Offsets in Prudential Margin – Economic Analysis

Prepared for

Australian Energy Market Commission

3 June 2016

FINAL REPORT

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PROMONTORY

3 June 2016

Alan Rai
Director
Australian Energy Market Commission
Level 6, 201 Elizabeth Street
Sydney, NSW, 2000

Dear Alan,

Re: Offsets in Prudential Margin – Economic Analysis

The Australian Energy Market Commission (AEMC) engaged Promontory Australia (Sydney) Pty Ltd (Promontory or we) to provide an analysis of the economic impact of proposed changes to the National Electricity Rules (NER) relating to offsets between trading amounts and reallocation amounts in the Prudential Margin (PM) calculation.

This Report provides our findings and recommendations for the AEMC. We have relied on information and reports made available to us by the AEMC, and relevant energy market reports and submissions available in the public domain. Our approach to providing the preliminary findings and recommendations is consistent with that described in our contract dated 23 November 2015.

We note that Promontory is not a law firm, and no part of this Report should be viewed as constituting legal advice.

We thank the AEMC for the opportunity to be of assistance in providing the enclosed economic analysis.

Sincerely,

Jeffrey Carmichael
Chief Executive
Promontory Australasia (Sydney) Pty Ltd

Contents

Abbreviations

AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
CLP	Credit Limit Procedures
EMMS	Electricity Market Management System
GST	Goods and Services Tax
MCL	Maximum Credit Limit
NEM	National Electricity Market
NER	National Electricity Rules
OSL	Outstandings Limit
PM	Prudential Margin
POE	Prudential Probability of Exceedance
RRP	Regional Reference Price

1 Introduction

1.1 Background

The Australian Energy Market Commission (AEMC) requested Promontory Australasia (Sydney) Pty Ltd (Promontory or we) to provide economic analysis of a proposal to allow offsetting between trading amounts and reallocation amounts in calculating the Prudential Margin (PM), which is used in calculating the credit support buffer required to cover potential liabilities following a market participant default. Promontory's analysis will form part of the AEMC's response to a rule change proposal submitted by the Australian Energy Market Operator (AEMO) in May 2015.[1]

The May 2015 rule change proposal follows a similar proposal submitted by AEMO in July 2012.[2] The AEMC did not implement AEMO's 2012 rule change proposal. In large part this was due to industry concerns over the level of discretion available to AEMO under the proposed rule change and the resulting uncertainty and potential costs to market participants this discretion could bring. The AEMC decided that assessing AEMO's proposal would require more rigorous analysis before it could be implemented.

Accordingly, AEMO's 2015 rule change proposal contains further analysis, including the modelling of costs and benefits to market participants and the impact of the proposed netting on the prudential risk to the National Electricity Market (NEM).[3] Promontory's economic analysis aims to provide both qualitative and quantitative analysis of AEMO's most recent rule change proposal, and provides advice on whether it has adequately addressed concerns raised in the 2012 proposal.

The AEMC has published a consultation paper to seek stakeholder comments on AEMO's 2015 rule change proposal.[4] It has received five submissions from stakeholders, including a submission from AEMO that provides some revisions to the results that were included in its rule change proposal and an outline of potential options to mitigate the prudential risk to the NEM.[5] Although we summarise the key information provided in the AEMO's proposals throughout this Report, a more comprehensive background can be found in AEMO's 2015 rule change proposal, the AEMC's 2015 consultation paper, and AEMO's 2016 submission to the consultation paper.

1.2 Approach

In setting out our analysis in this Report, Promontory has drawn on our experience in prudential requirements and similar collateral arrangements in the financial sector (i.e., collateral netting used by clearing houses and banks). We have undertaken research on the application of the current offsetting arrangements and held a number of discussions with relevant staff from the AEMC and AEMO. Broadly, this involved:

- understanding prudential requirements applied to market participants in the NEM;
- reviewing reports and submissions in relation to AEMO's rule change proposals;
- identifying the differences in AEMO's two similar rule change proposals;

[1] AEMO 2015, Offsets in Prudential Margin, Electricity Rule Change Proposal, 28 May 2015.
[2] AEMO 2012, NEM Prudential Standard and Framework Draft Rule Determination – ERC0122, 9 July 2012.
[3] The NEM interconnects five regional market jurisdictions – Queensland, New South Wales (includes Australian Capital Territory), Victoria, South Australia and Tasmania. Western Australia and Northern Territory are not part of the NEM.
[4] AEMC 2015, Application of Offsets in the Prudential Margin Calculation, Consultation Paper, 10 December 2015.
[5] AEMO 2016, Rule Change Consultation – Application of Offsets in the Prudential Margin, 17 February 2016.

- analysing the economic impact of AEMO's proposed rule change; and
- validating AEMO's modelling approach, inputs and results.

1.3 Structure of this Report

This Report is structured as follows:

- Section 2 provides a brief overview of prudential requirements in the NEM, including credit support requirements and the use of reallocation agreements;
- Section 3 includes our analysis and comparison of AEMO's proposals, including our views on whether AEMO's 2015 rule change proposal adequately addresses industry concerns;
- Section 4 provides our validation of AEMO's modelling approach, model and results to support its rule change proposal;
- Section 5 identifies and assesses the costs and benefits of AEMO's rule change proposal across various market participants in the NEM; and
- Section 6 summarises our findings and offers recommendations to assist the AEMC in its draft determination.

2 Prudential requirements in the NEM

2.1 Overview

Electricity is a commodity that cannot be warehoused easily. The provision of electricity in the NEM is facilitated through a pool, or spot market, where the output from all generators is aggregated and scheduled at five-minute intervals to meet demand. The pool is managed by a set of procedures that AEMO oversees in line with the National Electricity Law (NEL) and the National Electricity Rules (NER).

A dispatch price for electricity is determined every five minutes using a bidding process. The average of six dispatch prices is used to determine the spot price for every half-hour trading interval for each of the five regions in the NEM. This spot price is known as the regional reference price (RRP). AEMO uses the RRP as the basis for the settlement of financial transactions for all electricity traded in the NEM.

AEMO acts as the principal for all market participants (i.e., retailers, generators and gentailers)[6] in providing billing and clearance for the settlement of all transactions in the NEM. The amount settled each year, based on 2012/13 figures, exceeds $11 billion.[7] AEMO's obligation to settle payments owed to market participants is limited by the funds that it receives from market participants with respect to each (weekly) billing period.

Market participants are given four weeks to fulfil their payment obligations at the end of each weekly billing period. As a consequence, at any point in time there is a substantial volume of unsettled transactions in the NEM, which exposes AEMO to the risk that one or more market participants may default on their obligations. For instance, if a retailer fails to pay for the electricity its customers have consumed (i.e., load), AEMO's total incoming payments from retailers would be less than outgoing payments to generators for the energy supplied (i.e., generation). The potential difference in AEMO's incoming and outgoing payments is referred to as "settlement risk" throughout this Report.

The need to manage settlement risk has led to the creation of prudential requirements for market participants in the NEM. Market participants can use credit support and reallocation agreements to meet or manage their prudential requirements. These are explained in Section 2.2 below.

2.2 Credit support

A market participant is required to post collateral (or credit support) with AEMO if it does not meet certain acceptable credit criteria and a minimum credit rating. The acceptable credit criteria require that a market participant is an entity either prudentially regulated by the Australian Prudential Regulation Authority, or a central borrowing authority of an Australian State or Territory.[8] The minimum credit rating is set as a rating of A-1 or better as rated by Standard & Poor's (Australia), or a rating of P-1 or better as rated by Moody's Investor Service.[9] For those market participants that do not meet the acceptable credit criteria and minimum credit rating, credit support must be provided in the form of an unconditional bank guarantee or a letter of credit.

[6] Gentailers are vertically integrated businesses that supply electricity in the NEM and also provide retail services to consumers.
[7] AEMO 2014, Fact Sheet: The National Electricity Market.
[8] In addition, the market participant must: have a permanent establishment in Australia; not be an externally administered body corporate; not be immune from suit; and be capable of being sued in its own name in an Australian court.
[9] Both the Standard & Poor's and Moody's ratings refer to the ratings for short-term, unsecured counterparty obligations.

Maximum Credit Limit

Since the core participants in the NEM (generators, retailers and gentailers) are not financial institutions, they do not meet the acceptable credit criteria and minimum credit rating. Thus, most participants are required to provide credit support to AEMO. The amount of credit support that a market participant must provide (if it does not meet the acceptable criteria and minimum rating) must be sufficient to cover the market participant's maximum credit limit (MCL). The MCL for each market participant is calculated by AEMO and must be met at all times. It is calculated as the sum of the outstanding limit (OSL) and PM, i.e.:

$$MCL = OSL + PM$$

The OSL for each market participant is an estimate of the potential liabilities for electricity consumed but not paid over a five-week period (referred to as the "outstandings").[10] Credit support to cover the OSL provides the AEMC with some assurance that liabilities in the NEM should be able to be settled in the event of the participant's default. The OSL calculation incorporates historical data, regional parameters and market participant specific factors. The PM measures the additional liabilities that may potentially be accrued from the time a call notice is issued by AEMO to the time that the market participant is suspended from the NEM (referred to as the "reaction period"). Requiring credit support to cover the PM provides a buffer to cover these outstandings during the reaction period, which is assumed to be seven days.

The OSL of a market participant can be positive or negative (it is negative for net suppliers of electricity such as generators and some gentailers). The PM, however, must be positive, and the MCL is subject to a floor of zero (i.e., where the sum of the OSL and PM results in a negative figure, the MCL must be set to zero). It follows that market participants with negative OSLs would not need to lodge credit support with AEMO unless their PM is sufficiently large that it results in a positive MCL.

Prudential Standard

Credit support arrangements are based on estimated outstandings. Thus, they do not guarantee that available collateral will be sufficient to cover a market participant's outstandings in the event of a non-remedied default. That is, there may be instances where the amount of credit support provided to AEMO will fall short of the actual amount needed to cover the outstandings of a defaulted market participant; such instances are likely to lead to a payment shortfall in the NEM. To reduce this likelihood the AEMC has established a *Prudential Standard* that requires the MCLs calculated by AEMO to satisfy an overall tolerance for such shortfalls (i.e., gaps between estimated and actual outcomes).

