Shortening the Settlement Cycle - Credit Limit Procedure Updates

Consultation paper -

Standard consultation for the National Electricity Market

Published: 4 June 2025

Explanatory statement and consultation notice

This consultation paper commences the first stage of the standard rules consultation procedure conducted by AEMO to consider proposed amendments to the National Electricity Market (NEM) Credit Limit Procedures (Procedures), made under clause 3.3.8 of the National Electricity Rules (NER), to:

- Reflect changes to be made with effect from 9 August 2026 by the National Electricity Amendment (Shortening the settlement cycle) Rule 2024 (SSC Rule).
- Propose changes that address gaps in the Procedures in order to better align market participant credit support requirements with prudential risks.

The standard rules consultation procedure is described in NER 8.9.2.

The Procedures establish the methodology by which AEMO determines the credit support requirements for each market participant – represented by the maximum credit limit (**MCL**) - so that the 2% prudential standard is met for the NEM. The prudential standard represents the probability of a market participant's credit support being insufficient to cover its outstanding liabilities by the time of suspension, following a payment default. The Regional Model is based on the Procedures and is used to calculate key factors for market participant MCL assessment.

SSC Rule related changes

To implement the SSC Rule, AEMO proposes to update the Procedures and the Regional Model to reflect an outstandings limit time period of 21 days.

Other proposed changes

The NEM is under transition, with new types of market participants and market behaviour, increasing price volatility, periods of very high prices (i.e. winter 2022) and more instances of negative prices. These factors, together with gaps identified by AEMO in the current prudentials methodology, have all contributed to the 2% prudential standard (prescribed in NER 3.3.4A) not being met for most regions over the past three years. Not meeting the prudential standard can result in a mismatch between credit support and actual market liabilities that can increase the probability of a shortfall upon a default.

AEMO is proposing to amend the Procedures and the Regional Model to improve the current methodology and assist in re-establishing the prudential standard. The proposed amendments relate to:

- Improving Regional Model calibration and meeting the prudential standard.
- Accounting for negative prices in the Regional Model.
- Correcting TAS region data.
- Reflecting market participant risk profile in MCL calculations.
- Using credit and debit energy and absolute value of price concepts when calculating MCL.

AEMO considers the proposed amendments to be preferable to alternative options considered as they:

- Ensure that credit support requirements are better aligned with accrued liabilities and the 2% prudential standard is met.
- Can be implemented efficiently together with the SSC Rule related changes, with minimum system/process changes.

- Require no/minimal process or system changes from participants.

- Allow all other aspects of the prudentials process to remain unchanged.

The detailed sections of this consultation paper include more information on the proposal and AEMO's reasons for making it.

Consultation notice

AEMO is now consulting on this proposal and invites written submissions from interested persons on the issues identified in this paper to prudentials@aemo.com.au by 5:00pm (Melbourne time) on 21 July 2025.

Submissions may make alternative or additional proposals you consider may better meet the objectives of this consultation and the national electricity objective in section 7 of the National Electricity Law. Please include supporting reasons.

Before making a submission, please read and take note of AEMO's consultation submission guidelines, which can be found at https://aemo.com.au/consultations. Subject to those guidelines, submissions will be published on AEMO's website.

Please identify any parts of your submission that you wish to remain confidential, and explain why. AEMO may still publish that information if it does not consider it to be confidential, but will consult with you before doing so. Material identified as confidential may be given less weight in the decision-making process than material that is published.

Submissions received after the closing date and time will not be valid, and AEMO is not obliged to consider them. Any late submissions should explain the reason for lateness and the detriment to you if AEMO does not consider your submission.

Interested persons can request a meeting with AEMO to discuss any particularly complex, sensitive or confidential matters relating to the proposal. Please refer to NER 8.9.1(k). Meeting requests must be received by the end of the submission period and include reasons for the request. We will try to accommodate reasonable meeting requests but, where appropriate, we may hold joint meetings with other stakeholders or convene a meeting with a broader industry group. Subject to confidentiality restrictions, AEMO will publish a summary of matters discussed at stakeholder meetings.

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1.   Stakeholder consultation process

As required by the National Electricity Rules (**NER**) clause 3.3.8(g), AEMO is consulting on proposed amendments to the Credit Limit Procedures (proposal) in accordance with the standard rules consultation procedure in NER 8.9.2.

Note that this consultation paper uses terms defined in the NER and in the Procedures, which are intended to have the same meanings. There is a glossary of additional terms and abbreviations in Appendix A.

