

CREDIT LIMIT PROCEDURES

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Important Notice

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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
GST	Goods and Services Tax
LWPR	load weighted price ratio
OSL	<i>outstandings limit</i>
MCL	<i>maximum credit limit</i>
MLF	<i>marginal loss factor</i>
MNSP	<i>market network service provider</i>
NER	National Electricity Rules
PM	<i>prudential margin</i>
POE	<i>prudential probability of exceedance</i>
PRAF	Participant Risk Adjustment Factor specific to <i>Market Participant</i>
Procedures	<i>credit limit procedures</i>
RDS_R	<i>Market Participant's average daily debit swap reallocations in region</i>
RD\$_R	<i>Market Participant's average daily debit dollar reallocations in region</i>
RRP	<i>regional reference price</i>
T_{OSL}	<i>OSL time period, 35 days</i>
T_{RP}	<i>reaction period time period, 7 days</i>
VF	Volatility Factor
TA	<i>typical accrual</i>

1 Introduction

These are the **Credit Limits Procedures (Procedures)** made in accordance with clause 3.3.8 of the National Electricity Rules (**NER**).

These Procedures commence on **[1 June 2013]**.

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

2 Purpose

The purpose of these Procedures is to establish the methodology by which AEMO will determine the *prudential settings* for each *Market Participant* so that the *prudential standard* is met for the NEM.

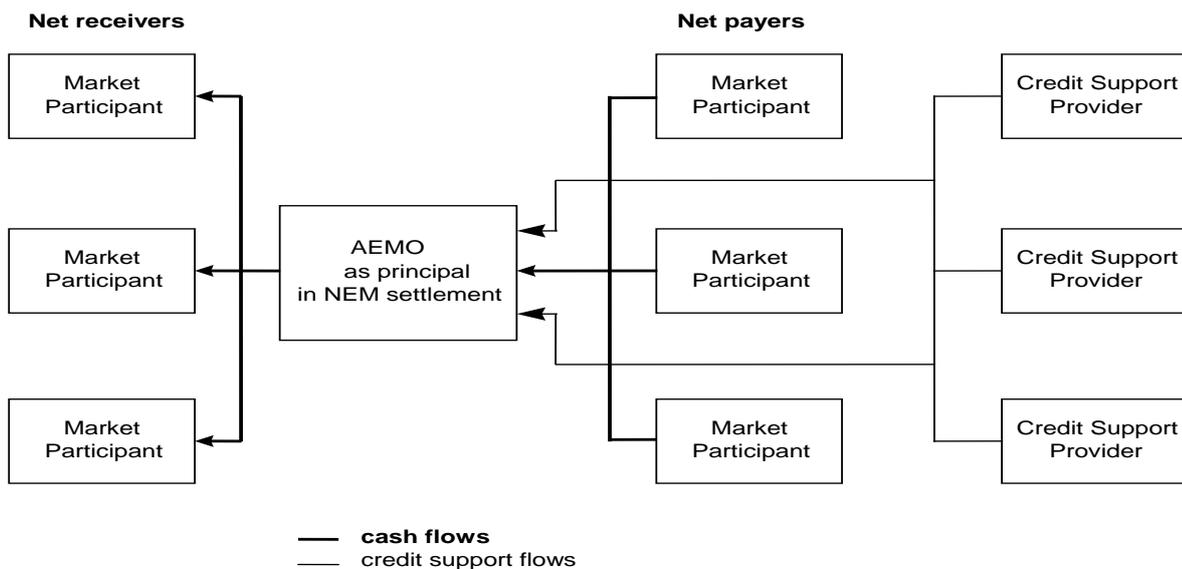
The *prudential standard* means the value of the prudential probability of exceedance (POE), expressed as a percentage. The POE means the probability of a Market Participant's maximum credit limit (MCL) being exceeded by its *outstandings* at the end of the *reaction period* following the Market Participant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

3 Credit Support in the NEM

AEMO acts as the principal in the settlement of financial transactions with *Market Participants* related to the electricity spot market. Settlement occurs up to 5 weeks after the liability accrues, which gives rise to the need for *credit support* and credit limits.

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 FINANCIAL 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.

4 Rationale for Setting a *Maximum Credit Limit* (MCL)

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 govern the prudential supervision of *Market Participants*, and are designed to ensure credit risk is not factored into the determination of the RRP.

A key element of the NER is a requirement for *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 estimating-determining *Market Participants' credit support* requirements have been designed to take account of seasonal differences in RRP, volatility and *Market Participants' particular characteristics*.