To satisfy the Prudential Standard, AEMO calibrates the MCL calculation so as to target the proportion of non-remedied market participant defaults that could lead to a payment shortfall in the NEM to the specified tolerance percentage. The Prudential Standard is set at a level of 2% under the current rules.[11] Put simply, a Prudential Standard of 2% implies that a payment shortfall should arise only in two out of 100 cases of non-remedied market participant defaults.

Whether the Prudential Standard of 2% is achieved is measured by way of the prudential probability of exceedance (POE).[12] The POE represents the probability of a market participant's outstandings *exceeding its*

[10] We note that OSL is different to a market participant's trading limit, which has been in operation since prior to when the OSL requirement was introduced in 2012. The trading limit is the maximum amount that a market participant's outstandings are allowed to reach before AEMO issues a call notice under clause 3.3.11 of the NER. The trading limit for any market participant represents the difference between the amount of credit support provided and the PM. It serves to minimise the risk that a market participant incurs a liability to AEMO in excess of the amount of credit support AEMO holds for that market participant.
[11] Clause 3.3.4A, NER, AEMC.
[12] Clause 3.1.1A, NER, AEMC.

MCL by the end of the seven-day reaction period in the event of its non-remedied default. The POE serves as a guide for AEMO to determine whether market participants' prudential settings (i.e., OSL, PM and MCL) are consistent with the level of prudential risk acceptable to the NEM as specified by the Prudential Standard. AEMO can adjust the prudential settings until they fall within the target tolerance.

Importantly, the POE relates to the likelihood of a shortfall in credit support; it does not reflect the size of the potential losses that could occur in those cases (i.e., where the credit support provided is insufficient relative to the market participant's outstandings). In such instances, the shortfall is not absorbed by AEMO but rather is shared among market participants to whom payments are to be made by AEMO (i.e., each generator receives a reduced *pro rata* amount for electricity supplied through the market in the relevant billing period).[13] Responsibility for estimating and managing the potential size of such a shortfall is left to market participants.

Nevertheless, the Prudential Standard provides AEMO with the necessary target for calibrating the MCL calculation and its various parameters, thereby ensuring that, through the credit support arrangements, the NEM is not exposed to prudential risk inconsistent with the overall tolerance for instances of shortfall in the NEM.[14] In this Report, prudential risk refers to the risk of a shortfall in a market participant's credit support to cover outstandings owed to AEMO in the event that the market participant is suspended from the NEM.

2.3 Reallocations

While credit support arrangements serve to mitigate the settlement risk from market participants' outstandings to the NEM, market participants are able to manage their individual outstandings through the use of reallocation agreements. A reallocation is a financial arrangement between two market participants that works to mitigate each participant's exposure to significant movements in the price of electricity,[15] or to manage volatile cash flows. Reallocations are underpinned by an off-market trading relationship, typically, through an underlying hedge contract either directly between the two market participants or indirectly through a reallocator, such as a financial institution.[16] For example, a retailer may enter into a reallocation agreement with a generator (either directly or indirectly) in order to minimise its exposure to spot price fluctuations.[17]

To manage their outstandings to the NEM, market participants must register their reallocations with AEMO. All requests to register reallocations must meet certain requirements set out in AEMO's reallocation procedures. For instance, market participants are required to: specify the agreement type (energy or dollar);[18] select the relevant region;[19] and provide the start and end dates for the reallocation. AEMO also requires confirmation of a contractual arrangement between the debit and credit counterparties for the entire period of the reallocation request.[20] Reallocations can be registered either before the target trading intervals to which they will apply (i.e., *ex ante* or prospective reallocations), or after the relevant trading intervals (i.e., *ex post* or retrospective reallocations). Market participants are free to choose when they register their reallocations with AEMO.

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[13] Clause 3.15.22(c), NER, AEMC.
[14] AEMO aims to ensure that the Prudential Standard is met for market participants through its Credit Limit Procedures (CLP), a document formulated in accordance with clause 3.3.8 of the NER to establish the methodology by which AEMO determines the prudential settings (i.e., MCL, OSL and PM) for each market participant.
[15] The spot price in the NEM can be highly volatile fluctuating between minus $1,000/MWh (price floor) and $13,800/MWh (price cap).
[16] Reallocators are market participants in the NEM that are generally large financial institutions (i.e., banks) that have entered into hedging contracts with market participants.
[17] We note that gentailers are able to reallocate internally given they are both suppliers and consumers of electricity in the NEM.
[18] Energy reallocations are also referred to as MWh or quantity-based reallocations where there is an underlying contract that is specified in a quantity of energy. Dollar reallocations specify a dollar amount that is to be exchanged between the reallocation counterparties for inclusion in the NEM settlement calculations.
[19] The region is necessary in order to apply the relevant RRP in determining the dollar value of an energy reallocation agreement.
[20] If the contractual arrangement is terminated during the period of the reallocation, the party who submitted the request must immediately notify AEMO to deregister the request.

Based on our discussion with the AEMC and AEMO, we understand that the use of reallocations in the NEM depends on a variety of factors. These include: the cost incurred by retailers in entering into reallocation agreements; the willingness of generators to reallocate a proportion of their generation; the risks to market participants in the event of reallocations being dissolved; and the availability of internal reallocations for gentailers.

The recognition of reallocations by AEMO serves two purposes:

1) minimising settlement risk in the NEM by allowing reallocations to be netted against pool settlement; and

2) providing cost benefits to a market participant by lowering its MCL and therefore its need to provide credit support (provided the reallocations are prospective).

Minimising settlement risk

Once a reallocation has been accepted by AEMO, the relevant reallocation amounts (in accordance with the reallocation agreement) are taken into account in determining the settlement amounts for the relevant market participants in each billing period. That is, settlement amounts are based on the net of NEM transactions and reallocation transactions.

The effect of an AEMO-registered reallocation is that it can reduce settlement risk in the NEM by reducing outstandings and circular cash flows. To illustrate, consider a scenario where the average weekly pool spot price is $250/MWh and the load (energy consumed by a retailer's customers) for that week is 5,000 MWh. Further, assume that a retailer and a generator have entered into a base-load swap at a strike price of $50/MWh. Given the gross pool nature of the NEM and the off-market transaction between the retailer and generator, the retailer is required to pay AEMO a settlement amount of $1.25 million ($250 x 5,000) for the pool settlement, while the generator is required to pay the retailer a differential payment of $1 million (5,000 x ($250 - $50)) under the base load swap and receive the settlement amount of $1.25 million from AEMO.

However, if a reallocation corresponding to the base-load swap was registered with AEMO, the retailer would pay AEMO a net amount of $0.25 million ($1.25 – $1 million), and the generator would have no outstanding amounts due, thereby significantly reducing their total outstandings. The settlement amount is reduced as AEMO would credit the retailer with a reallocation amount of $1 million and simultaneously debit the generator with an identical reallocation amount for that billing period. This is because when two market participants have a reallocation agreement in place, one will be credited with a reallocation amount and the other will be debited an identical reallocation amount for each trading interval for the duration of the reallocation. AEMO's systems require market participants to select whether they are a debit or credit counterparty for each reallocation.

Providing cost benefits

While both prospective and retrospective reallocations can minimise settlement risk, only prospective reallocations may reduce a market participant's MCL, thereby directly affecting the amount of credit support that needs to be provided. Clause 3.3.8(d) of the NER allows AEMO to take into account only prospective reallocations in the determination of MCL. A prospective reallocation that meets AEMO's *ex ante* timetable can provide benefits to the market participant by reducing the market participant's credit support obligations (and attached costs) associated with the OSL and PM.[21]

[21] AEMO's *ex ante* timetable requires prospective reallocations to be lodged at least seven days from the first trading interval under the reallocation agreement.

Prospective reallocations can reduce a market participant's OSL through the following offsets:

1) trading amounts offset against reallocation amounts – for example, a generator can offset a positive trading amount (i.e., generation) against a negative reallocation amount (i.e., reallocation debit), or a retailer can offset a negative trading amount (i.e., load) against a positive reallocation amount (i.e., reallocation credit); and

2) reallocation offsets – for example, a reallocator can offset positive reallocation amounts (i.e., reallocation credit) against negative reallocation amounts (i.e., reallocation debit).

Prospective reallocations can also reduce a market participant's PM through the use of offsets. However, clause 3.3.8(e) of the NER does not allow trading amounts to be offset against reallocation amounts in the calculation of a market participant's PM. This limits the amount of credit support relief that prospective reallocations can provide when calculating each market participant's PM.

We note that, even though the prohibition under clause 3.3.8(e) applies to all market participants, not all market participants are affected equally. Table 1 shows how the nature of market participants' businesses may affect their ability to use offsetting in the OSL and PM calculations.

Table 1 – Offsets in the OSL and PM calculations

Market participant type	Offsets in OSL calculation	Offsets in PM calculation
Retailer	✓	×
Gentailer	✓	✓
Generator	✓	×
Reallocator	✓	✓

Table 1 shows that all types of market participants have the ability to use some form of offsetting in the OSL calculation. However, only reallocators and gentailers have the ability to use some form of offsetting in the PM calculation. Reallocators can use reallocation offsets by offsetting reallocation credits against reallocation debits. Similarly, vertical integration allows gentailers to use energy offsets (i.e., offset generation against load).

In contrast, generators and retailers lack the ability to use energy offsets and reallocation offsets in the calculation of their OSL and PM (given the stand-alone nature of their business). These market participants are either a supplier or consumer of electricity but not both. Similarly, they are either a credit or debit counterparty to a reallocation but not both. Therefore, generators and retailers can rely on offsets only between trading amounts and reallocation amounts, which can be taken into account in the calculation of the OSL. Due to the restriction under clause 3.3.8(e), generators and retailers cannot rely on such offsets in the calculation of their PMs.