AEMO's indicative process and timeline for this consultation is outlined below. Future dates may be adjusted and additional steps may be included if necessary, as the consultation progresses.

Consultation steps	Dates
Settlement Managers Working Group (brief presentation on proposed Procedure changes)	8 May 2025
Consultation paper published	4 June 2025
Submissions due on consultation paper	21 July 2025
Draft report published	Expected 25 August 2025
Submissions due on draft report	Expected 24 September 2025
Final report published	Expected 22 October 2025

2.   Background

2.1.   Context for this consultation

2.1.1.   The SSC Rule

The Australian Energy Market Commission (AEMC) made the *National Electricity Amendment (Shortening the settlement cycle) Rule 2024* (SSC Rule) to shorten the national electricity market (NEM) settlement cycle to nine business days following the end of a billing period, from the current 20 business days.

Under the SSC Rule:

- AEMO will issue preliminary statements within three business days and final statements within seven business days following the end of a billing period.

- The payment date will be the ninth business day after the end of a billing period, or two business days after receiving a final statement, whichever is the later.

- Participants and AEMO will still have 15 business days following the end of a billing period to use reasonable endeavours to resolve disputes regarding preliminary statements.

- AEMO will issue a routine revised statement at 20 business days following the end of the billing period. This is in addition to the routine revisions that occur at 20 and 30 weeks.

The SSC Rule will commence on 9 August 2026.

2.1.2.   Procedure and Regional Model changes – SSC Rule

The concepts and associated terminology introduced by the SSC Rule will necessitate corresponding terminology updates to the Procedures. It will also necessitate changes to AEMO's Regional Model which is used to calculate key factors for market participant prudential risk assessment calculations.

2.1.3.   Procedure and Regional Model changes - other

At the same time as making the SSC Rule related changes, AEMO is taking the opportunity to improve the Procedures and Regional Model by addressing gaps related to:

- Improving Regional Model calibration and meeting the prudential standard.

- Accounting for negative prices in the Regional Model.

- Correcting TAS region data.

- Reflecting market participant risk profile in Maximum Credit Limit (MCL) calculations.

- Using energy and absolute value of price concepts when calculating MCL.

Historically these gaps have not had a material prudential impact. However, as the NEM continues to change, they are increasingly likely to result in more significant misalignment of some market participants' credit support requirements with their prudential risk. Additionally, the SSC Rule itself, with a shorter outstandings period, will further exacerbate the gaps. AEMO considers these issues should be addressed by amending the Procedures to appropriately account for these matters in prudential calculations.

2.2.   NER requirements

2.2.1.   Shorter settlement cycle

The SSC Rule changes the definition of payment date in the NER, from "the 20th business day after the end of a billing period," to the "9th business day after the end of a billing period". There are also other changes to settlement related timings, which are not relevant to the Procedures.

2.2.2.   Credit limit procedures and prudential settings

The Procedures are made under clause 3.3.8 of the NER, with the objective of establishing the process by which AEMO determines the prudential settings for each market participant so that the 2% prudential standard is met for the NEM. The key prudential settings for a market participant comprise its MCL, outstandings limit (**OSL**) and prudential margin (**PM**). The MCL is the sum of the OSL and the PM (under clause 3.3.8(k) of the NER), and each market participant is required to procure credit support equal to or greater than its MCL. AEMO may draw down on the credit support and apply it against the market participant's liabilities in the event of a default.

The prudential standard of 2% is set by clause 3.3.4A of the NER, and refers to the prudential probability of exceedance (POE). That is, the probability of a market participant's MCL being exceeded by its outstandings within 7 days after a payment default (being the 'reaction period' within which the market participant is likely to be suspended).

Clause 3.3.8(d) of the NER sets out the factors that AEMO must take into account when determining the prudential settings methodology, which are:

- Regional reference prices.

- Time of year.

- Volatility of load and regional reference price for a region.

- AEMO's estimate of a market participant's generation and load.

- The relationship between average load and peak load for a market participant.

- Prospective reallocations for the assessment period.

- Correlations between energy, reallocations and the regional reference price.

- Statistical distribution of any accrued amounts owing to AEMO.

- The time period for which the prudential settings are being calculated.

- Any other factors AEMO considers relevant having regard to the objective of the Procedures to meet the prudential standard for the NEM.

The factors directly impacted by the SSC Rule are:

- Volatility of load and regional reference price for a region.

- The time period for which the prudential settings are being calculated.