4.1 Rationale for Setting an *Outstandings Limit* (OSL)

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.

4.2 Rationale for Setting a *Prudential Margin* (PM)

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 7 days).

5 NER Requirements for Determining OSL and PM

AEMO is required to develop a methodology to determine the OSL and PM of each *Market Participant*, that is *Market Generators*, *Market Customers* and *Market Network Service Providers* (MNSPs), in accordance with clause 3.3.8 of the NER.

The NER do not prescribe the formula to determine the OSL and PM, but specify the principles of the calculation.

Clause 3.3.8(b) of the NER requires that "*credit limit procedures ... establish the process by which AEMO will determine the prudential settings for each Market Participant so that the prudential standard is met for the NEM.*" The *prudential standard* is the value of the *prudential probability of exceedance* (POE) expressed as a percentage. That percentage is determined by clause 3.3.4.A to be 2%.

The POE is the probability of the *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 the breach.

5.1 Components AEMO must consider in calculating the OSL and the PM

These Procedures are based on a number of components that AEMO must consider. These components, included in clause 3.3.8(d) of the NER are:

- 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.

~~In line with the requirements of the NER, the Procedures determines the MCL for a Market Participant as the sum of the OSL and the PM.~~

6 Meeting the *Prudential Standard*

6.1 Approach to calculating the MCL

These Procedures consider:

- Expected *regional load* and RRP.
- 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:

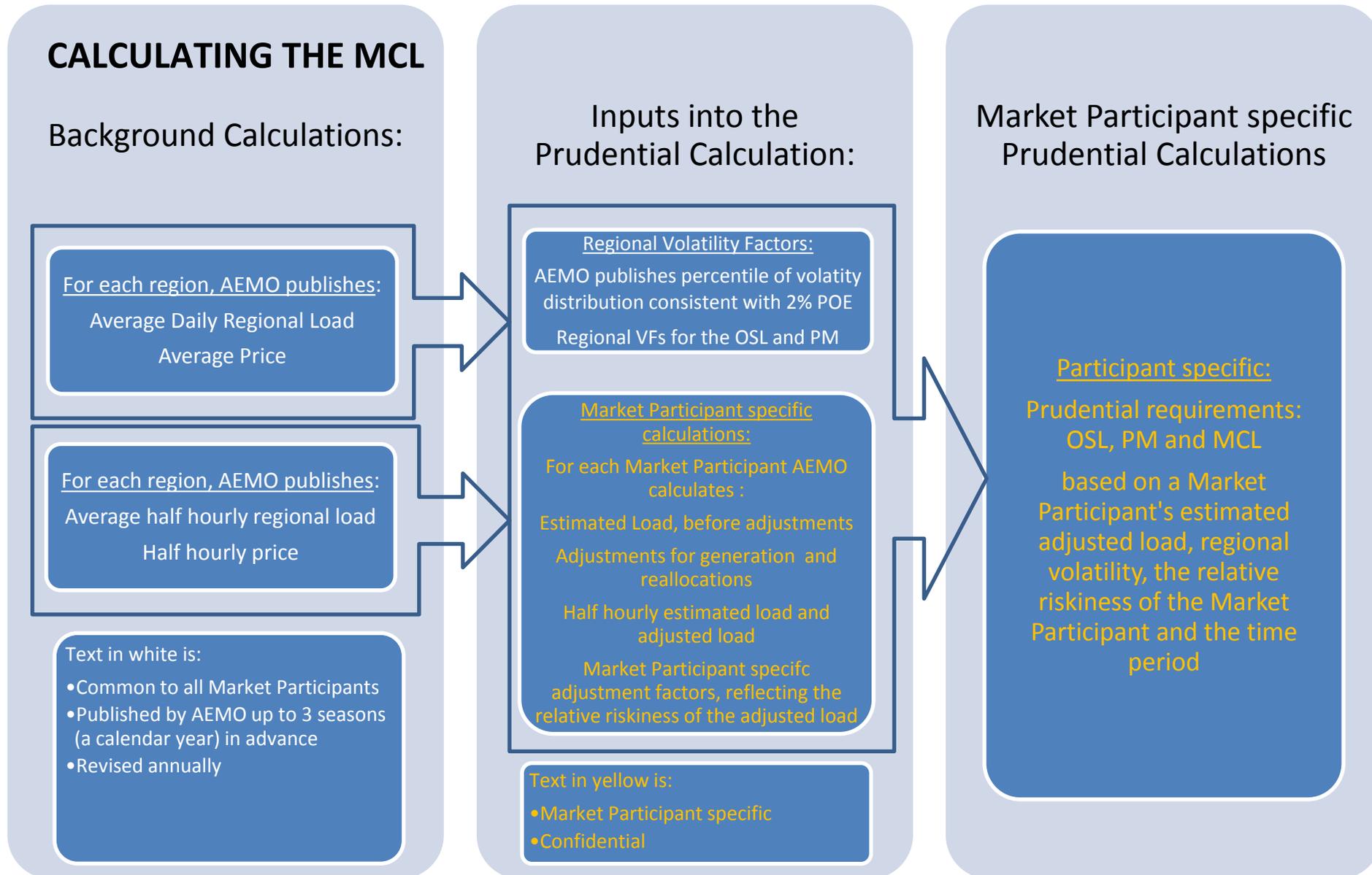
- A number of *regional* calculations that establish the *regional* inputs into the calculation of a *Market Participant's* OSL and PM.
- A number of *regional* calculations, common to all *Market Participants*, that are used in the calculation of an individual *Market Participant's* OSL and PM.
- A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

