ (VEL_R - VEG_R) \times T_{RP} / VFPM_R\,\right]$$

$$PM_{R,R} = MAX\left[\,(VRD_R - VRC_R + RD\$_R - RC\$_R) \times T_{RP},\ (VRD_R - VRC_R) / VFPM_R \times T_{RP} + (RD\$_R - RC\$_R) \times T_{RP}\,\right]$$

$VEL_R = EL_R \times P_R \times PRAF_{L,R} \times VFPM_R \times (GST + 1)$ (value of energy *load*)

$VEG_R = EG_R \times P_R \times PRAF_{G,R} \times VFPM_R \times (GST + 1)$ (value of energy *generation*)

$VRD_R = RD_R \times P_R \times PRAF_{R,R} \times VFPM_R$ (value of debit energy *reallocations*)

$+ RDS_R \times (P_R \times PRAF_{R,R} \times VFPM_R - PDS_R)$ (value of debit swap *reallocations*)

$+ \Sigma_C\,[RDC_{R,C} \times (P_R \times PRAF_{R,R} \times VFPM_R - P_R \times PRAF_{R,R,C} \times VFPM_R)]$ (value of debit cap *reallocations*)

$VRC_R = RC_R \times P_R \times PRAF_{R,R} \times VFPM_R$ (value of credit energy *reallocations*)

$+ RCS_R \times (P_R \times PRAF_{R,R} \times VFPM_R - PCS_R)$ (value of credit swap *reallocations*)

$+ \Sigma_C\,[RCC_{R,C} \times (P_R \times PRAF_{R,R} \times VFPM_R - P_R \times PRAF_{R,R,C} \times VFPM_R)]$ (value of credit cap *reallocations*)

Where:

Regional Parameters:

GST	Represents the applicable rate for the Goods and Services Tax.
P_R	Represents *AEMO's* estimate of the average future RRP for each *region* R.
T_{RP}	Is the *reaction period*, which is seven days.
$VFPM_R$	Is a volatility factor, which is a scaling factor specific to the PM used to achieve the *prudential standard* for each *region* R.

Market Participant Specific Parameters:

$PM_{R,E}$	Represents the value of *energy* in the *regional* PM with no allowance for *regional volatility* on net credit amounts.
$PM_{R,R}$	Represents the value of *reallocations* in the *regional* PM with no allowance for *regional volatility* on net credit amounts.
VEL_R	Represents the value of *load* for a *Market Participant* in *region* R.
VEG_R	Represents the value of *generation* for a *Market Participant* in *region* R.
VRD_R	Represents the value of debit energy *reallocations* for a *Market Participant* in *region* R.
VRC_R	Represents the value of credit energy *reallocations* for a *Market Participant* in *region* R.
$PRAF_{L,R}$	Is a Participant Risk Adjustment Factor (*load*) used to adjust the OSL and PM for a *Market Participant* to reflect their relative *load* risk and achieve the *prudential standard* in *region* R for the *Market Participant*.

$PRAF_{G,R}$	is a Participant Risk Adjustment Factor (generation) used to adjust the OSL and PM for a *Market Participant* to reflect their relative generation risk and achieve the *prudential standard* in *region* R for the *Market Participant*.
$PRAF_{R,R}$	is a Participant Risk Adjustment Factor (energy and swap reallocations) used to adjust the OSL and PM for a *Market Participant* to reflect their relative energy and swap reallocation risk and achieve the *prudential standard* in *region* R for the *Market Participant*.
$PRAF_{R,R,C}$	is a Participant Risk Adjustment Factor (cap reallocations) for a cap value of C used to adjust the OSL and PM for a *Market Participant* to reflect their relative risk of cap *reallocations* and achieve the *prudential standard* in *region* R for the *Market Participant*.
EL_R	represents *AEMO*'s estimate of the *Market Participant's* average daily *load* in *region* R.
EG_R	represents *AEMO*'s estimate of the *Market Participant's* average daily *generation* in *region* R.
RC_R	represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RD_R	represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
RCS_R	represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RDS_R	represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
PCS_R	represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the credit party in *region* R.
PDS_R	represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
$RCC_{R,C}$	represents the average daily *energy* of prospective (ex ante) cap *reallocation transactions* for which the *Market Participant* is the credit party, for a cap value C in *region* R.
$RDC_{R,C}$	represents the average daily *energy* of prospective (ex ante) cap reallocation transactions for which the *Market Participant* is the debit party, for a cap value C in *region* R.
$RC\$_R$	represents the average daily dollar amount of prospective (ex ante) dollar *reallocation transactions* for which the *Market Participant* is the credit party, in *region* R.
$RD\$_R$	represents the average daily dollar amount of prospective (ex ante) dollar *reallocation transactions* for which the *Market Participant* is the debit party, in *region* R.

The calculated value is rounded in accordance with section 10.1.

Detailed definitions of each term are provided in section 9.

7 The Typical Accrual

Determination of a *typical accrual* amount is required for the purposes of determining a *call amount* under NER clause 3.3.11(2).

It is assumed that under typical conditions cap and floor *reallocations* will not take effect.