2.3. The national electricity objective (NEO)

Within the specific requirements of the NER applicable to this proposal, AEMO will seek to make a determination that is consistent with the national electricity objective (NEO) and, where considering options, to select the one best aligned with the NEO.

The NEO is expressed in section 7 of the National Electricity Law as:

> to promote efficient investment in, and efficient operation and use of, electricity services for the long term interests of consumers of electricity with respect to:
>
> (a)   price, quality, safety, reliability and security of supply of electricity; and
>
> (b)   the reliability, safety and security of the national electricity system; and
>
> (c)   the achievement of targets set by a participating jurisdiction—
>
> > (i)   for reducing Australia's greenhouse gas emissions; or
> >
> > (ii)   that are likely to contribute to reducing Australia's greenhouse gas emissions.

3.   Proposal discussion

Questions

1. Reflecting the SSC Rule in the CLP
   • Are there any comments on the length of the T_{OSL} chosen for calculating the OSL component of the MCL under a shorter settlement cycle (i.e. T_{OSL} = 21 days)?
   • Are there any comments relating to the proposed changes to MCL under extreme market conditions?
   • Are there any comments relating to the proposed changes related to new entrants, MNSPs and DRSPs?
2. Improving Regional Model calibration and meeting the prudential standard
   • Are there any comments on the updated Regional Model to reflect a 21 day T_{OSL} and the updated calibration methodology?
3. Accounting for negative prices in the Regional Model
   • Are there any comments on the ToD segments proposed by AEMO ?
   • Are there any unintended/adverse consequences of the ToD segments proposed?
   • Should ToD segments differ by region (noting the added complexity this would bring), and if so why, and what should they be?
   • Are there any comments/preferences with regard to the two calibration methodologies (Option 1 and Option 2) under ToD segmentation?
4. Correcting TAS region data
   • Are there any comments on the removal of problematic TAS region data to allow a more accurate calculation of volatility factors and POE for the region?
5. Reflecting market participant risk profile in MCL calculations
   • Are there any comments on the ToD based methodology that is proposed to replace the use of PRAFs for MCL calculations?
   • Are there any unintended/adverse consequences of the removal of PRAFs in MCL calculations?
6. Using energy and absolute value of price concepts when calculating MCL
   • Are there any unintended/adverse consequences of using a credit or debit determination and the absolute value of price for MCL calculations for each participant?
   • Are there any comments on allowing both an increase and decrease in MCL under the proposed changes?
7. Other
   • Is there any additional clarifying information required in the Procedures for implementing the SSC Rule, and the improvements proposed by AEMO?
   • Are there any unintended/adverse consequences of the proposed changes as described in the Procedures?
   • Are there any comments regarding the proposed transition period over which AEMO can choose the most appropriate methodology (current or new) by which to assess market participant MCL?

3.1. Reflecting the SSC Rule in the Procedures

3.1.1. Credit support in the NEM

Market participant confidence in the financial settlement of spot electricity transactions is critical to the operation of the NEM and setting the spot market price. AEMO's obligation to settle payments in a billing period is limited to the funds received from market participants in that billing period or provided under credit support arrangements and security deposits. Any shortfall in funds available to make payments in a billing period will proportionately reduce the amount of energy or reallocation payments due to be made by AEMO in that billing cycle (typically resulting in short payments to generators).

Credit support arrangements need to be set at a level that ensures that in 98 out of 100 of market participant default events, AEMO holds enough credit support to avoid a shortfall. This is referred to as the 2% prudential standard.

3.1.2. Determining the level of credit support

The NER requires market participants to provide credit support in the form of an unconditional guarantee to AEMO from an acceptable financial institution, at or above the pre-determined MCL value. The MCL is, therefore, what determines the minimum credit support available to meet the prudential standard. The MCL is the sum of the OSL and the PM for a market participant.

The OSL is the amount needed to cover liabilities for all trading periods that have occurred but not yet been paid for (i.e. 35 days). The PM is the buffer intended (i.e. 7 days) to cover accruing liabilities while a defaulting market participant is removed from the market (suspended).

In simplified terms:

- OSL = Load x Average Price x OSL Volatility Factor x Participant Risk Adjustment Factor x 35
- PM = Load x Average Price x PM Volatility Factor x Participant Risk Adjustment Factor x 7

3.1.3. Calculating Volatility Factors in the Regional Model

AEMO's Regional Model is built to reflect the Procedures, and takes a statistical approach. It uses historical NEM load and price data to calculate volatility factors for OSL and PM (VFOSL and VFPM) that are adjusted through the volatility factor percentile to meet the 2% prudential standard (see Clause 4.2.2 of the Procedures).