3 Offsets in PM calculations

3.1 Overview

The restriction that currently applies when offsetting trading amounts and reallocation amounts in the calculation of a market participant's PM came into force under the National Electricity Amendment (Reallocations) Rule 2007, when the PM and MCL were calculated independently. At the time, market participants' MCL and PM were determined under a "reasonable worst case" approach. This assumed that settlement credits from generation and reallocation would cease during the reaction period, for instance, as a result of the failure of a generation facility or as a result of a reallocation becoming ineffective.[22]

This restriction was maintained under an amendment to the NER in 2012 (referred to as the New Prudential Framework in this Report) that merged the PM and MCL calculations. The preservation of this restriction was due to concerns related to the legal standing of the underlying contracts and AEMO's role in settling contracts in the absence of an underlying contract between the counterparties to a prospective reallocation.[23]

AEMO, however, believes this restriction should have been removed as part of the New Prudential Framework. AEMO is of the view that the restriction in place under clause 3.3.8(e) of the NER limits the benefits of prospective reallocations when calculating a market participant's PM. AEMO believes that this leads to an inefficient use of market participants' collateral and has expressed this concern to the AEMC in two proposals submitted in:

- July 2012, where AEMO requested the AEMC to amend clause 3.3.8(e);[24] and
- May 2015, where AEMO requested the AEMC to remove clause 3.3.8(e).

While stakeholders generally supported AEMO's 2012 proposal to improve offsetting in the PM calculation, there was a concern that the proposal might have granted a level of discretion to AEMO that it did not have in other parts of the prudential framework, which could in turn decrease the transparency of the prudential framework. As a result, the AEMC decided not to implement AEMO's 2012 proposal.

The AEMC suggested that the issue of allowing offsetting of trading amounts and reallocation amounts warranted more rigorous analysis or a different amendment than the one proposed. With its 2015 proposal, AEMO opted to provide analysis of the potential impacts of allowing offsets between trading amounts and reallocation amounts in order to support its proposal to remove clause 3.3.8(e) altogether.

Promontory has been asked by the AEMC to analyse the scope of AEMO's 2015 proposal and compare it with AEMO's earlier proposal. Promontory has also been asked to provide its opinion on whether the 2015 rule change proposal sufficiently addresses the concerns raised in relation to AEMO's discretion and the associated uncertainty and potential cost for market participants.

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[22] National Electricity Market Management Company Limited 2006, Request for Amendment to National Electricity Rules: Reallocations, 27 March 2006.
[23] In developing the 2012 Rule that introduced the Prudential Standard for MCL calculation, there was, and still remains, a concern that AEMO may assume the role of clearing and settling in the absence of an underlying contract between the counterparties to a prospective reallocation, rather than simply reflect an existing hedge contract.
[24] AEMO's July 2012 proposal was included in its submission to the AEMC's Draft Rule Determination, National Electricity Amendment (New Prudential Standard and Framework in the NEM) Rule 2012, 12 April 2012.

3.2 AEMO's 2015 rule change proposal

On 28 May 2015, the AEMC received a rule change proposal from AEMO to remove clause 3.3.8(e) from the NER and make one consequential change to clause 3.3.8(d).[25] The proposal, if accepted, would allow AEMO to take into account positive trading amounts and positive reallocation amounts when calculating a market participant's PM. The proposal, if implemented, would effectively remove the existing restriction in relation to offsetting between trading and reallocation amounts when calculating the PM.

AEMO's proposal does not affect the likelihood of a market participant defaulting in the NEM. It does, however, reduce the amount of credit support buffer available to cover the liabilities accruing during the reaction period in the event that a market participant defaults. This could be a concern from a prudential risk standpoint to the extent that an offset between a trading amount and reallocation amount is not "firm".

AEMO considers an offset to be firm if the offset continues for the duration of the reaction period (i.e., if each of the trading amounts and reallocation amounts continues throughout the reaction period). If information becomes available that either the trading or reallocation amounts will not remain at the levels specified going forward, then these amounts should be reduced accordingly. Such an adjustment may lead to a reduction in the amount of the offset recognised in the PM, which may increase the MCL of a market participant. [26]

There are scenarios that AEMO has recognised where offsets between trading amounts and reallocation amounts may be recognised even though those offsets may not be firm. In particular, when analysing the impact of its proposal from a prudential risk perspective, AEMO has recognised two separate scenarios that highlight the potential concerns related to the firmness of an offset. These are discussed below.

Scenario 1 - Generation output reduction

AEMO's MCL calculation assumes that a defaulting market participant would continue to operate its generation facilities during the reaction period, since it has a financial incentive to maintain generation output. However, if there was a reduction in generation output during the reaction period, a proportion of generation may no longer be available to offset the reallocation debit amount. This would adversely affect the firmness of the offset between reallocation and trading amounts, which in turn, could lead to a potential shortfall in the amount of credit support collected by AEMO to cover any liabilities during the reaction period.

AEMO recognises that the very reason that a market participant (generator or gentailer) might default could be due to the loss of a generating unit or an entire facility. It also recognises that the possibility of reduced generation capacity is an existing prudential risk when offsetting load with generation when calculating both OSL and PM. AEMO has indicated that it has the ability to mitigate the impact to the NEM from reduced generation by:

- reducing the generation amount in the MCL calculation (i.e., the amount that is offsetting the reallocation debit) and hence requiring additional credit support to be provided by the market participant; and
- continuing to improve its internal processes and systems to mitigate the impact of reduced generation output of a market participant. This includes the introduction of timely alerts for instances when generation drops to a level that is materially different to that assumed by AEMO in the determination

[25] Clause 3.3.8 of the NER provides a high-level framework for the establishment and determination of the prudential settings (i.e., MCL, OSL and PM) for market participants in the NEM. Clause 3.3.8(d) lists the factors that AEMO is required to take into consideration in determining a market participant's prudential settings. These considerations must also take into account the restrictions under clause 3.3.8(e).

[26] For clarity, if AEMO does not receive additional credit support from a market participant (as a result of the increase in the MCL) and has insufficient time to suspend the market participant within the reaction period (i.e., prior to the reduction in trading or reallocation amounts taking effect), the offset is not considered to be firm.

of MCL requirements. If an alert is triggered, AEMO could conduct an immediate MCL review which might result in additional credit support being required.

Scenario 2 - Reallocation request dissolves (expiry or deregistration)

An offset between trading and reallocation amounts cannot be firm if the underlying prospective reallocation request is dissolved as a result of its expiry or deregistration. AEMO's MCL calculation assumes that the duration of a reallocation is at least 42 days (35 for OSL and seven for PM). If a reallocation expires or is deregistered within that period, this would reduce a market participant's reallocation credit offsetting its load. Hence, the expiry or deregistration of a reallocation can lead to a potential shortfall in the amount of credit support collected by AEMO to cover any liabilities during the reaction period.

Reallocations can expire during the reaction period if the duration of the reallocation is less than 42 days (e.g., seven day reallocations).[27] There is a risk that such reallocations may fail to be rolled over for various reasons (e.g., one of the parties to the reallocation transaction defaulting, premiums required to be paid for the reallocation no longer being economically feasible, or the *ex ante* timetable applying to prospective reallocations in order for the reallocation to be recognised for the purposes of MCL not being met). An active reallocation can also be deregistered during the reaction period by AEMO if one party to a reallocation defaults[28] or if both parties involved request that AEMO deregister the reallocation.

AEMO is of the view that it has adequate processes to manage the prudential risks arising from reallocation expiry and deregistration. These include:

- the ability to undertake an *ad hoc* MCL review of a market participant if it believes there is a prudential impact related to a reallocation request, both on parties to the reallocation and to the NEM;
- an *ex ante* timetable requirement of seven days for all reallocations, which ensures reallocations cover at least the reaction period in the event of a default;
- the ability to deregister a reallocation request at any point during the reaction period at the request of both parties to the reallocation (although neither party can request to terminate a reallocation unilaterally); and
- AEMO not being compelled to deregister a reallocation request if it believes that the termination would increase the exposure of the NEM following a default event, even if such a request has been received by both parties to the reallocation.

Overall, we are of the view that the proposal does not pose material prudential risk to the NEM, but does bring into question whether the PM calculation could inappropriately allow offsets (as a result of the rule change proposal) that may not be firm. AEMO has considered various scenarios that could result in the relevant offsets not being firm and was initially of the view that it has adequate systems and processes to manage the relevant risks involved (i.e., reduced generation and reallocation expiry). In particular, AEMO believed that it could address these risks through the alert system that it is currently developing to monitor low-generation and seven-day reallocations. More recently, AEMO has recognised that the seven-day alert period for reallocations may not provide sufficient time for AEMO to suspend a market participant from the NEM (in the event that the market participant does not provide the required additional credit support) prior to the reallocation expiring.

[27] The duration of a prospective reallocation request is typically up to 3 months; however, it is not uncommon for certain market participants to reallocate on a weekly basis. AEMO has indicated that such short-term reallocations consist of a very small proportion (less than 1%) of all reallocations in the market.
[28] Clause 3.15.11(l) of the NER allows AEMO to deregister a reallocation request at any time (by notice) while the default event is still subsisting.

As a result, AEMO is considering the implementation of one of the following additional enhancements to complement its alerts:

- *One business day credit support rule* – The NER requires market participants to provide any additional required credit support within one business day after an MCL review is completed and the market participant is notified of the increase.[29] In the event a market participant does not provide the required additional credit support after one business day, AEMO has discretion to either immediately issue a default notice or allow more time for the provision of the required credit support before a default notice is issued.[30] A default notice may ultimately lead to the market participant being suspended from the NEM. AEMO anticipates that its proposal may increase the frequency at which it would have to immediately issue a default notice upon breach by a market participant of the one business day rule. AEMO believes that consistently enforcing the one business day rule in such a manner would ensure that a defaulting market participant is removed from the NEM prior to the expiry of its reallocation.

- *Ex ante timetable* – AEMO recognises that it may be challenging for some of the smaller retailers to secure bank guarantees within one day. Hence, AEMO is exploring the possibility of extending its *ex ante* timetable requirement to 14 days. This would allow market participants approximately one week (instead of one day) to provide any required additional credit support.[31]

- *Partial offsets* – AEMO recognises that by allowing offsets between trading amounts and reallocation amounts as proposed, certain market participants could reduce their MCLs to a small amount (even zero). For such cases, AEMO is considering whether it would be appropriate for it to retain some flexibility, as is implied by clause 3.3.8(d), to apply partial offsets in calculating the market participant's PM. AEMO believes this would ensure the firmness of a market participant's reallocations and mitigate the risk of exposure to the NEM.