The *typical accrual* calculation is represented by:

TA = DTA x T

$DTA = \Sigma_R DTA_R$ (daily *typical accrual*)

$DTA_R = EL_R \times P_R \times (GST + 1)$ (typical daily value of energy *load*)

$- EG_R \times P_R \times (GST + 1)$ (typical daily value of energy *generation*)

$+ RD_R \times P_R$ (typical daily value of debit energy *reallocations*)

$- RC_R \times P_R$ (typical daily value of credit energy *reallocations*)

$+ RDS_R \times (P_R - PDS_R)$ (typical daily value of debit swap *reallocations*)

$- RCS_R \times (P_R - PCS_R)$ (typical daily value of credit swap reallocations)

$+ (RD\$_R - RC\$_R)$ (typical daily net value of dollar *reallocations*)

Where:

Regional Parameters:

GST	Represents the applicable rate for the Goods and Services Tax.
P_R	Represents *AEMO's* estimate of the average future RRP for each *region* R.
T	Is the number of days over which the corresponding *outstandings* are calculated.

Market Participant Specific Parameters

EL_R	Represents *AEMO*'s estimate of the *Market Participant's* average daily *load* in *region* R.
EG_R	Represents *AEMO*'s estimate of the *Market Participant's* average daily *generation* in *region* R.
RC_R	Represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RD_R	Represents the average daily *energy* of prospective (ex ante) energy *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
RCS_R	Represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
RDS_R	Represents the average daily *energy* of prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
PCS_R	Represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the credit party in *region* R.
PDS_R	Represents the swap energy-weighted average strike price for prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.

Detailed definitions of each term are provided in Section 9.

8 Calculation of Participant Risk Adjustment Factor

Participant Risk Adjustment Factor (PRAF) is a *Market Participant* specific factor calculated by *AEMO* and used to adjust the PM and OSL for a *Market Participant* to reflect their relative risk.

A separate PRAF is calculated for a *Market Participant's load*, *generation*, energy and swap *reallocations* and cap *reallocations*.

The PRAFs are based on the following calculations:

$\mathbf{PRAF_{L,R}}$ =	$\mathbf{MAX[LWPR_{L,R},(LWPR_{L,R})^2]}$	(PRAF - *load*)
$\mathbf{PRAF_{G,R}}$ =	$\mathbf{MAX[LWPR_{G,R},(LWPR_{G,R})^2]}$	(PRAF - *generation*))
$\mathbf{PRAF_{R,R}}$ =	$\mathbf{MAX[LWPR_{R,R},(LWPR_{R,R})^2]}$	(PRAF - energy and swap *reallocations*)
$\mathbf{PRAF_{R,R,C}}$ =	$\mathbf{MAX[LWPR_{R,R,C},(LWPR_{R,R,C})^2]}$	(PRAF cap *reallocations* for a cap value of C)
$LWPR_{L,R}$ =	$PLWP_R / RLWP_R$	(Load-weighted price ratio - *load*)
$LWPR_{G,R}$ =	$PGWP_R / RLWP_R$	(Load-weighted price ratio - *generation*)
$LWPR_{R,R}$ =	$PRWP_R / RLWP_R$	(Load-weighted price ratio - energy and swap *reallocations*)
$LWPR_{R,R,C}$ =	$PLWP_{R,C} / RLWP_{R,C}$	(Load-weighted price ratio - cap *reallocations*)
$PLWP_R$ =	$\Sigma_{HH} (P_{HH,R} \times EL_{HH,M,R}) / (\Sigma_{HH} EL_{HH,R})$	(*Market Participant load*-weighted price)
$PGWP_R$ =	$\Sigma_{HH} (P_{HH,R} \times EG_{HH,M,R}) / (\Sigma_{HH} EG_{HH,R})$	(*Market Participant generation*-weighted price)
$PRWP_R$ =	$\Sigma_{HH} (P_{HH,R} \times R_{HH,R}) / (\Sigma_{HH} R_{HH,R})$	(*Market Participant* energy and swap *reallocation*-weighted price)
$PLWP_{R,C}$ =	$\Sigma_{HH} (P_{HH,R,C} \times R_{HH,R,C}) / (\Sigma_{HH} R_{HH,R,C})$	(*Market Participant load*-weighted price cap *reallocations*)
$RLWP_R$ =	$\Sigma_{HH} (P_{HH,R} \times ERL_{HH,R}) / (\Sigma_{HH} ERL_{HH,R})$	(*Regional load*-weighted price)
$R_{HH,R}$ =	$(RD_{HH,R} - RC_{HH,R})$	(Net prospective half-hourly energy *reallocation* position)
	$+ (RDS_{HH,R} - RCS_{HH,R})$	(Net prospective (ex-ante) half-hourly swap *reallocation* position)
$R_{HH,R,C}$ =	$(RDC_{HH,R,C} - RCC_{HH,R,C})$	(Net prospective (ex-ante) half-hourly cap *reallocation* position for a Cap Value of C)

where:

Regional Parameters:

$ERL_{HH,R}$	Represents *AEMO's* estimate of the half-hourly expected *load* for each *region R.*
$P_{HH,R}$	Represents *AEMO's* estimate of a half-hourly future RRP for each *region* R.
$P_{HH,R,C}$	Represents *AEMO's* estimate of a capped half-hourly future RRP for each *region* R for a cap value of C.
$RLWP_R$	Represents AEMO's estimate of the *regional* load-weighted price in each region R.
$RLWP_{R,C}$	Represents AEMO's estimate of the regional load-weighted capped price in each region R.