3.1.4. The direct effect of SSC Rule on determining MCL

The settlement cycle length directly impacts the MCL calculation through altering the number of days credit support is required to cover.

The settlement cycle length is also a key underlying assumption of the Regional Model. Changing the settlement cycle length to nine days will change the OSL and PM[1] volatility factors output from the Regional Model as well as the POE calculation.

Objectives of the proposed changes: update the Procedures to reflect a 9 day settlement cycle.

3.1.5. Description and effect of proposal

The length of the settlement cycle is a direct input into AEMO's calculation of each market participant's MCL, under the Procedures. A market participants MCL is a sum of the OSL and PM, where the:

- OSL calculation is based on the OSL time period (T_{OSL}) of 35 days (derived from settlement cycle length).
- PM calculation is based the reaction time period (T_{RP}) of seven days.

Under the SSC Rule, the NEM settlement cycle is shortened to nine business days following the end of a billing period, from the current 20 business days.

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[1] PM volatility factor also changes with the SSC Rule as the calibration mechanism links the two volatility factors , i.e. as the model is calibrated both volatility factors are adjusted concurrently.

How is the T_{OSL} determined under the current 20 day settlement cycle?

Under the current 20 day settlement cycle, it is assumed that on average the total number of days a market participant will accrue settlement amounts for (and hence will need prudential cover for) is:

- 20 business days (4 weeks), plus

- 4 x 2 weekend days, plus

- 7 days billing period.

That is, a total of 35 days (T_{OSL}).

While the NEM settlement cycle length is set according to the NER, the settlement calendar considers other factors, including not having settlements on national public holidays. This means, that depending on how weekends and public holidays fall, there will be a range of settlement period lengths (i.e. number of days of outstandings before payment) over time. AEMO analysis shows that under the current 20 day settlement cycle, settlement period lengths range from 32 to 38 days.

How will the T_{OSL} be determined under a 9 day settlement cycle?

AEMO proposes to amend the Procedures to encompass the shorter settlement cycle by setting T_{OSL} at 21 days. The logic for the proposal is as follows:

1. Under a 9 day settlement cycle, the total average number of days a market participant will accrue settlement amounts for (and hence will need prudential cover for) is determined as:

   - 9 business days (equivalent to 2 weeks, accounting for any public holidays), plus

   - 2 x 2 weekend days, plus

   - 7 days billing period

   That is, a total of 21 days (T_{OSL})

2. This methodology is confirmed by AEMO's analysis, which has shown that under the 9 day settlement cycle, settlement period lengths range from 17 to 22 days, making a 21 day T_{OSL} an appropriate choice. According to AEMO's analysis, a total of 97% of settlement period lengths (analysing data from 2012 - 2025) would be covered under the proposed 21 day T_{OSL}.

3. The T_{RP} will remain unchanged at seven days.

Will a shorter settlement cycle reduce MCL requirements?

While market participant MCLs will be reduced under the SSC Rule, the reduction will be not proportional to the reduction of settlement days (i.e. moving from 20 days to 9 days is i.e. 55% reduction in days), for two reasons:

1) With a T_{OSL} reduced from 35 to 21 days, the total number of days (OSL and PM) included in the MCL calculation will fall from 42 days to 28 days (as the time period for the PM remains unchanged at 7 days). This will reduce the number of days used for the MCL calculation by 33%.

2) In general, the reduction in T_{OSL} will lead to an increase in the OSL volatility factor (as volatility is higher when measured over a shorter timeframe). As the OSL volatility factor is a key part of the MCL calculation, this increase will result in a decrease in MCL reductions under the SSC Rule. The calculation of volatility factors under the SSC Rule and other proposed changes are discussed in Section 3.3.

So while MCL will be reduced under the SSC Rule, the reduction will be not directly proportional to the reduction of settlement days from 20 days to 9 days. Further, other proposed changes, that aim to better align prudential requirements with market participant behaviour, will also affect market participants' MCLs by smaller or larger amounts, depending on the participant's prudential risk profile. For indications of likely MCL reductions under the SSC Rule and other proposed changes, see Section 3.7 and 3.8.

Managing extreme market conditions under SSC

Clause 9.5 of the Procedures includes additional provisions for the calculation of MCL under extreme market conditions. These provisions were designed with a 35 day T_{OSL} in mind and will have to be updated to reflect the SSC Rule. This will be done by amending the number of days current accrued liabilities are averaged over to calculate OSL (Clause 9.5.2 (a) of the Procedures) to be in line with the SSC Rule.