The following diagram 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, GST.

The next sections list the elements in each part of the calculation, while the specific equations are discussed in Sections 7 to 11.



6.2 Statistical Approach to the Development of these Procedures

In taking into account the factors *AEMO* must consider, the timeframes over which the performance of these Procedures is to be assessed and the desirability for the *prudential standard* not to display unnecessary instability from one period to the next, 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 RRP 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*.

The objective of the Procedures is to 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.

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

6.2.1.1 Regional inputs used in the VF 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 regards to estimated *regional loads*, estimated *regional* RRP, estimated VFs for the PM and OSL and the appropriate time periods (T_{OSL}, T_{RP}).

6.2.1.2 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 will publish its calculation of the percentile of the volatility distribution consistent with a 2% POE for each *region* annually in advance. Consistent with the assessment of these Procedures performance described in Section 6.2.5.2 it is unlikely that these percentiles will change more than once every 3 years.

6.2.2 Approach to calculating a *Market Participant's* OSL and the PM

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

- Regional parameters such as forecast-estimated RRP and estimated volatility.
- An estimate of *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 RRP.
 - The LWPR is expressed as an index relative to the expected half hourly RRP, where a value greater than 1 indicates that a *Market Participant's* load weighted price is higher than that for the *region*.

6.3 Elements of the *Credit Limit Procedures*

6.3.1 Elements common to all *regions*

6.3.1.1 Season definitions

There are three seasons used for all *regions*:

- Summer, which is the period beginning 1 December and ending on 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.

6.3.1.2 *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 is based on factors as defined in Schedule 3.3 of the NER.~~ It has two components, namely:

- The *billing period*, which is defined as 7 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 7 days.

6.3.1.3 Goods and Services Tax Rate (GST)

The GST rate is the value of the GST which is applicable for the 3 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.

6.3.2 *Regional Level Calculations*

The parameters resulting from the *regional* level calculations are identical for all *Market Participants*. AEMO will publish the seasonal parameters in advance for all *regions*.

6.3.2.1 Calculations used in determining VF for the OSL (VF_{OSL_R}) and the PM (VF_{PM_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 such a level to ensure that, for each *region*, the *prudential standard* is met.

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

6.3.3 **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 11.4.5);
- 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 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 to the PM to eliminate insignificant changes and to simplify the management of credit support.
- OSLs for new *Market Participants* are based on information provided by them, including projected *load* growth and estimates of *load* during construction and commissioning. Where information is unavailable the parameters set out in Section 12.2 may be used.

The OSL is assessed over a 35 day period (T_{OSL}).

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; and
 - 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 7 days).

6.3.3.1 Calculating a *Market Participant's* adjusted Load

Additional scaling factors are used to derive a more accurate estimate of trading amounts, specifically GST.

6.3.3.2 Calculating the OSL and the PM

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* (VF_{OSL_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} .