Market Participant Specific Parameters:

$EL_{HH,M,R}$	Represents *AEMO*'s estimate of the *Market Participant's* half hourly-load adjusted for *marginal loss factors* in each *region* R.

$EG_{HH,M,R}$	Represents *AEMO*'s estimate of the *Market Participant's* half-hourly generation adjusted for *marginal loss factors* in each *region* R.
$EL_{HH,R}$	Represents *AEMO*'s estimate of the *Market Participant's* half-hourly load in each *region* R.
$EG_{HH,R}$	Represents *AEMO*'s estimate of the *Market Participant's* half-hourly generation in each *region* R.
$LWPR_{L,R}$	Represents *AEMO's* estimate of the *Market Participant's* Load-Weighted Price Ratio (*load*) in *region* R.
$LWPR_{G,R}$	Represents *AEMO's* estimate of the *Market Participant's* Load-Weighted Price Ratio (*generation*) in *region* R.
$LWPR_{R,R}$	Represents *AEMO's* estimate of the *Market Participant's* (Load-Weighted Price Ratio (energy and swap *reallocations*) in *region* R.
$LWPR_{R,R,C}$	Represents *AEMO's* estimate of the *Market Participant's* Load-Weighted Price Ratio (cap reallocations) in *region* R.
$PLWP_{R}$	Represents *AEMO's* estimate of the *Market Participant's* Participant Load-Weighted Price in *region* R.
$PGWP_{R}$	Represents *AEMO's* estimate of the *Market Participant's* Participant Generation-Weighted Price in *region* R.
$PRWP_{R}$	Represents *AEMO's* estimate of the *Market Participant's* Participant Energy and Swap Reallocation-Weighted Price in region R.
$PLWP_{R.C}$	Represents *AEMO's* estimate of the *Market Participant's* Participant Load-Weighted Price Cap Reallocations in *region* R.
$R_{HH,R}$	Represents *AEMO*'s estimate of the *Market Participant's* net half-hourly energy and swap reallocation in each *region* R.
$R_{HH,R,C}$	Represents *AEMO*'s estimate of the *Market Participant's* net half-hourly prospective cap *reallocation* position for each *region* R for a cap value of C.
$RC_{HH,R}$	Represents the half-hourly *energy* of prospective (ex ante) energy *reallocation transactions* for which the *Market Participant* is the credit party of *region* R.
$RD_{HH,R}$	Represents the half-hourly *energy* of prospective (ex ante) energy *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
$RCS_{HH,R}$	Represents the half-hourly *energy* of prospective (ex ante) swap *reallocation transactions*, for which the *Market Participant* is the credit party in *region* R.
$RDS_{HH,R}$	Represents the half-hourly *energy* of prospective (ex ante) swap *reallocation transactions* for which the *Market Participant* is the debit party in *region* R.
$RCC_{HH,R,C}$	Represents the half-hourly *energy* of prospective (ex ante) cap *reallocation transactions* for which the *Market Participant* is the credit party, for a cap value C in *region* R.
$RDC_{HH,R,C}$	Represents the half-hourly *energy* of prospective (ex ante) cap *reallocation transactions* for which the *Market Participant* is the debit party, for a cap value C in *region* R.

Detailed definitions of each term are provided in Section 9.

9 Details of the OSL and PM Components of the MCL

9.1 Adjustment for the Introduction and Repeal of a Carbon Price

On 1 July 2012, as a result of the introduction of the Clean Energy Act 2011 (CEA), the RRP in each region was estimated to have been increased by approximately $20 per MWh in the medium term.

Historical prices used in calculating these Procedures have been adjusted by increasing the historical RRPs by $20 per MWh for each trading interval prior to 1 July 2012.

In accordance with Australian Government policy, the CEA may be repealed with effect on or after 1 July 2014. Following the effective repeal of the CEA and evidence of carbon price-exempt NEM wholesale spot prices AEMO will, as soon as practical, conduct an MCL review.

This and future MCL reviews will include adjustments to:

- Remove the $20 per MWh adjustment on historical RRPs for each trading interval prior to 1 July 2012.
- Decrease historical RRPs by $21 per MWh[1] for regions on the mainland and $12 per MWh[1] for Tasmania for each trading interval from 1 July 2012 to 30 June 2014 (or a later date from which AEMO determines the direct carbon price impact is effectively removed from the RRP).

Retrospective removal of the carbon price will not impact retrospective MCL levels.

9.2 Regional Level Factors

The following factors are calculated at the *regional* level.

9.2.1 Average Daily Regional Load (ERL_R)

The average daily *regional load* for the region (ERL_R) is *AEMO*'s estimate of the average daily *regional load* for a *region* R to be used as an input for the purposes of achieving the desired *prudential standard* at a *regional* level.

The ERL_R is calculated by season, using an exponential weighted moving average approach based on the previous value $ERL_{R(previous)}$ and the most recent *regional loads* for that season. The calculation is outlined below:

1. For each season calculate last year's actual average daily *regional load* ($AERL_R$) using actual daily *regional loads*.
2. Calculate the current ERL_R

   $ERL_R = ERL_{R(previous)} \times (1 - W_{L,R}) + AERL_R \times W_{L,R}$

   Where:

   $ERL_{R(previous)}$ is the previously calculated value of the relevant seasons ERL_R.