We agree with AEMO that one business day may not be sufficient for some market participants to obtain additional credit support. As a result, we are of the view that in order to minimise prudential risk associated with the rule change proposal (or specifically, the risks associated with offsets not being firm), the proposed rule change should be considered in conjunction with AEMO's proposed enhancements. Such enhancements may include timely and carefully calibrated alerts (for low generation and seven day reallocations)[32] and the extension of the *ex ante* timetable requirement to 14 days.

3.3 Comparison of AEMO's proposals

The overall effects of AEMO's initial proposal in 2012 and its subsequent proposal in 2015 are similar. Both proposals have been designed to allow AEMO to offset trading amounts and reallocation amounts, thus enabling market participants to offset load with prospective reallocations in the calculation of PM. Both proposals also provide a level of discretion to AEMO, although the provision and interpretation of this discretion differ.

Provision of discretion

Clause 3.3.8 of the NER sets out the framework for the determination of the prudential settings of market participants in the NEM. Although the framework provides AEMO with a broad level of discretion in

[29] Clause 3.3.6(b), NER, AEMC.
[30] Clause 3.15.21(b), NER, AEMC.
[31] AEMO 2016, Rule Change Consultation – Application of Offsets in the Prudential Margin, February 2016.
[32] Such alerts, for example, could be calibrated to take into account the typical fluctuations in generation amounts versus material shift in generation that may affect the firmness of any reallocations going forward.

determining prudential settings, it also includes some explicit limitations to that discretion. For example, clause 3.3.8(j) requires that AEMO must determine the OSL and PM simultaneously to meet the Prudential Standard for the NEM. Similarly, clause 3.3.8(e) restricts AEMO from offsetting trading amounts against reallocation amounts in the calculation of a market participant's PM.

AEMO's initial proposal involved replacing the restriction under clause 3.3.8(e) with a set of principles that required AEMO to limit credit offsets[33] where it believed there is a reasonable probability that offsetting may not be effective during the reaction period.[34] Specifically, the principles allowed discretion for AEMO to incorporate potential scenarios to limit the positive trading amounts and positive reallocation amounts in calculating the PM of a market participant. These scenarios included instances where AEMO considered there was a risk that:

- a market participant's generation capacity might cease during the reaction period; and
- a market participant's prospective reallocations might cease or be deregistered during the reaction period.

The principles were not included in AEMO's subsequent proposal in 2015. The 2015 proposal simply proposed to remove clause 3.3.8(e) and make one consequential amendment to clause 3.3.8(d). However, we note that the existing rules already incorporate a broad level of discretion relating to generation and prospective reallocations under clause 3.3.8(d).[35] Indeed, as we have discussed in Section 3.2 above, AEMO considers it would be appropriate for it to retain some flexibility in applying offsets when calculating a market participant's PM. AEMO believes that such flexibility is implicitly provided for in clause 3.3.8(d). We also note the explicit scenarios that formed part of AEMO's initial proposal in 2012 are similar to those AEMO is now considering in its analysis of firmness of reallocation.

Interpretation of discretion

AEMO interpreted its discretion under its 2012 proposal as giving the flexibility to apply either a full or reduced offset when calculating a market participant's PM. Specifically, AEMO interpreted that its draft clause allowed it to apply full offset where a market participant had reallocation credit, but a reduced offset for a market participant with generation capacity when calculating the PM. In other words, AEMO indicated that the discretion allowed it to assume a full reallocation amount (credit) in calculating the PM, but to reduce the trading amount (generation) to reflect a situation in which the market participant's largest generating facility was unavailable. AEMO justified the interpretation as follows:

- *Full offset* – where AEMO could not identify any realistic scenarios in which a market participant's reallocation credit might dissolve during the reaction period.
- *Reduced offset* – where, based on its analysis, AEMO considered there to be potential for a market participant's generation output to be reduced during the reaction period.

AEMO's interpretation of the current discretion allowed for under clause 3.3.8(d) is slightly different to its draft clause in the 2012 proposal and seems to have evolved since it submitted the 2015 proposal to the AEMC. We note that clause 3.3.8(d) requires AEMO to "take into consideration" the generation amount and prospective reallocations when calculating a market participant's PM. In its 2015 proposal AEMO suggested that the removal of clause 3.3.8(e) would provide market participants with a full offset when calculating the

[33] Credit offsets are offsets that involve reallocation credits (positive reallocation amount) and generation credits (positive trading amount).
[34] AEMO did not used the term "firm offset" in its initial proposal. We view an effective offset to be a firm offset.
[35] Clause 3.3.8(d) requires that, in developing its methodology to determine the prudential settings for market participants, AEMO must take into consideration, among other factors, AEMO's estimate of market participant's generation and any prospective reallocations for the relevant period being assessed.

PM. In its subsequent submission in February 2016, AEMO highlighted that clause 3.3.8(d) provides it with some flexibility to apply partial offsets. As noted above, one of the options AEMO is considering involves partial offsets for those market participants where the MCL is significantly lowered (or becomes zero) following the implementation of the rule change proposal. AEMO's rationale for the partial offset is to "ensure the firmness of participant reallocations and mitigate the risk of exposure of [sic] the NEM."

3.4 Addressing stakeholder concerns

When the AEMC sought views in relation to AEMO's initial proposal to amend clause 3.3.8(e) in 2012, stakeholders expressed a number of concerns that broadly fell into two categories – the level of discretion granted to AEMO and the lack of supporting analysis. Specifically, market participants were concerned that:

- the proposal gave AEMO an explicit discretion to count or discount the amount of generation and reallocation credits when calculating a market participant's PM; and
- the proposal provided no analysis or quantification of the costs and benefits to demonstrate that there will be a net benefit to consumers or the market after accounting for the resulting uncertainty and costs.

The AEMC has sought Promontory's advice on whether the 2015 proposal sufficiently addresses the stakeholders concerns related to the 2012 proposal.[36]

Level of AEMO's discretion

In our view, the concern in relation to the level of discretion has not been addressed in the 2015 rule change proposal. In particular, we believe greater transparency is needed. We are of the view that the implicit discretion under clause 3.3.8(d) is open to interpretation. If interpreted broadly, it would allow AEMO the flexibility to limit positive trading amounts and positive reallocation amounts in a similar manner to its 2012 proposal. We note AEMO makes reference to this implicit discretion in its submission to the AEMC's consultation paper, where AEMO acknowledges that "it would be appropriate for AEMO to retain some flexibility, as is implicit in clause 3.3.8(d) as currently proposed".[37] We are of the view that there is a need for greater clarity on the flexibility that clause 3.3.8(d) offers and AEMO's intended application of the flexibility it is afforded. This includes clarity in relation to:

- clause 3.3.8(d)(4), including whether this provides AEMO the discretion to determine the circumstances under which it could reduce generation amounts (e.g., to simply assume that the largest generating facility is unavailable); and
- clause 3.3.8(d)(6), including whether this allows AEMO to implement an alternative framework involving partial offsets for prospective reallocations.

An example of such an alternative framework was presented by AEMO in its February 2016 submission (Option 4 - Partial offset). As noted above, the partial offset would involve limiting the offset to five days during the seven-day reaction period. While such an alternative framework may address the risk of firmness of offsets, it may also disadvantage certain market participants.

[36] We note certain market participants also expressed concerns with respect to inadequate opportunity to consider the proposal, the strength of process and the level of guidance in the draft clause. In our view, these concerns have either been addressed or are inapplicable in the context of AEMO's current proposal. We note that the current proposal does not introduce any new draft clauses.
[37] AEMO 2016, Rule Change Consultation – Application of Offsets in the Prudential Margin, February 2016.

Lack of supporting analysis

In our view, this concern has been sufficiently addressed, as AEMO's current rule change proposal demonstrates the costs and benefits of allowing offsets between trading amounts and reallocation amounts. Specifically, AEMO has modelled the impact on market participants' PM and MCL requirements, as a result of implementing the rule change. In doing so, AEMO provides an estimate of the reduction in market participants' credit support requirements and associated cost savings for market participants. In addition, AEMO has attempted to model the impact of the rule change on the prudential risk to the NEM. It has also estimated the cost of updating its systems to implement the rule change and considered the cost impacts on market participants.

4 Model validation

4.1 Overview

AEMO believes that its rule change proposal would promote prudential requirements that allow more efficient use of market participant collateral while still reflecting a level of prudential risk consistent with the Prudential Standard. To support this assertion, AEMO has modelled the effect of allowing offsetting between trading amounts and reallocation amounts when calculating market participants' PM, the impact of the resultant change in MCL requirements, and the effect on the POE in comparison with the 2% target.

Promontory has been asked by the AEMC to provide analysis of the model and results stemming from AEMO's 2015 rule change proposal. In particular, the AEMC is seeking a critical analysis and, if appropriate, validation of AEMO's modelling approach, the inputs used (to the extent possible) and the model outputs put forward by AEMO to support its rule change proposal. Where possible, we have also replicated AEMO's model to assist in validating the results. Our findings and results are discussed in Sections 4.2 and 4.3 below.

4.2 Change in MCL

AEMO has modelled the impact on prudential requirements by estimating the reduction in market participants' MCL requirements from the proposed rule change. We note that AEMO initially estimated the reduction in market participants' MCL using data only from summer 2014. It later extended this analysis in its model to include data from summer 2015 and, subsequently, to other seasons in 2014 and 2015 (i.e., shoulder 1, winter and shoulder 2).[38] We note, however, that the scope of our review is limited to the summer 2014 and summer 2015 seasons.

4.2.1 Approach

As noted in Section 2.2, the MCL is calculated as the sum of OSL and PM. The OSL is not affected by the rule change proposal, and hence AEMO proceeded to model the impact on the PM. The impact on the PM was modelled by simply extracting each market participant's OSL from its Electricity Market Management System (EMMS), then calculating the reduction in each market participant's MCL as a result of the proposed rule.