7 The *Outstandings Limit* Calculation

The OSL Calculation is represented by:

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

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

$$- (VEG_R + VRC_R + RC\$_R) \times T_{OSL} \quad (\text{OSL decreased by credit})$$

$$OSL_{R,I} = (VEL_R + VRD_R) \times T_{OSL} / VFOSL_R$$

$$- (VEG_R + VRC_R) \times T_{OSL} / VFOSL_R$$

$$+ (RD\$_R - RC\$_R) \times T_{OSL}$$

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

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

$$VRD_R = RD_R \times P_R \times \text{PRAF}_{R,R} \times VFOSL_R \quad (\text{value of debit energy reallocations})$$

$$+ RDS_R \times (P_R \times \text{PRAF}_{R,R} \times VFOSL_R - PDS_R) \quad (\text{value of debit swap reallocations})$$

$$+ \sum_C [RDC_{R,C} \times (P_R \times \text{PRAF}_{R,R} \times VFOSL_R - P_R \times \text{PRAF}_{R,R,C} \times VFOSL_R)] \quad (\text{value of debit cap reallocations})$$

$$VRC_R = RC_R \times P_R \times \text{PRAF}_{R,R} \times VFOSL_R \quad (\text{value of credit energy reallocations})$$

$$+ RCS_R \times (P_R \times \text{PRAF}_{R,R} \times VFOSL_R - PCS_R) \quad (\text{value of credit swap reallocations})$$

$$+ \sum_C [RCC_{R,C} \times (P_R \times \text{PRAF}_{R,R} \times VFOSL_R - P_R \times \text{PRAF}_{R,R,C} \times VFOSL_R)] \quad (\text{value of credit cap reallocations})$$

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_{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*;

PM AEMO's calculation of the PM for a *Market Participant*

$\text{PRAF}_{L,R}$ is a Participant Risk Adjustment Factor (*load*) used to adjust the OSL and PM for a 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 <i>prudential standard</i> in <i>region R</i> for the <i>Market Participant</i> ;
PRAF _{R,R}	is a Participant Risk Adjustment Factor (energy and swap reallocations) used to adjust the OSL and PM for a participant to reflect their relative energy and swap reallocation risk and achieve the <i>prudential standard</i> in <i>region R</i> for the <i>Market Participant</i> ;
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 participant to reflect their relative risk of cap <i>reallocations</i> and achieve the <i>prudential standard</i> in <i>region R</i> for the <i>Market Participant</i> ;
EL _R	represents AEMO's estimate of the <i>Market Participant's</i> average daily <i>load</i> in <i>region R</i> ;
EG _R	represents AEMO's estimate of the <i>Market Participant's</i> average daily <i>generation</i> in <i>region R</i> ;
RC _R	represents the average daily <i>energy</i> of prospective (ex ante) <i>energy reallocation transactions</i> , for which the <i>Market Participant</i> is the credit party in <i>region R</i> ;
RD _R	represents the average daily <i>energy</i> of prospective (ex ante) <i>energy reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in <i>region R</i> ;
RCS _R	represents the average daily <i>energy</i> of prospective (ex ante) <i>swap reallocation transactions</i> , for which the <i>Market Participant</i> is the credit party in <i>region R</i> ;
RDS _R	represents the average daily <i>energy</i> of prospective (ex ante) <i>swap reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in <i>region R</i> ;
PCS _R	represents the swap energy-weighted average strike price for prospective (ex ante) <i>swap reallocation transactions</i> for which the <i>Market Participant</i> is the credit party in <i>region R</i> ;
PDS _R	represents the swap energy-weighted average strike price for prospective (ex ante) <i>swap reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in <i>region R</i> ;
RCC _{R,C}	represents the average daily <i>energy</i> of prospective (ex ante) <i>cap reallocation transactions</i> for which the <i>Market Participant</i> is the credit party, for a cap value C in <i>region R</i> ;
RDC _{R,C}	represents the average daily <i>energy</i> of prospective (ex ante) <i>cap reallocation transactions</i> for which the <i>Market Participant</i> is the debit party, for a cap value C in <i>region R</i> ;
RC _{\$R}	represents the average daily dollar amount of prospective (ex ante) <i>dollar reallocation transactions</i> for which the <i>Market Participant</i> is the credit party, in <i>region R</i> ;
RD _{\$R}	represents the average daily dollar amount of prospective (ex ante) <i>dollar reallocation transactions</i> for which the <i>Market Participant</i> is the debit party, in <i>region R</i> ;
The calculated value is rounded in accordance with Section 12.1.	
Detailed definitions of each term are provided in Section 11.	