   $W_{L,R}$ is the weighting factor for average *regional loads*.

The current value of $W_{L,R}$ is 70%. This weighting factor value is derived based on historic analysis of actual *regional loads* and chosen to best fit average *regional loads* with the exponential moving average approach. The weighting factor will be periodically reviewed by *AEMO* and adjusted following consultation with *Market Participant*s.

[1] These values may change if AEMO calculates a different estimate of the direct impact of the carbon price from 1 July 2012 until the effective date of its removal from the RRP.

9.2.2 Average Price for the Region (P_R)

The average price for the *region* (P_R) is *AEMO*'s estimate of the average seasonal RRP expected to prevail for a *region* R for the purposes of the OSL and PM calculation only. The estimated RRP will be the same for all *Market Participants* in that *region*.

The P_R is calculated by season using an exponential weighted moving average approach based on the previous value $P_{R(previous)}$ and the most recent half-hourly RRPs for that season. The calculation is outlined below:

1. For each season calculate last year's actual average price (AP_R) using actual half-hourly RRP.
2. Calculate the current P_R:

   $P_R = P_{R(previous)} \times (1 - W_{P,R}) + AP_R \times W_{P,R}$

   Where:

   $P_{R(previous)}$ is the previously calculated value of the relevant season's P_R.

   $W_{P,R}$ is the weighting factor for average prices.
3. Where the change in the P_R from one season to the corresponding season in the following year is more than 10%, then the change in the value of P_R is restricted to an increase/decrease of +/- 10%.

The current value of the $W_{P,R}$ is 10%. The weighting factor value is derived based on historic analysis of actual RRP and chosen to best fit average prices with the exponential moving average approach. The weighting factor will be periodically reviewed by *AEMO* and adjusted following consultation with *Market Participant*s.

The change constraint in P_R is designed to increase the stability in the MCL whilst maintaining the 2% POE *prudential standard*.

Where a new region is created, the historical RRPs will be taken from a proxy region as outlined in section 9.3.6

9.3 Regional Level Factors Used in Calculating OSL and PM

9.3.1 Half-hourly Regional Load ($ERL_{HH,R}$) Profile

The calculation of average *half hourly regional loads* ($ERL_{HH,R}$) for the region is required to determine a *regional load* profile as an input into the PRAF calculation only. The average half-hourly *regional load* profile will be the same for all *Market Participants* in that *region*.

The $ERL_{HH,R}$ is calculated per half-hour by season using an exponential weighted moving average approach based on the previous value $ERL_{HH,R\ (previous)}$ and the most recent *regional loads* for that half-hour and season. The calculation is outlined below and repeated for each half-hour in a day (i.e. 48 times):

1. For each season calculate last year's actual average *regional load* for the half-hour ($AERL_{HH,R}$) using actual half-hourly *regional loads*.
2. Calculate the current $ERL_{HH,R}$:

   $ERL_{HH,R} = ERL_{HH,R(previous)} \times (1 - W_{L,R}) + AERL_{HH,R} \times W_{L,R.}$

   Where:

   $ERL_{HH,R(previous)}$ is the previously calculated value of the relevant seasons $ERL_{HH,R}$.

   $W_{L,R}$ is the weighting factor for average *regional loads* (see 9.2.1).

9.3.2 Half Hourly Regional Price ($P_{HH,R}$) Profile

The calculation of average half-hourly prices for the *region* ($P_{HH,R}$) is required to determine a regional price profile as an input into the PRAF calculations only. The average half-hourly *regional* price profile will be the same for all *Market Participants* in that *region*.

The $P_{HH,R}$ is calculated per half-hour by season using an exponential weighted moving average approach based on the previous value $P_{HH,R(previous)}$ and the most recent half-hourly RRPs for that half-hour and season. The calculation is outlined below and repeated for each half hour in a day (i.e. 48 times):

1. For each season, calculate last year's actual average *regional* price for the half hour ($AP_{HH,R}$) using actual half-hourly RRP.
2. Calculate the current $P_{HH,R}$:

   $P_{HH,R} = P_{HH,R(previous)} \times (1 - W_{P,R}) + AP_{HH,R} \times W_{P,R.}$

   Where:

   $P_{HH,R(previous)}$ is the previously calculated value of the relevant seasons $P_{HH,R}$

   $W_{P,R}$ is the same as the weighting factor for average prices (see 9.2.2).
3. Where the change in the $P_{HH,R}$ from one season to the corresponding season in the following year is more than 10%, then the change in the value of $P_{HH,R}$ is restricted to an increase/decrease of +/- 10%.

The change constraint in $P_{HH,R}$ is designed to increase the stability in the PRAF.

Where a new *region* is created, the historical RRPs will be taken from a proxy *region* as outlined in section 9.3.6.

9.3.3 Half-hourly Regional Price ($P_{HH,R,C}$) profile for cap value C

The calculation of average half-hourly capped prices for the *region* ($P_{HH,R,C}$) is required to determine a regional price profile as an input into the PRAF calculations for cap *reallocations* only. The average half-hourly *regional* capped price profile will be the same for all *Market Participants* in that *region*.