MCL for new entrants, MNSPs and DRSPs

Clauses 10.2, 10.3 and 10.4 of the Procedures provide for a simplified calculation of MCL for new entrants, MNSPs and DRSPs. These simplified calculations of PM and OSL split OSL and PM at a ratio of 80% to 20% (based on the 35 day OSL time period vs the 7 day PM time period). Thus a $10,000 MCL, would be made up of an OSL of $8,000 and a PM of $2,000.

As the OSL time period is being reduced to 21 days, the split between OSL and PM will be adjusted to 70% (OSL) and 30% (PM) to reflect the ratio between OSL and PM (i.e. 21 to 7 days). Thus a $10,000 MCL, would be made up of OSL of $7,000 and a PM of $3,000.

3.1.6. How the proposal meets the objectives

The proposal to update the T_{OSL} to 21 days to reflect the shorter settlement cycle of 9 days will:

- Allow market participants to have a lower MCL, reducing their need for working capital.

- Potentially reduce the quantum of any loss to the market, as defaulting market participants will have a lower quantum of outstandings under a shorter settlement cycle (noting that the prudential standard will remain unchanged at 2%).

The proposal to reflect the SSC Rule in clauses related to managing extreme market conditions will:

- Ensure AEMO has the appropriate tools under a 9 day settlement cycle to manage market participant prudential requirements where extreme market conditions result in significant misalignment between a Market Participant's MCL and its accrued liabilities.

The proposal to reflect the SSC Rule in clauses related to MCL for new entrants, MNSPs and DRSPs will:

- Appropriately reflect the changed split between OSL and PM for these participants.

3.1.7. Alternative options

As indicated above, AEMO's analysis has shown that under a 9 day settlement cycle, settlement period lengths will vary between 17 and 22 days. A 21 days T_{OSL} will ensure that MCL covers most settlement cycle lengths (besides those that happen to be 22 days). It offers a good compromise between having adequate MCL coverage and ensuring lowest costs for market participants.

AEMO did not consider alternative options for SSC Rule changes related to managing extreme market conditions and MCL calculations for new entrants, MNSPs and DRSPs.

> **Questions for participants:**
> - Are there any comments on the length of the T_{OSL} chosen for calculating the OSL component of the MCL under a shorter settlement cycle (i.e. T_{OSL} = 21 days)?
> - Are there any comments relating to the proposed changes to MCL under extreme market conditions?
> - Are there any comments relating to the proposed changes related to new entrants, MNSPs and DRSPs?

3.1.8. Relevant Procedure and Regional Model updates

The following updates will be made to accommodate a 9 day settlement cycle:

- CLP: all mentions of T_{OSL}= 35 days to be updated to 21 days.
- Clauses to be updated: 3.2, 4.3.1, 4.3.4, 5, 9.3.4, 9.4.3, 9.5, 10.2, 10.3 and 10.4.
- Regional Model: reflecting the CLP, all relevant calculations to be done for a T_{OSL} of 21 days.

3.2. Improving Regional Model calibration and meeting the prudential standard

3.2.1. Issues with meeting the prudential standard

The prudential standard represents the agreed prudential risk level in the NEM. It is the value of the prudential probability of exceedance (POE), expressed as a percentage and is set at 2% (NER clause 3.3.4A).

In the Regional Model, the volatility factor percentile (0% to 100%) is used to adjust the volatility factors to meet the 2% prudential standard (i.e. model calibration). This ensures that MCLs are set neither too low or too high for market participants.

The POE over the past five years, for each NEM region is shown in Table 1. As shown, the prudential standard was exceeded in all regions in 2024.

Table 1   POE - over the past 5 years

Region	2020	2021	2022	2023	2024
NSW	2.0%	2.3%	2.8%	3.0%	2.9%
QLD	1.5%	1.8%	2.7%	2.9%	2.9%
SA	1.3%	1.3%	1.9%	2.0%	2.1%
TAS	4.7%	4.4%	5.2%	5.2%	5.2%
VIC	2.6%	2.6%	3.1%	3.2%	3.2%

The volatility factor percentile is currently set at 100% for all regions, meaning that under the current methodology it is not possible to calibrate the Regional Model, and the prudential standard will not be met under the foreseeable future.