8 The Prudential Margin Calculation

The PM calculation is represented by:

$$PM = \text{MAX} [\sum_R (\text{PMVEL}_{R,E} - \text{VEG}_{R,E}) \times T_{RP}, 0] \\ + \text{MAX} [\sum_R (\text{PMVRD}_R - \text{VRC}_R + \text{RDS}_R - \text{RCS}_R) \times T_{RP}, 0]$$

$$\text{PM}_{R,E} = \text{MAX} [(\text{VEL}_R - \text{VEG}_R) \times T_{RP}, (\text{VEL}_R - \text{VEG}_R) \times T_{RP} / \text{VFPM}_R]$$

$$\text{PM}_{R,R} = \text{MAX} [(\text{VRD}_R - \text{VRC}_R + \text{RDS}_R - \text{RCS}_R) \times T_{RP}, \\ \frac{(\text{VRD}_R - \text{VRC}_R) / \text{VFPM}_R \times T_{RP} + (\text{RDS}_R - \text{RCS}_R) \times T_{RP}}{1}]$$

$$\text{VEL}_R = \text{EL}_R \times P_R \times \text{PRAF}_{L,R} \times \text{VFPM}_R \times (\text{GST} + 1) \quad (\text{value of energy load})$$

$$\text{VEG}_R = \text{EG}_R \times P_R \times \text{PRAF}_{G,R} \times \text{VFPM}_R \times (\text{GST} + 1) \quad (\text{value of energy generation})$$

$$\text{VRD}_R = \text{RD}_R \times P_R \times \text{VFPM}_R \times \text{PRAF}_{R,R} \quad (\text{value of debit energy reallocations})$$

$$+ \text{RDS}_R \times (P_R \times \text{VFPM}_R \times \text{PRAF}_{R,R} - \text{PDS}_R) \quad (\text{value of debit swap reallocations})$$

$$+ \sum_C [\text{RDC}_{R,C} \times$$

$$(P_R \times \text{VFPM}_R \times \text{PRAF}_{R,R} - P_R \times \text{VFPM}_R \times \text{PRAF}_{R,R,C})] \quad (\text{value of debit cap reallocations})$$

$$\text{VRC}_R = \text{RC}_R \times P_R \times \text{PRAF}_{R,R} \times \text{VFPM}_R \quad (\text{value of credit energy reallocations})$$

$$+ \text{RCS}_R \times (P_R \times \text{PRAF}_{R,R} \times \text{VFPM}_R - \text{PCS}_R) \quad (\text{value of credit swap reallocations})$$

$$+ \sum_C [\text{RCC}_{R,C} \times$$

$$(P_R \times \text{PRAF}_{R,R} \times \text{VFPM}_R - P_R \times \text{PRAF}_{R,R,C} \times \text{VFPM}_R)] \quad (\text{value of credit cap reallocations})$$

where:

Regional Parameters:

P_R represents AEMO's estimate of the average future RRP for each region R;

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;

T_{RP} is the reaction period, which is 7 days;

GST represents the applicable rate for the Goods and Services Tax.

Market Participant Specific Parameters

$\text{PM}_{R,E}$ represents the value of energy in the regional PM with no allowance for regional volatility on net credit amounts

$\text{PM}_{R,R}$ 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 energy 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;

IRA represents the adjustment to the OSL for Market Participants with a net credit;

PM AEMO's calculation of the PM for a Market Participant

$\text{PRAF}_{L,R}$ is a Participant Risk Adjustment Factor (load) used to adjust the OSL and PM for a 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 <i>prudential standard</i> in region R for the <i>Market Participant</i> ;
PRAF _{R,R}	is a Participant Risk Adjustment Factor (energy and swap reallocations) used to adjust the OSL and PM for a participant to reflect their relative energy and swap reallocation risk and achieve the <i>prudential standard</i> in region R for the <i>Market Participant</i> ;
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 participant to reflect their relative risk of cap <i>reallocations</i> and achieve the <i>prudential standard</i> in region R for the <i>Market Participant</i> ;
EL _R	represents AEMO's estimate of the <i>Market Participant's</i> average daily <i>load</i> in region R;
EG _R	represents AEMO's estimate of the <i>Market Participant's</i> average daily <i>generation</i> in region R;
RC _R	represents the average daily <i>energy</i> of prospective (ex ante) energy <i>reallocation transactions</i> , for which the <i>Market Participant</i> is the credit party in region R;
RD _R	represents the average daily <i>energy</i> of prospective (ex ante) energy <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in region R;
RCS _R	represents the average daily <i>energy</i> of prospective (ex ante) swap <i>reallocation transactions</i> , for which the <i>Market Participant</i> is the credit party in region R;
RDS _R	represents the average daily <i>energy</i> of prospective (ex ante) swap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in region R;
PCS _R	represents the swap energy-weighted average strike price for prospective (ex ante) swap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the credit party in region R;
PDS _R	represents the swap energy-weighted average strike price for prospective (ex ante) swap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in region R;
RCC _{R,C}	represents the average daily <i>energy</i> of prospective (ex ante) cap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the credit party, for a cap value C in region R;
RDC _{R,C}	represents the average daily <i>energy</i> of prospective (ex ante) cap reallocation transactions for which the <i>Market Participant</i> 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 <i>reallocation transactions</i> for which the <i>Market Participant</i> is the credit party, in region R;
RD\$ _R	represents the average daily dollar amount of prospective (ex ante) dollar <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party, in region R;