The $P_{HH,R,C}$ is calculated per half-hour by season using an exponential weighted moving average approach based on the previous value $P_{HH,R,C(previous)}$ and the most recent capped half-hourly RRPs for that half-hour and season. The calculation is outlined below and repeated for each half-hour in a day (i.e. 48 times).

1. For each season calculate last year's actual average price for the half-hour ($AP_{HH,R,C}$) using actual half hourly RRP, but limiting any actual half-hourly RRP to the cap value C.
2. Calculate the current $P_{HH,R,C}$

   $P_{HH,R,C} = P_{HH,R,C(previous)} \times (1 - W_{P,R}) + AP_{HH,R,C} \times W_{P,R}$

   Where:

   $P_{HH,R,C(previous)}$ is the previously calculated value of the relevant seasons $P_{HH,R,C}$

   $W_{P,R}$ is the same as the weighting factor for average prices (see 9.2.2).
3. Where the change in the $P_{HH,R,C}$ from one season to the corresponding season in the following year is more than 10%, then the change in the value of $P_{HH,R,C}$ is restricted to an increase of +/- 10%.

The change constraint in $P_{HH,R,C}$ is designed to increase the stability in the PRAF.

Where a new *region* is created, the historical RRPs will be taken from a proxy *region* as outlined in section 9.3.6.

9.3.4 Outstandings Limit Volatility Factor ($VFOSL_R$)

The outstandings limit volatility factor ($VFOSL_R$) is a number derived from the distribution of estimated *load* by estimated price and is used as an input to a *Market Participant's* OSL. The $VFOSL_R$ is calculated on a *regional* basis.

The $VFOSL_R$ is calculated by season using an exponential weighted moving average approach based on the previous value $VFOSL_{R(previous)}$ and the most recent half-hourly RRPs and *regional loads* for the season. The calculation is outlined below:

1. For each season calculate last year's actual volatility factor ($AVFOSL_R$) using actual half hourly RRP and *regional load*.
    a. For the relevant season, calculate half-hourly values of the product of RRP and total *load* in the *region*.
    b. Calculate the sum of these half-hourly values on a daily basis.
    c. Using the results of step b, calculate a rolling 35-day average payment for each day within the relevant season. This gives a distribution of the rolling 35-day average daily purchase (RADP).
    d. Calculate the mean (M) of the distribution RADP.
    e. Use the relevant percentile value (X) of the distribution RADP required to calibrate the regional level MCL to meet the *prudential standard*.
    f. Calculate the $AVFOSL_R$ to 1 decimal place, as:

    $AVFOSL_R = X / M$
2. Calculate the current $VFOSL_R$:

    $VFOSL_R = VFOSL_{R(previous)} \times (1 - W_{VF,R}) + AVFOSL_R \times W_{VF,R}$

    Where:

    $VFOSL_{R(previous)}$ is the previously calculated value of the relevant season's $VFOSL_R$.

    $W_{VF,R}$ is the weighting factor for volatility factors.
3. Where the change in the $VFOSL_R$ from one season to the corresponding season in the following year is more than 10%, then the change in the value of $VFOSL_R$ is restricted to an increase/decrease of +/- 10%.

The current value of the $W_{VF,R}$ is 10%. The weighting factor value is derived based on historic analysis of actual VFs and chosen to best fit VFs with the exponential moving average approach. The weighting factor will be periodically reviewed by *AEMO* and adjusted following consultation with *Market Participant*s

The change constraint in $VFOSL_R$ is designed to increase stability in the OSL.

Where a new region is created, the historical RRPs and loads will be taken from a proxy region as outlined in section 9.3.6.

9.3.5 Prudential Margin Volatility Factor ($VFPM_R$)

The prudential margin volatility factor $VFPM_R$ is a number derived from the distribution of estimated load by estimated price and is used as an input to a *Market Participant's* PM. The $VFPM_R$ is calculated on a *regional* basis.

The $VFPM_R$ is calculated by season using an exponential weighted moving average approach based on the previous value $VFPM_{R(previous)}$ and the most recent half-hourly RRPs and *regional loads* for the season. The calculation is outlined below:

1. For each season calculate last year's actual volatility factor ($AVFPM_R$) using actual half-hourly RRP and *regional load*.

a. For the relevant season, calculate half-hourly values of the product of RRP and total customer *load* in the *region*.

b. Calculate the sum of these half-hourly values on a daily basis.

c. Using the results of step b, calculate a rolling seven-day average payment for each day within the relevant season. This gives a distribution of the rolling seven-day average daily purchase (RADP).

d. Calculate the mean (M) of the distribution RADP.

e. Use the relevant percentile value (X) of the distribution RADP that has been chosen by AEMO to calibrate the regional level MCL to achieve the desired *prudential standard*.

f. Calculate the $AVFPM_R$ to 1 decimal place, as:

$AVFPM_R = X / M$

2. Calculate the current $VFPM_R$:

$VFPM_R = VFPM_{R(previous)} \times (1 - W_{VF,R}) + AVFPM_R \times W_{VF,R}$

Where:

$VFPM_{R(previous)}$ is the previously calculated value of the relevant season's $VFPM_R$.

$W_{VF,R}$ is the weighting factor for volatility factors.