Exceeding the prudential standard does not mean there will be a settlement shortfall in any given year. However, as the purpose of the prudential standard is to provide a target within which AEMO can maintain the risk of loss in the event of market participant default, changes to the calibration methodology are necessary to ensure that the Regional Model can function as intended.

Objectives of the proposed changes: ensure the Regional Model functions under the SSC Rule related changes, and develop a way to allow the Regional Model to be calibrated even when the VF percentiles are at 100%.

AEMO has updated its Regional Model to reflect the reduction in T_{OSL} from 35 days to 21 days, and calibrated the model to meet the 2% prudential standard. The updated Regional Model functions as required, with the required volatility factors calculated and the model being able to be calibrated.

As shown in Table 2 below, these changes result in the prudential standard being met, or close to being met in four regions. The reasons why it is easier to meet the prudential standard under the 21 days T_{OSL} is as follows:

- The key components of the POE calculations[2] are the total outstandings on a day compared to the total MCL on a day.

- The outstandings used in POE calculations reduce linearly with the reduction in settlement days.

- The volatility factors increase with a shorter settlement period, and even though MCL is calculated over the reduced number of settlement days, there is a smaller decrease in the MCLs used in POE calculations.

- This results in fewer exceedances overall, and makes it easier for the prudential standard to be met (the issue with the TAS region is dealt with in Section 3.4).

Table 2   POE - current methodology vs 21 day T_{OSL}

Region	2024	Under the SSC Rule change
NSW	2.9%	2%
QLD	2.9%	2%
SA	2.1%	2%
TAS	5.2%	3.5%
VIC	3.2%	2.2%

3.2.2. Description and effect of proposal

While the T_{OSL} changes allow the model to be calibrated to the 2% prudential standard for some regions (which is not the case under the current methodology), AEMO proposes to amend the Procedures to allow calibration of the Regional Model even when the VF percentile is at 100%.

The proposed methodology for calibration when VF is above 100% is to take the maximum volatility factors for VFOSL and VFPM (that are equivalent to a VF percentile of 100%) and multiply them by a calibration factor (CF) to meet the 2% prudential standard.

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[2] The POE means the probability of a market participant's MCL being exceeded by its outstandings at the end of the reaction period following the market participant exceeding its outstandings limit on any day and failing to rectify this breach. The calculation is performed on a regional basis.

Example calculation:

- Current settings:

    - VF percentile set so POE = 2%

    - VF % =100%, POE = 2.8%

    - VFOSL=1.2, VFPM= 1.4 (no further calibration possible, even where POE>2%)

- Proposed calculation:

    - if VF % = 100% and POE>2%

    - VFSOL = $VFSOL_{100\%}$ x CF and VFPM = $VFPM_{100\%}$ x CF where CF is set so POE = 2%

    - $VFOSL_{100\%}$=1.2, $VFPM_{100\%}$= 1.4

    - CF at 2% POE = 1.1

    - VFOSL = 1.2 x 1.1 = 1.32

    - VFPM = 1.4 x1.1 = 1.54

3.2.3. How the proposal meets the objectives

The 21 day T_{OSL} can be implemented in the Regional Model, with the model functioning as required under the new settings. These changes also make it easier for the prudential standard to be met.

Including an additional calibration factor in the methodology will give AEMO the flexibility to calibrate the Regional Model even when the VF percentiles are at 100%. With other proposed changes (see Section 3.3) to the Regional Model, this calibration mechanism will ensure that the volatility factors and hence MCLs are better aligned to the actual prudential risks at all times.

3.2.4. Alternative options

AEMO has not identified alternate options to for dealing with model calibration. AEMO considers that the proposed change is a good fit with the current methodology, is easy to implement in the Regional Model and easy for market participants to understand.

> **Questions for participants:**
>
> - Are there any comments on the updated Regional Model to reflect a 21 day T_{OSL} and the updated calibration methodology?

3.2.5. Relevant Procedure and Regional Model updates

The following updates are proposed to enable calibration of the Regional Model when VF percentile is 100%:

- CLP: inclusion of the calibration factor (CF) in the VFOSL and VFPM calculation methodology.

- Procedure clauses to be updated: 9.3.4 and 9.3.5.

- Regional Model: reflecting the CLP, all relevant calculations for VFOSL and VFPM to include CF.

3.3. Accounting for negative prices in the Regional Model

3.3.1. Negative prices in the Regional Model and MCL

AEMO's estimate of the average reference price (**RRP**) for a region, P_R, is a key factor in market participant MCL calculations. It is calculated by MCL season in the Regional Model, which was designed under the Rules and is described in the Procedures. The distribution of P_R is used to calculate the volatility factors to meet the 2% prudential standard and the P_R for each season is used in MCL calculations.