The calculated value is rounded in accordance with Section 12.1.

Detailed definitions of each term are provided in Section 11.

9 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:

$$TA = DTA \times T$$

$$DTA = \sum_R DTA_R \quad \text{(daily typical accrual)}$$

$$DTA_R = \begin{aligned} & EL_R \times P_R \times (GST + 1) && \text{(typical daily value of energy load)} \\ & - EG_R \times P_R \times (GST + 1) && \text{(typical daily value of energy generation)} \\ & + RD_R \times P_R && \text{(typical daily value of debit energy reallocations)} \\ & - RC_R \times P_R && \text{(typical daily value of credit energy reallocations)} \\ & + RDS_R \times (P_R - PDS_R) && \text{(typical daily value of debit swap reallocations)} \\ & - RCS_R \times (P_R - PCS_R) && \text{(typical daily value of credit swap reallocations)} \\ & + (RD\$_R - RC\$_R) && \text{(typical daily net value of dollar reallocations)} \end{aligned}$$

where:

Regional Parameters:

- 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
 GST represents the applicable rate for the Goods and Services Tax.

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 11.

10 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:

$PRAF_{L,R} =$	$MAX[LWPR_{L,R}, (LWPR_{L,R})^2]$	(PRAF - load)
$PRAF_{G,R} =$	$MAX[LWPR_{G,R}, (LWPR_{G,R})^2]$	(PRAF - generation)
$PRAF_{R,R} =$	$MAX[LWPR_{R,R}, (LWPR_{R,R})^2]$	(PRAF - energy and swap reallocations)
$PRAF_{R,R,C} =$	$MAX[LWPR_{R,R,C}, (LWPR_{R,R,C})^2]$	(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)
$PRWP_R =$	$\Sigma_{HH} (P_{HH,R} \times PR_{HH,R}) / (\Sigma_{HH} PR_{HH,R})$	(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 <i>Market Participant's</i> half hourly generation adjusted for <i>marginal loss factors</i> in each <i>region R</i> ;
$EL_{HH,R}$	represents AEMO's estimate of the <i>Market Participant's</i> half hourly load in each <i>region R</i> ;
$EG_{HH,R}$	represents AEMO's estimate of the <i>Market Participant's</i> half hourly generation adjusted for <i>marginal loss factors</i> in each <i>region R</i> ;
$LWPR_{L,R}$	represents AEMO's estimate of the <i>Market Participant's</i> Load Weighted Price Ratio (<i>load</i>) in <i>region R</i>
$LWPR_{G,R}$	represents AEMO's estimate of the <i>Market Participant's</i> Load Weighted Price Ratio (<i>generation</i>) in <i>region R</i>
$LWPR_{R,R}$	represents AEMO's estimate of the <i>Market Participant's</i> (Load Weighted Price Ratio (<i>energy and swap reallocations</i>)) in <i>region R</i>
$LWPR_{R,R,C}$	represents AEMO's estimate of the <i>Market Participant's</i> Load Weighted Price Ratio (<i>cap reallocations</i>) in <i>region R</i>
$PLWP_R$	represents AEMO's estimate of the <i>Market Participant's</i> Participant Load Weighted Price in <i>region R</i>
$PGWP_R$	represents AEMO's estimate of the <i>Market Participant's</i> Participant Generation Weighted Price in <i>region R</i>
$PRWP_R$	represents AEMO's estimate of the <i>Market Participant's</i> Participant Energy and Swap Reallocation Weighted Price in <i>region R</i>
$PLWP_{R,C}$	represents AEMO's estimate of the <i>Market Participant's</i> Participant Load Weighted Price Cap Reallocations in <i>region R</i>
$R_{HH,R}$	represents AEMO's estimate of the participant's net half hourly energy and swap reallocation in each <i>region R</i> ;
$R_{HH,R,C}$	represents AEMO's estimate of the <i>Market Participant's</i> net half hourly prospective cap reallocation position for each <i>region R</i> for a cap value of C;
$RC_{HH,R}$	represents the half hourly energy of prospective (<i>ex ante</i>) energy <i>reallocation transactions</i> for which the <i>Market Participant</i> is the credit party of <i>region R</i> ;
$RD_{HH,R}$	represents the half hourly energy of prospective (<i>ex ante</i>) energy <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in <i>region R</i> ;
$RCS_{HH,R}$	represents the half hourly energy of prospective (<i>ex ante</i>) swap <i>reallocation transactions</i> , for which the <i>Market Participant</i> is the credit party in <i>region R</i> ;
$RDS_{HH,R}$	represents the half hourly energy of prospective (<i>ex ante</i>) swap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party in <i>region R</i> ;
$RCC_{HH,R,C}$	represents the half hourly energy of prospective (<i>ex ante</i>) cap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the credit party, for a cap value C in <i>region R</i> ;
$RDC_{HH,R,C}$	represents the half hourly energy of prospective (<i>ex ante</i>) cap <i>reallocation transactions</i> for which the <i>Market Participant</i> is the debit party, for a cap value C in <i>region R</i> ;
The calculated value is rounded in accordance with Section 12.1.	
Detailed definitions of each term are provided in Section 11.	