3. Where the change in the $VFPM_R$ from one season to the corresponding season in the following year is more than 10%, then the change in the value of $VFPM_R$ is restricted to an increase/decrease of +/- 10%.

The current value of the weighting factor is 10%. The weighting factor value is derived based on historic analysis of actual VFs and chosen to best fit VFs with the exponential moving average approach. The weighting factor will be periodically reviewed by *AEMO* and adjusted following consultation with *Market Participant*s.

The change constraint in $VFPM_R$ is designed to increase stability in the PM.

Where a new *region* is created, the historical RRPs and *loads* will be taken from a proxy *region* as outlined in section 9.3.6.

9.3.6 Regions with insufficient historical data

The approach for determining the $VFOSL_R$ and $VFPM_R$ for a *region* with less than 12 months historical data or less than an entire historical like season is to reference the $VFOSL_R$ and $VFPM_R$ for a *region* selected by *AEMO* that has sufficient historical data.

The selected proxy region would be:

1. For existing *regions* that have been modified by the addition or removal of *connection points*, the existing *region*.
2. For new *regions* with no *interconnection* history, a *region* with similar electrical size;
3. For new *regions* with *interconnection* for more than 12 months, the *interconnected region*.
4. For new *regions* created by the division of an existing *region*, the existing *region*.

Once there is sufficient historical data for a new *region*, 1 is to be applied.

The second approach, 2, would apply to any boundary change that affects *regions*.

9.4 Market Participant Specific Calculations

The following factors are calculated by *AEMO* for each *Market Participant* and are specific to that *Market Participant*.

9.4.1 Estimated Load (EL_R)

The Estimated *Load* (EL_R) for each *Market Participant* is a positive *energy* amount that represents the estimated value of the *Market Participant*'s average daily *load* within *region* R for each season. The average daily *load* is estimated by reference to historical *loads* and evident trends in the *Market Participant*'s usage patterns. AEMO may take into consideration information from the Market Participant when estimating this value. For new *Market Participant*s, the estimate will be agreed between *AEMO* and the *Market Participant* using any relevant information available.

MNSPs operate so that energy is dispatched in a direction and at times leading to surplus *settlement residue* accruing and a credit in the MNSP's settlement account. The dispatched flow varies according to current market conditions, bears a low correlation with historical values and, therefore, cannot be reliably forecast into the future. Accordingly, the estimated *load* and estimated *generation* for a MNSP is zero.

9.4.2 Estimated Half-hourly Load ($EL_{HH,R}$), ($EL_{HH,M,R}$)

The estimated *load* ($EL_{HH,R}$) and the *estimated load* ($EL_{HH,M,R}$) adjusted for marginal loss factors for each *Market Participant* is a positive *energy* amount that represents the estimated value of the *Market Participant*'s half-hourly *load* within *region* R for each season. The half-hourly *load* is estimated by reference to historical *load patterns*. For new *Market Participant*s, the estimate will be agreed between *AEMO* and the *Market Participant* using any relevant information available.

9.4.3 Estimated Generation (EG_R)

The estimated *generation* (EG_R) for each *Market Participant* is a positive *energy* amount that represents the estimated value of average daily sent-out *generation* within *region* R for each season. The average daily sent-out *generation* is estimated based on historical *generation* patterns. AEMO may take into consideration information from the Market Participant when estimating this value. For new *Market Participant*s, the estimate will be agreed between *AEMO* and the *Market Participant* using any relevant information available.

9.4.4 Estimated Half-hourly Generation ($EG_{HH,R}$), ($EG_{HH,M,R}$)

The estimated *generation* ($EG_{HH,R}$) and the *estimated generation* ($EG_{HH,M,R}$) adjusted for marginal loss factors for each *Market Participant* is a positive energy amount that represents the estimated value of half-hourly sent-out *generation* within *region* R for each season. The half-hourly sent-out *generation* is estimated based on historical *generation* patterns. For new *Market Participant*s, the estimate will be agreed between *AEMO* and the *Market Participant* using any relevant information available

9.4.5 Reallocation Amounts (RC_R/RD_R), (RCS_R/RDS_R), (PCS_R/PCS_R), ($RCC_{R,C}/RDC_{R,C}$), ($RC\$_R/RD\$_R$)

Clause 3.3.8 of the NER requires that OSLs and PMs are determined after taking into account the effect of *reallocations*. Substantial *reallocation*, *load* or both by a *Market Generator* (at a level approaching the estimated value of *energy* sales) can lead to its MCL being assessed at a value greater than zero.

The *reallocation* energy credit/debit (RC_R/RD_R) for each *Market Participant* is a positive *energy* amount that represents the estimated average daily *energy* of prospective (ex ante) energy *reallocation* requests (i.e. do not specify a strike price) in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

The *reallocation* swap energy credit/debit (RCS_R/RDS_R) for each *Market Participant* is a positive *energy* amount that represents the estimated average daily *energy* of prospective (ex ante) swap

reallocation requests in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

The reallocation swap price credit/debit (PCS_R/PDS_R) for each *Market Participant* is a positive dollar amount that represents the estimated swap energy-weighted average strike price of prospective (ex ante) swap *reallocation* requests in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

The *reallocation* cap energy credit/debit ($RCC_{R,C}$/$RDC_{R,C}$) for each *Market Participant* is a positive *energy* amount that represents the estimated average daily energy of prospective (ex ante) cap *reallocation requests* in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R and a cap value C.