Modelling of each participant's PM under the current and proposed rules was based on the following formulae:

Under the current rule:

$$PM = Max\left[\sum_R\left(PM_{trading\ amount,R}\right), 0\right] + Max\left[\sum_R\left(PM_{reallocation\ amount,R}\right), 0\right]$$

Under the proposed rule:

$$PM = Max\left[\sum_R\left(PM_{trading\ amount,R}\right) + \sum_R R\left(PM_{reallocation\ amount,R}\right), 0\right]$$

where:

- *R* represents region;

[38] Since the introduction of POE in summer 2014, MCL has been calculated prior to the commencement of every season (i.e., summer, shoulder 1, winter and shoulder 2). Summer is the period beginning 1 December and ending 31 March; Shoulder 1 consists of the month of April; Winter is the period beginning 1 May and ending 31 August; and Shoulder 2 is the period from 1 September to 30 November.

- $PM_{trading\ amount,R}$ is a function of aggregate trading amount; and
- $PM_{reallocation\ amount,R}$ is a function of aggregate reallocation amount.

The key difference is that the formula under the proposed rule permits offsetting of trading and reallocation amounts prior to applying the requirement that the PM must either be positive or set to zero. We note that the model inputs used to calculate PM under the proposed rule are identical to those under the current rule. These inputs, and the way in which AEMO derived them, are described in Table 2 below.

Table 2 – PM model inputs

Inputs	Description
Estimated generation and load (in MWh)	To calculate the trading amounts, AEMO obtained each market participant's historical energy data (generation and load) for each region in which the market participant was present from the previous equivalent season (e.g., summer 2013 for summer 2014).[39]
Reallocation credit and debit (in MWh and dollars)	For the reallocation amounts, AEMO used the EMMS to obtain each market participant's energy and dollar reallocation data (debit and credit) for each region in accordance with the region where the reallocation was registered.[40]
Average price for the region (P_R)	AEMO converted each market participant's trading amounts (both generation and load) and reallocation amounts (both debit and credit) to dollar values by multiplying them by its estimate of the P_R for the season.[41] The P_R is the same for all market participants' trading amounts and reallocation amounts in a given region.
Prudential Margin Volatility Factor ($VFPM_R$)	AEMO adjusted each market participant's trading amounts (both generation and load) and reallocation amounts (both debit and credit) by multiplying them by $VFPM_R$ for the season.[42] As with the P_R, the $VFPM_R$ for the season is the same for all market participants' trading amounts and reallocation amounts in a region.
Participant risk adjustment factors (PRAFs)	AEMO adjusted each market participant's trading amounts (both generation and load) and reallocation amounts (debit and credit), to reflect the relative risk of the market participant's estimated load, generation and swap reallocations using PRAFs.[43] Unlike P_R and $VFPM_R$, PRAFs are market participant specific and are used to reflect the relative risk of the market participant's estimated load, generation and reallocations.

[39] Where a market participant lacked historical data, AEMO used energy data from the previous season. In the case of a new market participant, AEMO used an arbitrary MCL.
[40] Even though a reallocation has two parties, it can be registered only under one region.
[41] The regional price is calculated using an exponential weighted moving average approach based on the previous equivalent season's P_R and the most recent half-hourly RRPs for that season. The underlying calculation was not included in the spreadsheet model given to Promontory.
[42] This factor is calculated for each season, using an exponential weighted moving average approach based on the previous equivalent season's $VFPM_R$ and the most recent half-hourly RRPs and regional loads for the season. This underlying calculation was not included in the spreadsheet model given to Promontory.
[43] PRAFs are calculated using historical data and are based on an analysis of the relationship between half-hourly regional energy or reallocation profiles and half-hourly regional prices and historic POE. For new market participants, AEMO uses default PRAFs. The underlying calculation to determine each market participant's PRAF was not included in the spreadsheet model given to Promontory.

Inputs	Description
Goods and Services Tax (GST)	Represents the applicable rate for the GST. AEMO is required to adjust market participant's trading amount (both generation and load) for GST.
Reaction period (T_{RP})	Represents the seven-day reaction period. Both net trading amount (load minus generation) and net reallocation amount (debit minus credit) are adjusted for T_{RP}.

4.2.2 Observations

We agree with the overall approach and inputs used by AEMO to model the impacts on prudential requirements as a result of the rule change proposal. In validating AEMO's calculations for the change in MCL requirements, focus was given to the PM calculations used to estimate the reduction in MCL requirements. We were unable to directly verify a large proportion of the inputs given we did not have access to some of the underlying data used (e.g., data necessary to construct the inputs to the MCL calculation such as volatility and half-hourly prices).

We performed checks on data consistency throughout the model to ensure that the input data were consistent across the multiple worksheets provided (see below for our findings). We shared our findings with AEMO, providing the opportunity for AEMO to either explain or to rectify any inconsistencies. As a result of our inquiries, AEMO provided several updated versions of their model in an attempt to address any concerns and identified inconsistencies (i.e., identified by both Promontory and AEMO themselves).

Potential data errors

The potential data errors we found generally fell into two categories: duplicates or missing values. We considered values as duplicates if we found a market participant had an identical energy profile (load/generation) for a particular region under a different company name. We treated values as missing if we found a market participant with an energy profile for a region that was lacking a PRAF for that region and vice-versa.

In the initial spreadsheet model provided to us, we found 19 instances (with total energy exceeding 40,000 MWh) that met our definition of duplicate values for the summer 2014 period data. In the same spreadsheet, we found seven instances where market participants with load data were missing PRAF values and three instances where market participants with PRAFs were missing energy values.

In our view, the duplicate or missing values had the potential to skew market participants' calculated PM (and hence the MCL) calculations. AEMO addressed these concerns through improvements to its data extraction processes. This involved:

- AEMO identifying and removing market participants that had their company names changed during the data extraction process (these were direct causes of duplication).
- For market participants with energy profiles but missing PRAFs (i.e., where PRAFs could not be derived from the previous equivalent season), AEMO applied default values (1.05 for load and 0.95 for generation) in accordance with its Credit Limit Procedures (CLP).
- Conversely, where market participants with PRAFs had missing energy values, AEMO clarified that those market participants were inactive players.

In addition to our queries and concerns, AEMO also highlighted an error in the application of its CLP when calculating the PM for the summer 2014 period (i.e., the period used in AEMO's rule change proposal). AEMO noted that, in applying the seven-day reaction period in the PM calculation, AEMO incorrectly placed the reaction period in the denominator of the formula as opposed to the numerator. AEMO resolved this error in its revised model provided to Promontory. We note that this revision significantly affected the results shown in AEMO's 2015 proposal. This is discussed in the next section.

Potential model inconsistencies

The inconsistencies we identified also fell into two categories: inconsistencies within the model and inconsistencies between the model and reference documents (i.e., CLP and MCL calculators).[44] The former related to instances when data inputs within the model were inconsistent (e.g., instances in which the versions of PRAF and energy values were not the same), whereas the latter involved model inputs not matching values or formulae within reference documents (e.g., $VFPM_{R,}$ P_R, T_{RP}). These inconsistencies had the potential to influence the PM (and hence MCL) calculations.

The spreadsheets that AEMO provided us with the PM and MCL calculations contained version numbers for many of the parameters needed for the calculations. These version numbers represented the version of the relevant parameters and prudential settings issued by AEMO for the relevant season.[45] For example, data items relating to OSL, PRAFs, energy values and reallocations all had associated version numbers attached. We found that, in some instances, the version numbers for market participants' PRAFs and energy values did not match, suggesting some inconsistency in the way the model inputs were used.[46] AEMO explained that this issue occurred as a result of multiple data extractions. It addressed this in subsequent revisions by limiting model input data to that used in calculating the MCL (including any *ad hoc* MCL reviews) at the beginning of the relevant season (i.e., it removed the impact of any *ad hoc* MCL reviews that occurred after the season commenced).

Another inconsistency we observed in the model related to the exclusion of market participants from the MCL calculation, even though they had associated energy values or reallocations in place for the summer 2014 or summer 2015 periods. In response, AEMO explained that such inconsistencies between PM and MCL calculations were due to one of the following reasons:

- *PM with zero value* – Where a market participant had a PM of zero, there would be no impact on the market participant from the rule change and hence, such participants were excluded.
- *Financial institution* – AEMO excluded financial institutions that met the acceptable credit criteria and minimum credit rating as per Section 2.2 above.
- *Inactive participant* – AEMO excluded those market participants that had recently been authorised but that had not come online or those market participants that have not been active, such as small generation aggregators.

[44] MCL calculator is a tool for market participants to estimate how increasing or decreasing load, generation and reallocations will affect MCL, OSL and PM. It uses the latest average prices and volatility factors and is developed for each season (summer, winter or shoulder).
[45] Prior to the commencement of each season, AEMO reviews MCL for each market participant and issues a MCL notice for the season. These reviews are referred to as routine reviews. AEMO may review and change the MCL for a season for a variety of reasons (e.g., reallocation registration or expiry). These reviews are referred to as *ad hoc* reviews. *Ad hoc* reviews may occur either before the start of the season or during the season.
[46] For instance, the load amount for a market participant in a region may be flagged as summer 2014 version 5, whereas the $PRAF_L$ for that same market participant for that region may be flagged as summer 2014 version 1.

We also compared inputs provided in AEMO's PM model with AEMO's MCL calculators (for summer 2014 and summer 2015) and its CLP. We found that the relevant model inputs (e.g., price and volatility for each region) in AEMO's PM model were consistent with the MCL calculators supplied. We also found that the regional reference prices used in the PM model were at least $20 higher for summer 2014 than summer 2015, suggesting that AEMO's MCL calculations for summer 2015 reflected the repeal of the carbon tax in July 2014 as required in Section 9.1 of AEMO's CLP.

We note that the model excluded the value of cap and swap reallocations in the PM calculation for both summer 2014 and summer 2015. AEMO explained that cap and swap reallocations were not allowed to be taken into account for the purposes of reducing MCL until such time as it was granted an exemption from holding a Clearing and Settlement Facility license from ASIC and had implemented the enhanced reallocation procedures in the CLP. We understand that AEMO has now received the necessary exemption, although it still needs to enhance its reallocation procedures before implementation.

4.2.3 Results

PM calculation

As we have highlighted above, AEMO has revised its modelling results to reflect the correction of errors in the PM calculation since submitting its rule change proposal to the AEMC in 2015. Although our validation of AEMO's modelling results focused on these revised results, we also include the original results from AEMO's 2015 rule change proposal below for comparative purposes. Table 3 shows the reduction in PM requirements for both summer 2014 and summer 2015.