Over the past five years in the NEM, the number of trading intervals (**TIs**) with negative prices has been increasing (see Figure 1). Under the CLP methodology, the prices from TIs across a day are averaged to calculate a single price for the day. With negative prices occurring more frequently across days, this daily averaging process (i.e. averaging of negative and positive prices across the day) results in an inaccurate representation of price for MCL calculations.

Figure 1   Frequency of negative price trading intervals in each region over time
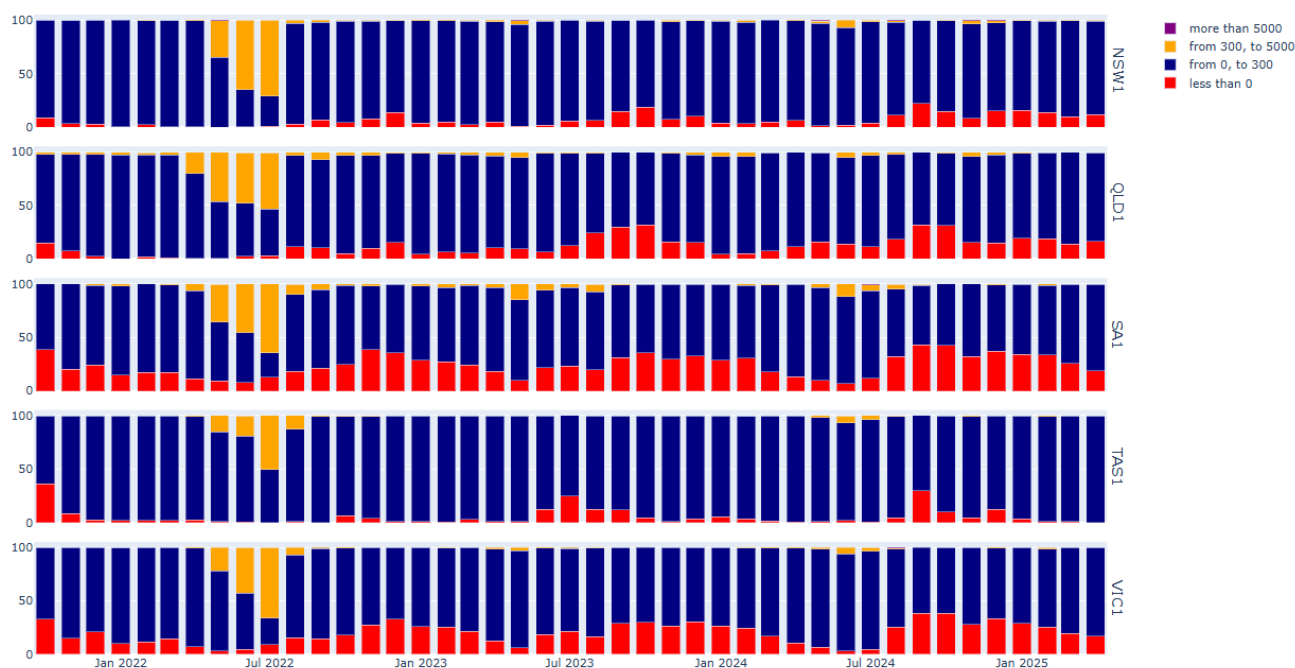
With the continuing increase in negative price TIs, a possible outcome is the reduction of P_R for a season to zero, resulting in all MCLs being zero. This outcome would not accurately reflect prudential risks, because while negative price periods occur and are increasing in number, positive and high prices still exist and need to be accurately accounted for in MCL calculations.

The distribution of P_R used in the Regional Model to determine volatility factors is also impacted by the frequency of the negative price TIs, making it increasingly difficult to determine volatility factors that are representative of actual prudential risks.

Objectives of the proposed changes: accurately reflect fluctuating prices (including negative prices) throughout the day in determining P_R for MCL calculations and the volatility factor calculations in the Regional Model.

3.3.2. Description and effect of proposal

Determining volatility factors in the Regional Model

In the Regional Model, the regional level parameters, estimated average RRP for the region (P_R) and estimated average daily regional load (ERL_R), are calculated for each season (creating a distribution of estimated load by estimated price for each region).