For the purposes of simplifying the calculation, a number of predefined cap values will be chosen, aligned with the cap values of cap *reallocations* that have been registered (initially these will be $100, $200 and $300). If a cap *reallocation request* has a strike price that does not align with a predefined cap value, it will be included in the next largest cap value. For example, a cap *reallocation* with an average strike price of $290 would be included in the $300 cap value. The predefined cap values will be reviewed during the annual review of the performance of these Procedures against the *prudential standard* detailed in section 11.

The *reallocation* dollar credit/debit ($RC\$_R$/$RD\$_R$) for each *Market Participant* is a positive dollar amount that represents the estimated average daily dollar value of all prospective (ex ante) dollar *reallocation requests* in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

AEMO estimates these average values according to one or more of following:

- The quantity and type of *reallocations* accepted over the previous three months.
- The quantity and type of *reallocations* proposed for up to three months in the future.
- Any sudden changes in *reallocation* patterns for periods in the immediate future.
- *AEMO* may consider written advice from *Market Participants* intending to commence regular prospective (ex ante) *reallocations* in determining the values. Where the lodgement and authorisation of such *reallocation transactions* do not occur according to the *reallocation* timetable, *AEMO* may immediately review the *Market Participant's* OSL and PM.

Reallocation requests based on floor offsets are not considered in the OSL and PM calculations.

The *reallocation* PRAFs have been designed to take account of the average daily profile and do not distinguish business and non-business days. Consequently, *reallocation requests* that AEMO consider inconsistent with the average daily valuation approach in these Procedures, for example, where the total of all *reallocations* cover in large part non-business days, may be ignored for the purpose of AEMO's estimation of the average daily *energy* and energy-weighted prices.

Ex post *reallocations* are not considered in the OSL and PM calculations. A demonstrated history of ex post *reallocations* does not give sufficient confidence that the practice will continue during periods of extreme RRPs. Ex post *reallocations* can assist in management of total outstandings, but not in reducing OSLs.

9.4.6 Half-hourly Reallocation Amounts ($RC_{HH,R}$/$RD_{HH,R}$), ($RCS_{HH,R}$/$RDS_{HH,R}$), ($RCC_{HH,R,C}$/$RDC_{HH,R,C}$)

The half-hourly *reallocation* amounts are estimated using an approach consistent with the average daily *reallocation* amounts.

The half-hourly *reallocation* energy credit/debit ($RC_{HH,R}$/$RD_{HH,R}$) for each *Market Participant* is a positive *energy* amount that represents the estimated half-hourly *energy* of prospective (ex ante) energy *reallocation requests* (i.e. do not specify a strike price) in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

The half-hourly *reallocation* swap energy credit/debit ($RCS_{HH,R}$/$RDS_{HH,R}$) for each *Market Participant* is a positive energy amount that represents the estimated half-hourly energy of prospective (ex ante) swap *reallocation requests* in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R.

The *reallocation* cap energy credit/debit ($RCC_{HH,R,C}$/$RDC_{HH,R,C}$) for each *Market Participant* is a positive *energy* amount that represents the estimated half-hourly energy of prospective (ex ante) cap *reallocation* requests in the immediate future for which the *Market Participant* is the credit/debit party respectively, for *region* R and a cap value C.

9.4.7 Participant Risk Adjustment Factors ($PRAF_{L,R}$, $PRAF_{G,R}$, $PRAF_{R,R}$)

The Participant Risk Adjustment Factors ($PRAF_{L,R}$ or $PRAF_{G,R}$ or $PRAF_{R,R}$) are factors derived by *AEMO* using historical data. They are used to reflect the relative risk of *Market Participants'* estimated *load*, *generation* and energy and swap *reallocations* respectively.

These PRAFs are based on an analysis of the relationship between half-hourly *regional load* / *generation* / *energy* and swap *reallocation* profiles, half-hourly *regional* prices and historic POE.

In determining of a *Market Participant's* PRAFs MLF-adjusted *load* and *generation* amounts are used to account for the impact of this variable on each *Market Participant's prudential settings*. Details of the calculation of the PRAFs are given in section 8.

The PRAF for each MCL review will be based on data from the previous like season where available and is determined to be representative of the *Market Participant's* current trading behaviour. Where insufficient historical data is available or the *Market Participant's* trading behaviour has changed significantly since the previous like season then a more representative range of historical data may be used. Where no data is available a default PRAF value of 1.05 for load ($PRAF_{L,R}$) and 0.95 for generation ($PRAF_{G,R}$) will be applied.

9.4.8 Participant Capped Risk Adjustment Factor ($PRAF_{R,R,C}$)

The Participant Risk Adjustment Factor ($PRAF_{R,R,C}$) is a factor derived by *AEMO* using historical data. It is used to reflect the relative risk of *Market Participants'* cap reallocations with capped price.

The $PRAF_{R,R,C}$ is based on analysis of the relationship between half-hourly *regional* cap *reallocation* profiles, capped half-hourly *regional* prices and historic POE. Details of the calculation of the $PRAF_{R,R,C}$ are given in section 8.

10 Maximum Credit Limit Determination

The MCL determination for a *Market Participant* is the sum of the OSL and the PM. The MCL is the minimum value of *credit support* that must be lodged with *AEMO* by the *Market Participant*.