Table 3 – Reduction in PM requirements

$ million (unless stated otherwise)	Summer 2014 (in proposal)	Summer 2014	Summer 2015
PM (current rule)	330	323.01	340.59
PM (proposed rule)	266	199.84	232.66
Reduction in PM requirements	64	123.17	107.92
% Change in PM requirements	19.4%	38.13%	31.68%

We note that the reduction in PM requirements for summer 2015 ($108 million) is noticeably lower than for summer 2014 ($123 million). After taking into account the error in the PM calculation noted above, and the various other updates to the model, we note that the reduction in PM requirements between AEMO's proposal and the revised calculation for summer 2014 is material ($123 million as opposed to $64 million).

We further note that the reduction in PM requirements from AEMO's proposal is considerable when we compare the percentage change in PM, that is, 38% for summer 2014 and 32% for summer 2015, compared with 19.4% for summer 2014 in the proposal.

The reduction in PM requirements suggests that the effect of allowing offsets between trading amounts and reallocation amounts has the potential to materially improve the efficient use of market participants' collateral. While that would have a potential to reduce market participants' MCL, it amplifies our earlier concerns regarding the risks associated with the firmness of offsets and the need to ensure that overall prudential settings remain consistent with the Prudential Standard.

MCL calculation

The extent to which AEMO's rule change can achieve efficient use of market participants' collateral depends on the portion of the reduction in PM that can be translated into a reduction in MCL requirements. In instances where a market participant's OSL is negative, only the portion of the reduction in PM that reduces the MCL to zero can assist in reducing a market participant's credit support requirements (recall from Section 2.2 that OSL can be negative for certain market participants, such as generators, but MCL and PM cannot be less than zero).

Therefore, not all of the reduction in the PM requirements arising from AEMO's rule change is passed on in the form of a reduction in the MCL requirements. This is shown for both 2014 and summer 2015 in Table 4 below. Table 4 shows that less than 50% of the reduction in PM requirements translates to reductions in MCL requirements for both summer 2014 and summer 2015.

Table 4 – Reduction in MCL requirements

$ million (unless stated otherwise)	Summer 2014 (in proposal)	Summer 2014 (revised)	Summer 2015
MCL (credit support collected)	920	901.57	675.45
OSL	590	576.72	333.01
Reduction in PM requirements	64	123.17	107.92
Reduction in MCL requirements	12	61.58	47.80
% Change in MCL requirements	1.3%	6.84%	7.10%

As with our validation of AEMO's PM calculations, the reduction in MCL requirements for summer 2014 is materially higher than what AEMO had presented in its 2015 proposal,[47] and noticeably higher than summer 2015. We note, however, that the percentage change in MCL is similar for both summer periods (approximately 7%), and that our estimates are consistent with AEMO's revised modelling results.

AEMO did not model the OSL, given that the rule change has no impact on OSL calculations. OSL figures were simply extracted from EMMS by AEMO and used as input data in the MCL calculation. Nevertheless, we separately calculated the OSL for a sample of market participants using both summer 2014 and summer 2015 data and found no material difference between our estimates and the OSL values supplied by AEMO.

4.3 Impact on POE

AEMO has modelled the impact on the POE by incorporating the reduction in market participants' MCL requirements from the proposed rule change. We note that AEMO initially estimated the POE over the life of the NEM (i.e., from beginning of summer 2000 until end of summer 2014). It later extended this analysis in its life-of-NEM model to include data until the end of shoulder 2 of 2015.

[47] As noted above, AEMO found an error in its PM calculation for summer 2014 and subsequently revised its model. This revision led to a material increase in the reduction of MCL requirements for summer 2014.

4.3.1 Approach

To model the impact on the POE, AEMO employed its life-of-NEM model. In particular, it estimated whether the Prudential Standard of 2% was exceeded for any region by calculating the probability of a region exceeding its MCL on a given day (after it has exceeded its OSL). It achieved this by estimating the POE for each region in the NEM using data over the life of the NEM covering approximately 17 years.

AEMO models the POE for each region as follows:

- It first identifies those days on which outstandings exceeded the OSL (i.e., an OSL breach).
- For these days, it identifies instances where the MCL is exceeded by outstandings at the end of the reaction period (assuming no action is taken to rectify the OSL breach). The total number of such instances is the MCL Exceedance Value.
- It then calculates POE as the MCL Exceedance Value divided by the total number of days over the life of the NEM.[48]

The key inputs used in the POE model include the daily outstandings for each region and the seasonal OSL and MCL for each region. AEMO obtains the daily outstandings for each region from its EMMS. It calculates the OSL and MCL for the seasons in each region by applying a simplified version of its CLP. The key simplifying assumption applied is that each region represents one retailer. The assumption means that market-participant specific parameters, such as PRAFs, are not taken into account in calculating the OSL and MCL for the POE model. Furthermore, all debit and credit reallocations are assumed to offset each other within a region and hence are also excluded from the POE model. Regional parameters, such as energy price and volatility, are included in the POE model, but rather than constructing them using historical data as per the CLP, AEMO uses forecasted values.

To understand the effect of the proposed rule change, AEMO reduced each region's MCL by attributing a share of the reduction in MCL requirements to each region. It achieved this by using the following approach:

1) The total reduction in MCL requirements as a result of the proposed rule change was calculated for each season in 2014 and 2015.
2) Each region's representative market share was calculated using the calculated region's MCL as a proportion of the aggregate MCL across all regions' MCL. These proportions are separately calculated for each season in 2014 and 2015.
3) Each region's market share is multiplied by the total reduction in MCL requirements for the relevant season in 2014 and 2015.

4.3.2 Observations

In relation to AEMO's approach to modelling and assessing the impact on the Prudential Standard, we make the following observations:

[48] When estimating the POE over the life of the NEM, the number of days differs between Tasmania and other regions. This is due to Tasmania having a start date of 1 April 2006, compared with other regions in the NEM using a start date of 1 December 1999. The total number of days is 365 days when AEMO estimates the POE on an annual basis for years 2014 and 2015.

- *Market participants* – In our view, further analysis is needed to ensure that AEMO's POE model reflects a realistic analysis of whether the proposed rule ensures a level of prudential risk that is consistent with the Prudential Standard. The Prudential Standard implies that no shortfall of monies collected by AEMO should arise in 98 out of 100 instances of non-remedied market participant default.[49] Given that AEMO has assumed in its modelling that only a single retailer exists in each region, its POE model does not provide an accurate reflection of the number of non-remedied market participant default instances at the market participant level. There are more than 50 market participants operating in the NEM on any given day, with some participating in more than one region. There may be instances where a market participant may experience an OSL breach, and subsequently a MCL Exceedance, but such an exceedance may not translate into an equivalent exceedance at the regional level. By making this assumption, AEMO's POE model also does not take into account the potential for multiple non-remedied market participant defaults to occur within a region and, more broadly, across the NEM.

- *Reallocations* – As a result of the assumption that a region is represented by only one retailer, debit and credit reallocations perfectly offset each other at the regional level, and hence are not taken into account in the MCL calculation. In practice, such a perfect offset is unlikely to occur, given that different market participants are likely to have varying proportions of the overall debit and credit reallocations within a region.

- *Consistency with the CLP* – We recognise that the exclusion of reallocations from the analysis is likely to lead to a conservative estimate of the MCL in the POE model. However, adopting an approach that deviates from that in the CLP (i.e., assuming one retailer in each regional level and thus eliminating the use of reallocations and PRAFs) may lead to a calibration of the relevant prudential parameters in the calculation of OSL and PM that is inconsistent with the POE (which is defined at a market participant level).

- *Reduction in MCL requirements* – AEMO used each region's representative market share to allocate the reduction in MCL across regions for a particular season. In practice, the allocation of the MCL savings will depend on a range of factors and may not necessarily align to the MCL proportions at the start of each season. Thus AEMO's market-share based approach to allocating the total MCL savings to individual regions may lead to regional MCLs being either over or under estimated.

- *Use of historical data* – As we have discussed above, AEMO estimated the POE using data over the life of the NEM (covering approximately 17 years). The intent of the POE model is to ensure that the prudential settings are calculated in such a way that, going forward, the POE for a market participant is equal to 2%. Using data (and associated exceedances) from across such a lengthy historical period may reduce its relevance in estimating and calibrating the POE going forward. In addition to using data over the life of the NEM in calculating the POE, we suggest running the POE model using 10 years and five years worth of data in order to observe any material trends or more recent increases in the number of MCL exceedances. Such an observation could be a strong indicator that the probability of a market participant exceeding its MCL over the next year may be greater than the Prudential Standard of 2%.

We understand that AEMO is not planning on reviewing the construct of the POE model at this time. The development of a more granular POE model would require identifying MCL exceedances at the market

[49] As noted in Section 2.2, non-remedied market participant default refers to instances where outstandings of a market participant exceed its MCL (or minimum credit support) at the end of the reaction period (i.e., seven days) in the event of default.

participant level (as opposed to the regional level). We recognise such an undertaking involves a series of data challenges. For instance, we understand that it may be difficult to source data at the market participant level going back 17 years. This may be compounded by the need to backfill parameters such as PRAFs and volatility. To alleviate some of these challenges, we suggest that a granular POE model focus on using historical data from summer 2014, that is, at the time that the revisions to the MCL calculation became effective. Once complete, comparisons can then be made between the results from using the life-of-NEM model and the more granular model.

4.3.3 Results

Notwithstanding our observations in relation to AEMO's POE modelling approach, we have validated AEMO's modelling results using historical data over the life of the NEM. As noted above, following its rule change proposal, AEMO had extended the time period used in its life-of-NEM model to calculate POE over the period between December 1999 and November 2015 (as opposed to using a March 2014 cut-off as it did in its rule change proposal). We refer to this life-of-NEM model as the revised POE model, with the model used in the proposal referred to as the original POE model.

Our validation of AEMO's POE model is based on the revised POE model, though we also include AEMO's original modelling results in the tables below for comparative purposes. Table 5 shows the original and revised POE estimates for each region calculated over the life of the NEM under the current and proposed rule; the difference between the current and proposed rule calculation is that the proposed rule incorporates the reduction in MCL requirements between December 2013 and November 2015.