11 Details of the OSL and PM Components of the MCL

11.1 Adjustment for the Introduction of a Carbon Price

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

Historical prices used in the calculations in these Procedures will be adjusted by increasing the historical RRP by \$20 per MWh for each trading interval prior to 1 July 2012.

These adjustments will be reviewed during the annual review of the performance of these Procedures against the *prudential standard* detailed in Section 13.

11.1.1.2 Regional Level Factors

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

11.1.1.2.1 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 has been 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 Participants*.

11.1.2.2 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 RRP 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. Adjust AP_R or P_{R(previous)} for any expected step changes in prices as described below.~~
3. Calculate the current P_R

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

Where:

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

$W_{P,R}$ is the weighting factor for average prices.

- 4.3.** 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 has been 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 Participants*.

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 RRP's will be taken from a proxy region as outlined in Section 11.3.6

11.211.3 Regional Level Factors Used in Calculating a *Market Participant's* OSL and PM

11.2.11.3.1 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 $ERL_{HH,R(\text{previous})}$ 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 $ERL_{HH,R}$

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

Where:

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

$W_{L,R}$ is the weighting factor for average *regional loads* (see 11.2.1)

11.2.211.3.2 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 $P_{HH,R(\text{previous})}$ and the most recent half hourly RRP's 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. Adjust $AP_{HH,R}$ or $P_{HH,R(\text{previous})}$ for any expected step changes in prices as described below.~~

- ~~3.2.~~ Calculate the current $P_{HH,R}$

$$4.3. P_{HH,R} = P_{HH,R(\text{previous})} \times (1 - W_{P,R}) + AP_{HH,R} \times W_{P,R}$$

Where:

$P_{HH,R(\text{previous})}$ 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 11.2.2).

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 RRP's will be taken from a proxy *region* as outlined in Section 11.3.6.

11.3.3 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 $P_{HH,R,C(\text{previous})}$ and the most recent capped half hourly RRP's 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. Adjust $AP_{HH,R,C}$ or $P_{HH,R,C(\text{previous})}$ for any expected step changes in prices as described below.~~

~~3.2.~~ Calculate the current $P_{HH,R,C}$

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

Where:

$P_{HH,R,C(\text{previous})}$ 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 11.2.2).

4.3. 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 RRP's will be taken from a proxy *region* as outlined in Section 11.3.6.

11.3.4 Outstandings Limit Volatility Factor ($VFOSL_R$)

The $VFOSL_R$ 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 $VFOSL_{R(\text{previous})}$ and the most recent half hourly RRP's 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:

$$\text{AVFOSL}_R = X / M$$

2. Calculate the current VFOSL_R

$$\text{VFOSL}_R = \text{VFOSL}_{R(\text{previous})} \times (1 - W_{\text{VF},R}) + \text{AVFOSL}_R \times W_{\text{VF},R}$$

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 has been 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 Participants*

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

Where a new region is created, the historical RRP and loads will be taken from a proxy region as outlined in Section 11.3.6

11.2.511.3.5 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 RRP 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 7-day average payment for each day within the relevant season. This gives a distribution of the rolling 7-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 $VFPM_R$

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

Where:

$VFPM_{R(\text{previous})}$ 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 has been 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 Participants*.