10.1 Rounding

The value of the MCL is determined as the sum of the *Market Participant's* OSL and the *Market Participant's* PM. The MCL and PM can never be less than zero.

The value of the MCL is then rounded up to the next multiple of $10,000 for values up to $250,000 and to the next multiple of $100,000 for values above $250,000 so that minor changes in a *Market Participant*'s average purchased *energy*, typically through contestable customer transfers, is unlikely to affect the end result of the MCL determination.

The value of the PM is rounded up to the nearest $1,000. The value of the OSL is rounded up to the nearest $1,000. This is performed to simplify the management of prudential requirements by *Market Participant*s.

10.2 Maximum Credit Limit for New Entrants and Exiting Market Participants

Where a new *Market Participant* registers as a *Market Customer*, *Market Generator* or *Market Small Generation Aggregator* (SGA), *AEMO* will assess the OSL and PM that are to apply from the effective date of registration. *AEMO*'s preference is that this calculation is based on information provided by the applicant, including:

- Expected *load* during the relevant period based on expected customer acquisition and transfer activity.
- For *Market Generators* and *Market SGA*, the expected capacity and output of *generating units* being registered, and projected *load* to be consumed during construction and commissioning.
- Intention to utilise *reallocations* to cover part or all of traded *energy*.

Where an existing *Market Participant* plans to deregister from the market and that participant has had no trading activity for a six month period AEMO may determine both OSL and PM to be zero.

The following table has been provided as a guide to the nominal OSL and PM values that *AEMO* may determine as part of the assessment of a new *Market Participant* or an existing *Market Participant* who is planning to deregister. Individual *Market Participant* calculations may vary.

PARTICIPANT TYPE	REQUIREMENT	OSL[2]	PM[2]
New *Market Generator* and *SGA* - not yet generating	Auxiliary/ commissioning load coverage	$2,000 per 1 MW	$500 per 1 MW
New *Market Customer* – planning to acquire customers	3 month growth estimates available	As per section 5, $8,000 minimum	As per Section 6, $2,000 minimum
Existing *Market Participant* – inactive	6 months inactive trading history available	$0	$0

Where a new active *Market Customer* is not able to provide any data on their expected *load* a default OSL of $80,000 and PM of $20,000 may be applied.

[2] For *Market Generators* and *SGA,* OSL assumes 2% house *load*, 24 hours per day for 35 days with a $VFOSL_R$ x P_R of $75/MWh and PM assumes 2% house *load*, 24 hours per day for 7 days with a $VFPM_R$ x P_R of $90/MWh for each 1 MW of generating capacity rounded up to the nearest 1 MW.

Any new *Market Participant* wishing to have *reallocations* taken into account in its MCL calculation must consult with *AEMO* on its expected *generation* and *load*.

Where a *Market Participant*'s actual *load* appears to be significantly greater than that assumed upon registration, an MCL review will be undertaken at the earliest opportunity and a revised MCL issued.

11 Review of Procedures and Prudential Settings

11.1 Methodology and calculation factors

Clause 3.3.8(f) of the NER requires that at least once a year *AEMO* must review, prepare and *publish* a report on the effectiveness of the methodology in achieving the objective of these Procedures to ensure the *prudential standard* is met for the NEM, with any recommendations to enhance the methodology. *AEMO* anticipates that the weighting factors and the adjustment factors used in the calculation of *Market Participants'* OSL and PM will be reviewed around every three years under normal market conditions.

11.2 Market Participant Prudential Settings

Clause 3.3.8(l) states that *AEMO* must review the *prudential settings* that apply to each *Market Participant* no later than a year after the last determination or review of the *Market Participant's* prudential settings.

Clause 3.3.8(m) of the NER allows *AEMO* at any time, and for any reason that is consistent with the objective of these Procedures in meeting the *prudential standard, to* change the *prudential settings* that apply to a *Market Participant*, provided that any change to the *Market Participant's prudential settings* applies no earlier than one *business day* after the date *AEMO* notifies the *Market Participant* of changes to its *prudential settings*.

12 Trading Limit

A *Market Participant* may provide *credit support* in excess of that required following application of these Procedures. Clause 3.3.10 of the NER states that the *trading limit* for the *Market Participant* will be determined from the difference between the total value of *credit support* and the PM. Note that where the PM exceeds the total *credit support*, the *trading limit* will be negative.

The following examples illustrate the *trading limit* in different scenarios (rounding has been ignored):

- For a *Market Customer* with *credit support* = $100 and PM = $16, then the *trading limit* = $84. The *Market Customer* must always ensure that the total *outstandings* is less than $84 (i.e. their debit position must not exceed $84).
- For a *Market Customer* with *credit support* = $50 and PM = $80, then *trading limit* = $-30. The *Market Customer* must always ensure that the total *outstandings* is more negative than $-30 (i.e. they must maintain a credit of more than $30).
- For a *Market Generator* with *credit support* = $0 and PM = $10, then *trading limit* = $-10. The *Market Generator* must always ensure that the total *outstandings* is more negative than $-10 (i.e. they must maintain a credit of more than $10).

Note that in the above examples, a negative *outstandings* is considered to be a net *settlement* amount owed by *AEMO* to the *Market Participant*.