Table 5 – POE estimates (Life of NEM)

Region	Original POE (proposal)*		Revised POE	
	Current rule	Proposed rule	Current rule	Proposed rule
NSW	1.8%	1.8%	1.73%	1.76%
QLD	1.8%	1.8%	1.85%	1.87%
SA	1.8%	1.8%	1.80%	1.88%
TAS	1.7%	1.7%	2.24%	2.27%
VIC	1.8%	1.8%	1.73%	1.75%

* AEMO's modelling results in its proposal were provided to one decimal place.

Table 5 suggests that the Prudential Standard was met for all the regions when the POE was calculated using AEMO's original POE model (refer to the shaded columns). In the original POE model, the reduction in MCL requirements from the proposed rule showed no impact on the POE. When we replicated AEMO's original POE model, we found no difference in the POE calculation over the life of the NEM (i.e., between December 1999 and March 2014), both for the current rule and proposed rules.

Once AEMO revised its POE model to account for the extended time period, the POE for one region (Tasmania) exceeded the target level of 2%. We have validated AEMO's revised POE modelling results and confirm that the POE target is exceeded for Tasmania over the life of the NEM (i.e., between December 1999 and November 2015). It is important to note that the Prudential Standard represents a target and not an upper hard limit on the POE. As such, minor fluctuations above and below the 2% level may be acceptable without necessarily reflecting a deviation from the Prudential Standard.

The disparity between the original and revised POE modelling results is driven by higher MCL Exceedance Values when the life-of-NEM model uses the extended period. The MCL Exceedance Value for all the regions

is evidently higher when POE is calculated over the extended period, as shown in Table 6 below. We also note that the MCL Exceedance Value increases materially for Tasmania between the two calculations.

Table 6 – MCL Exceedance Value (Life of NEM)

Region	Original POE (proposal)		Revised POE	
	Current rule	Proposed rule	Current rule	Proposed rule
NSW	100	100	101	103
QLD	100	100	108	109
SA	101	101	105	110
TAS	53	53	79	80
VIC	101	101	101	102

Table 6 shows that the proposed rule has the potential to increase the instances of MCL exceedances when the extended time period is used in the life-of-NEM model. We note that, with the exception of South Australia, the increases are not considered to be material. For South Australia, there are five additional MCL Exceedance Values compared to one or two for all of the other regions. We note that all of these five exceedances occur in 2015.

We investigated the cause for the material increases in the MCL Exceedance Values for 2015, recognising that MCL exceedances are also higher under the current rule when the extended period was used in the life-of-NEM model. This led us to the regional volatility factors used in calculating the MCL, which AEMO calibrates every three years.[50] We understand from AEMO that the volatility factors for the 2015 MCL calculations had not yet been calibrated to the percentile of the relevant distribution that is in line with the 2% POE target. The impact of this can be observed once we separate the MCL Exceedance Values for the extended period into those that occurred in 2014 and 2015 as shown in Table 7 below.

Table 7 – MCL Exceedance Value (2014 and 2015)

Region	2014		2015	
	Current rule	Proposed rule	Current rule	Proposed rule
NSW	0	0	1	3
QLD	0	0	8	9
SA	2	2	4	9
TAS	0	0	26	27
VIC	1	1	0	1

In our view, Table 7 demonstrates that, in the absence of any calibration in the volatility factor for 2015, material increases in the number of MCL Exceedance Values can be observed. For instance, the MCL Exceedance Values for Queensland in 2015 are 8 and 9 under the current and proposed rule, respectively; however, there were no such exceedances in 2014. Similar observations can be made for regions such as New South Wales, South Australia and Tasmania. The effect of the increase in MCL Exceedance Values is also visible when comparing the POE for 2014 and 2015, provided in Table 8 below.

[50] In accordance with 9.3.4(1)(e) and 9.3.5(1)(e) of the CLP, AEMO adjusts each region's percentile by calibrating the percentile (in its life-of-NEM model) in order to arrive at a POE of 2%. AEMO undertakes this calibration every three years, although in extreme circumstances it may decide to complete the calibration more frequently.

Table 8 – POE estimates (2014 and 2015)

Region	2014		2015	
	Current rule	Proposed rule	Current rule	Proposed rule
NSW	0.00%	0.00%	0.27%	0.82%
QLD	0.00%	0.00%	2.19%	2.47%
SA	0.55%	0.55%	1.10%	2.47%
TAS	0.00%	0.00%	7.12%	7.40%
VIC	0.27%	0.27%	0.00%	0.27%

Taking into account AEMO's explanation for the results observed in 2015, we believe the increase in MCL exceedances as a result of the proposed rule change are not material and hence do not materially impact the POE when using historical data over the life of the NEM. This suggests that the implementation of the rule change proposal would not impact the ability of AEMO to meet the Prudential Standard. Nevertheless, we encourage AEMO to consider whether a calibration of the regional volatility factors is needed prior to the implementation of the proposed rule change.

Separate to the life-of-NEM model, Promontory has also calculated the POE using a five- and ten-year historical period for the purposes of sensitivity and trend analysis. The results from this exercise are shown in Table 9 below.

Table 9 – POE estimates (sensitivity analysis)

Region	5 years		10 years	
	Current rule	Proposed rule	Current rule	Proposed rule
NSW	0.27%	0.38%	1.92%	1.97%
QLD	0.88%	0.93%	2.14%	2.16%
SA	0.93%	1.20%	2.19%	2.33%
TAS	1.42%	1.48%	2.24%	2.27%
VIC	0.11%	0.16%	2.14%	2.16%

Table 9 demonstrates that, over a ten-year period, the POE target of 2% has been exceeded in four of the five regions, but is comfortably below the target when we use a five-year historical data set. For both five- and ten-year periods, and similar to the results we saw when using data over the life of the NEM, there is an increase in the POE under the proposed rule (when compared to the current approach), although the increases are not considered to be material. This reinforces the view that if the rule change proposed were implemented, it should not materially impact the POE. On the other hand, whether the POE target is being achieved (regardless of the rule change proposal) depends on the region and the time period used to model the POE. In our view, once AEMO has calibrated the volatility factors for the relevant seasons and regions for 2015, there will be a need to re-examine alignment with the target POE as well as the impact of the rule change proposal on meeting the target.

5 Costs and benefits

The AEMC has requested that Promontory identify the costs and benefits for various types of market participants (i.e., gentailers, generators, retailers and reallocators) that may occur as a result of AEMO's 2015 rule change proposal. This includes any flow-on impacts to consumers as a result of the proposed changes to the offsetting arrangements. These are discussed below.

5.1 Costs

In our view, AEMO's rule change proposal does not introduce direct costs to any market participants and their customers. AEMO has also noted that it does not expect any impact on market participant systems or processes, and that changes to its own systems to implement the rule change would not be expected to exceed $100,000.

Notwithstanding the lack of direct cost impacts to various market participants, we note that the rule change has the potential to create post-default impacts (and subsequent flow-on effects to market participants) that would be higher than if the rule change were not implemented. This is due to the rule change reducing the amount of credit support required for the reaction period. Critically, any post-default impacts to market participants are difficult to estimate because:

- *No payment shortfalls in the NEM* – We understand from AEMO that there have been no historical payment shortfalls arising from non-remedied market participant defaults.
- *Pooled-nature of the NEM* – The pooled-nature of the NEM means that any payment shortfall would be shared across market participants as AEMO settles payments between market participants.

5.2 Benefits

AEMO is of the view that its rule change proposal offers a number of benefits to various market participants in the NEM. Specifically, it is AEMO's view that the proposed offset arrangements in the PM calculation would reduce credit support requirements, lower credit support costs and level the playing field for market participants in the NEM. Against that background, we have attempted to confirm whether the rule change proposal provides these benefits to the relevant market participants.

Reduce credit support requirements

As noted in Section 4.3, the effect of AEMO's proposal is a reduction in the MCL requirements for summer 2014 ($62 million) and summer 2015 ($48 million). Since the MCL represents the minimum amount of credit support that market participants are required to provide to AEMO, the reduction in MCL requirements would also reduce credit support requirements for different categories of market participants (i.e., generators, gentailers and retailers).[51] Interestingly, the largest proportion of the reduction in MCL requirements is expected to accrue to the gentailers, followed by retailers and then generators. This is shown in Figures 1 and 2 below.

[51] All the reallocators in the NEM for the summer periods in 2014 and 2015 were financial institutions that met AEMO's acceptable credit criteria and minimum credit rating and hence were not required to provide credit support.

Figure 1 – Reduction in MCL requirements by market participant category for summer 2014 ($ million)