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

Where a new *region* is created, the historical RRP and *loads* will be taken from a proxy *region* as outlined in Section 11.3.6.

11.2.611.3.6 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 affected *regions*.

11.311.4 Market Participant Specific Calculations

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

11.3.11.4.1 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 Participants*, 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.

11.3.211.4.2 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* ~~and evident trends in the Market Participant's usage patterns~~. For new *Market Participants*, the estimate will be agreed between AEMO and the *Market Participant* using any relevant information available.

11.3.311.4.3 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 Participants*, the estimate will be agreed between AEMO and the *Market Participant* using any relevant information available.

11.3.411.4.4 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 Participants*, the estimate will be agreed between AEMO and the *Market Participant* using any relevant information available

11.3.511.4.5 Reallocation Energy Credit and Debit (RC_R/RD_R)

Reallocation Swap Energy Credit and Debit (RCS_R/RDS_R)

Reallocation Swap Price Credit and Debit (PCS_R/PCS_R)

Reallocation Cap Energy Credit and Debit ($RCC_{R,C}/RDC_{R,C}$)

Reallocation Dollar Credit and Debit ($RC_{\$R}/RD_{\$R}$)

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 (e.g. \$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, ~~if cap values of \$150 and \$300 were chosen,~~ 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 13.

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 3 months.
- The quantity and type of *reallocations* proposed for up to 3 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 RRP. Ex post *reallocations* can assist in management of total outstandings, but not in reducing OSLs.

11.3.611.4.6 Half Hourly Reallocation Energy Credit and Debit ($RC_{HH,R}/RD_{HH,R}$) Half Hourly Reallocation Swap Energy Credit and Debit ($RCS_{HH,R}/RDS_{HH,R}$) Half Hourly Reallocation Cap Energy Credit and Debit ($RCC_{HH,R,C}/RDC_{HH,R,C}$)

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.

44.3.711.4.7 Participant Regional Adjustment Factors ($PRAF_{L,R}$, $PRAF_{G,R}$, $PRAF_{R,R}$)

The Participant Regional 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 riskiness 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 the determination 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 10.

The PRAF for each MCL review will be based on data from the previous like season where this is 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.

44.3.811.4.8 Participant Capped Regional Adjustment Factor ($PRAF_{R,R,C}$)

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

The $PRAF_{R,R,C}$ is based on an 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 10.

12 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*.

12.1 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 Participants*.

12.2 Maximum Credit Limit for New Entrants

Where a new *Market Participant* registers as a *Market Customer* or *Market Generator*, 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*, 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*.

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*.

PARTICIPANT TYPE	SIZE	REQUIREMENT	OSL	PM ¹
<i>Market Generator</i> - not yet generating	≤ 1 MW	Auxiliary/ commissioning load coverage	\$0	\$1,000
<i>Market Generator</i> - not yet generating	1 to 10 MW	Auxiliary/ commissioning load coverage	\$0	\$10,000
<i>Market Generator</i> - not yet generating	> 10 MW	Auxiliary/ commissioning load coverage	\$0	\$10,000 per 10 MW
Market Customer – inactive	-	Cover for unintentional NMI transfer	\$0	\$1,000
<i>Market Customer</i> – planning to acquire	-	3 month growth estimates available	As per section 7, \$9,000	As per Section 8, \$1,000

¹ For *Market Generators*, PM assumes 2% house *load*, 24 hours per day for 7 days with a VFPM_R x P_R of \$200/MWh based on a house *load* of 1MW for size less than 1 MW or rounded to the nearest 10MW for size greater than 1 MW.

PARTICIPANT TYPE	SIZE	REQUIREMENT	OSL	PM ¹
customers			minimum	minimum

Where a new active *Market Customer* is not able to provide any data on their expected *load* a default OSL of \$70,000 and PM of \$30,000 may be applied.

Any new *Market Participant* wishing to have *reallocations* taken into account in their MCL calculation must consult with *AEMO* on their 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.

13 Frequency of Review

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 for the enhancement of the methodology.

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.

It is anticipated that the weighting factors and the adjustment factors used in the calculation of *Market Participants'* OSL and PM will be reviewed around every 3 years: under normal conditions. It is not anticipated that market conditions will change in such a way as to require changes to the adjustment factors more frequently.

13.1 Immediate Review of *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 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*.

14 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*.