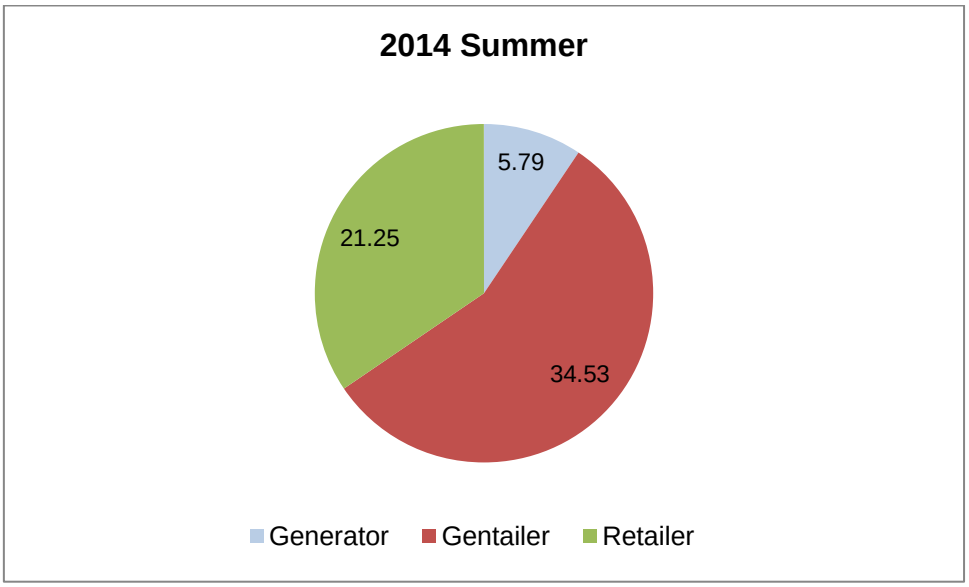
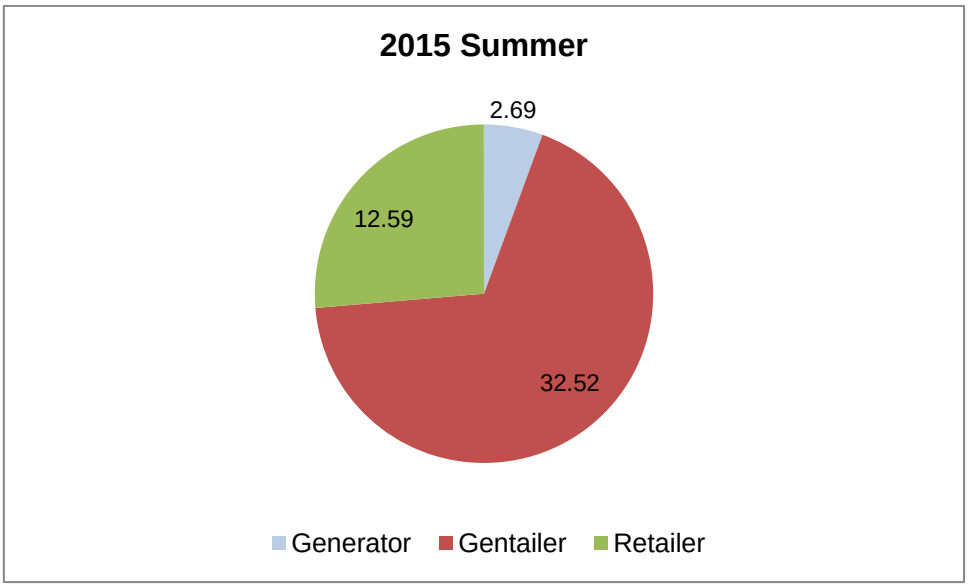


Figure 2 – Reduction in MCL requirements by market participant category for summer 2015 ($ million)



At $34.5 million and $32.5 million, gentailers have the greatest reduction in MCL requirements for summer 2014 and summer 2015, respectively. These figures represent approximately 56% and 68% of the reduction in MCL requirements for the two summer periods. These reductions reflect:

- *Share of gentailers' MCL* – Gentailers currently provide more than 70% of credit support and hence would be expected to benefit proportionally from any reduction in that support.
- *Share of prospective reallocations* – Gentailers are extensive users of prospective reallocations and thus benefit more in absolute terms when compared to retailers and generators.

Lower credit support costs

Given the reduction in MCL requirements, the proposed rule change would reduce credit support requirements for various types of market participants, and by extension, would lower credit support costs for those market participants. In its rule change proposal, AEMO estimated the savings in credit support costs to market participants by assuming a bank guarantee cost of between 1.5% and 4% per annum. We believe this range to be a reasonable representation of the possible credit support costs for market participants of varying sizes. Using the same range as AEMO, we provide our estimates of annual credit support costs saved by various market participants in Table 10. These figures are based on each market participant group's reduction in MCL requirements.

Table 10 – Credit support cost savings ($ million per annum)

Market Participants	Bank guarantee cost at 1.5%		Bank guarantee cost at 4%	
	Summer 2014	Summer 2015	Summer 2014	Summer 2015
Retailer	0.32	0.19	0.85	0.50
Gentailer	0.52	0.49	1.38	1.30
Generator	0.09	0.04	0.23	0.11
Total	**0.92**	**0.72**	**2.46**	**1.91**

Unsurprisingly, the credit support cost savings are greatest for the gentailers, given that they are responsible for the largest share of the forecast reduction of MCL requirements. For instance, gentailers in aggregate can save between $0.5 million and $1.3 million in collateral costs per annum assuming the reduced credit requirements for summer 2015 continue going forward. By comparison, retailers in aggregate can save between $0.2 million and $0.5 million per annum under the same assumption. The cost savings for generators are significantly lower, at between $40,000 and $110,000 per annum.

Levelling the playing field

As noted in Section 2.3, the current restriction on offsets between trading amounts and reallocation amounts limits the amount of credit support relief that market participants relying solely on prospective reallocations can obtain. In its rule change proposal, AEMO noted that gentailers were affected less by this restriction, since they can offset generation with load.

In AEMO's view, gentailers' ability to offset generation with load gives them an unfair advantage over retailers and generators. The removal of the restriction relating to offsets between trading amounts and reallocation amounts would thus reduce this advantage. In order to confirm this assertion, we compared the share of the various types of market participants' MCL under the current rule against their share of the reduction in MCL requirements under the rule change proposal (as shown in Table 11).

Table 11 – MCL savings and requirements (%)

Market Participants	Summer 2014		Summer 2015	
	Current MCL	MCL savings	Current MCL	MCL savings
Retailer	21.60%	34.51%	25.35%	26.34%
Gentailer	77.75%	56.08%	73.18%	68.04%
Generator	0.65%	9.41%	1.47%	5.62%

Table 11 shows that retailers' share of MCL under the current rules for summer 2014 is approximately 20%; however, their share of MCL savings under the rule change proposal is almost 35%. Similar observations can be made for generators. In contrast, gentailers, which contribute over 75% of MCL under the current rules for summer 2014, obtain a disproportionately lower share of MCL savings under the proposed rule (56%). The results support AEMO's view that the rule change proposal, to some extent, would reduce the advantage that gentailers currently maintain over retailers and generators (although gentailers, in dollar terms, remain the largest beneficiaries).

We note that the MCL savings shown in Table 11 assume a full offset between trading amounts and reallocation amounts in the calculation of a market participant's PM.[52] AEMO has raised the possibility of applying an alternative approach in its February 2016 submission to the AEMC. The alternative approach involves the application of partial offsets for those market participants where the MCL is significantly lowered (or becomes zero) following the implementation of the rule change proposal. We highlight that the share of the MCL savings to the various types of market participants (as shown in Table 11) would be different under such an alternative approach.

[52] Although we have assumed a full offset between trading amounts and reallocation amounts in the calculation of a market participant's PM, the benefit of that offset in reducing the PM is capped to the amount of the PM. More specifically, if the PM is greater than the offset, the full amount of the offset will work to reduce the PM amount. Alternatively, if the offset is greater than the PM, the offset will work only to reduce the PM to zero (since the PM cannot be negative).

6 Summary of findings

In light of stakeholder concerns about AEMO's 2012 proposal, various changes have been made by AEMO in its revised 2015 proposal. This includes the removal of the previous principles that required AEMO to limit credit offsets under particular circumstances and the provision of a quantitative analysis of the impact on both MCL levels and the POE.

We note that, over the course of our engagement, we have been provided various updates to the models used by AEMO in its quantitative analysis. These updates led to material changes to the results shown in AEMO's published 2015 rule change proposal. The changes show that the reductions in credit support as a result of the proposed rule change would be materially greater than originally anticipated. While on the surface such reductions would benefit many market participants, that is, via the associated reductions in the level and cost of credit support required, consideration must also be given to any increases in the prudential risk to the NEM. In particular, it will be critical to calibrate the MCL components to ensure that the reductions are justified in all instances (i.e., firmness of the offsets allowed) and that the overall reductions do not extend the prudential risk beyond the target Prudential Standard that has been set in the NER (i.e., 2% POE).

In light of these considerations, and based on our qualitative and quantitative analysis, we summarise our key findings as follows:

- *Benefits to market participants* – As we have highlighted, the updated model and analysis relating to AEMO's 2015 rule change proposal shows material reductions in the market participants' MCL of approximately 7% across the NEM. The reduction is materially greater than originally estimated by AEMO (i.e., estimated as 1.3% in the proposal). This in turn translates into savings in credit support costs for various market participants that are likely to total in the range of $0.72 to $2.46 million per annum (depending on the costs associated with providing credit support). Our analysis also shows that the rule change proposal has some effect in reducing the advantage that gentailers currently maintain over retailers and generators.

- *Prudential risks* – Based on the modelling results, we believe that AEMO's rule change proposal does not pose material additional prudential risk to the NEM. Nevertheless, we are of the view that the PM calculation and AEMO's procedures, as proposed, could inappropriately allow offsets that may not be firm in some instances. AEMO has recognised this and is considering various mitigating enhancements. In addition, we believe there is scope to improve the POE model to better reflect the intended granularity implied in the Prudential Standard. We believe this would improve AEMO's ability to test and align the prudential settings (and underlying parameters) against the Prudential Standard.

- *Implicit discretion* – Based on AEMO's February 2016 submission and our reading of the NER, we believe that there remains an implicit level of discretion that could be used by AEMO to alter the fundamental structure and modelling benefits of the rule change proposal. We highlight that the rule change proposal does not mention nor imply that AEMO intends to apply this discretion in such a manner. Nevertheless, subsequent to the rule change proposal, AEMO has raised the possibility of using this discretion to address a concern about the firmness of the offsets, which could be introduced as a result of the rule change proposal.

On balance we find that the benefits provided to market participants are material and should be allowed to proceed, provided the following concerns are clarified or addressed as part of the rule change process:

- *Firmness of offsets* – AEMO's existing processes and systems may not provide sufficient time for an *ad hoc* MCL review to be actioned by market participants. This raises the possibility that the offsets

introduced by the rule change proposal (under certain circumstances) may not be firm. We understand that AEMO is considering various enhancements to complement its processes and systems in order to address this matter. We recommend that the rule change allows sufficient time for the implementation of AEMO's proposed enhancements.

- *Transparency of discretion* – We recommend that greater clarity be provided on the discretion that clause 3.3.8(d) provides AEMO. We further recommend that AEMO provide transparency about its intended application of the flexibility afforded by clause 3.3.8(d), including how it intends to apply any alternative framework such as the application of partial offsets (as per AEMO's February 2016 submission to the AEMC).
- *Life-of-NEM model* – We recommend that AEMO work to redevelop and implement a revised POE model that uses market participant level data for the period since the POE was implemented (i.e., from summer 2014). We understand the potential data challenges involved and recognise that such a project may extend beyond the implementation of the rule change proposal.

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