AEMO proposes to amend the Procedures, and consequently the Regional Model, to allow the regional level calculations for ERL_R and P_R which currently result in a single distribution per region, to be broken into five time of day (**ToD**) segments. This will result in five ToD based distributions of estimated load by estimated price. In all other aspects, the ERL_R and P_R calculations for each of the ToD segments will remain as described in the CLP. The proposed ToD segments[3] are:

   a) Early Morning (EM) - 00:00 to 05:59

   b) Morning Peak (MP) - 06:00 to 09:59

   c) Middle of day (MD) - 10:00 to 15:59

   d) Afternoon Peak (AP) -16:00 to 19:59

   e) Late Evening (LE) - 20:00 to 23:59

Currently, the OSL and PM volatility factors ($VFOSL_R$ and the $VFPM_R$) are derived from the regional distribution of estimated load by estimated price and are calibrated through the volatility factor percentile to meet the 2% prudential standard. Under the proposed ToD methodology, calibration to meet the 2% prudential standard will still happen at a regional level, with the same VF percentile and calibration factor (for a region) applied to each ToD segment, and the outputs from each ToD segment aggregated on a daily basis.

The proposed methodology will result in 25 volatility factors for each of VFOSL and VFPM. See Table 3 and Table 4 for an example list of VF percentiles and corresponding OSL and PM volatility factors across the five ToD segments and five regions[4].

Table 3 Comparison of current OSL volatility factor (VF_{OSL}) per region to VF_{OSL} by ToD segments – Winter 2025

	NSW	QLD	SA	TAS	VIC
VFO$_{SL}$ under current methodology					
VF percentile	100%	100%	100%	100%	100%
VF$_{OSL}$	1.54	1.53	1.64	1.78	1.6
VFo$_{SL}$ by ToD under SSC and other prosed changes					
VF percentile - ToD	99%	96%	94%	95%	100.1%
VF$_{OSL}$ - Early morning	1.49	1.4	1.51	1.7	1.77
VF$_{OSL}$ - Morning peak	1.9	1.76	1.88	1.94	2.01
VF$_{OSL}$ - Middle of day	1.59	1.51	1.77	1.77	1.84
VF$_{OSL}$ - Afternoon peak	2.12	1.93	2.11	1.84	1.89

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[3] The ToD segments were derived from NEM data, matching the morning peak and afternoon peaks (for further detail on how the segments were derived at, see Appendix B).

[4] These are the volatility factors for the 2025 winter season, with all proposed changes (and Option 2 model calibration) implemented in the Regional Model and the model calibrated to meet the 2% prudential standard.

	NSW	QLD	SA	TAS	VIC
VF$_{OSL}$ - Late evening	1.62	1.54	1.96	1.68	1.68

Table 4 Comparison of current PM volatility factor (VF$_{PM}$) per region to VF$_{PM}$ by ToD segments – Winter 2025

	NSW	QLD	SA	TAS	VIC
VF$_{PM}$ under current methodology					
VF percentile	100%	100%	100%	100%	100%
VF$_{PM}$	2.74	2.44	2.88	2.36	2.58
VFP$_{PM}$ by ToD under SSC and other proposed changes					
VF percentile - ToD	99%	96%	94%	95%	100.1%
VF$_{PM}$ - Early morning	1.89	1.57	1.64	1.9	2.31
VF$_{PM}$ - Morning peak	2.74	2.16	2.17	1.71	2.81
VF$_{PM}$ - Middle of day	2.27	1.97	2.02	1.95	2.49
VF$_{PM}$ - Afternoon peak	3.5	2.56	2.19	1.85	2.88
VF$_{PM}$ - Late evening	2.14	1.74	1.8	1.79	2.13

The proposed ToD methodology improves the Regional Model by:

- More accurately reflecting the increased volatility of prices across a day (including negative prices).

- Better reflecting changing market and market participant behaviour brought on by the large increase in solar and other renewable generation and batteries.

- Allowing for a more refined calculation of volatility factors that are representative of the 2% prudential standard, ultimately resulting in MCLs that are more accurate for market participants.

- Better dealing with periods of low volatility.

Determining P$_R$ for MCL calculations

The average price for the region (**P$_R$**) is AEMO's estimate of the average seasonal RRP expected to prevail for a region R for the purposes of the OSL and PM calculation. P$_R$ for each MCL season is identical for all market participants and is published by AEMO in advance. See clause 9.2.2 of the CLP for how P$_R$ is calculated.

AEMO proposes to amend the CLP so that P$_R$ for MCL calculations is determined by ToD segments for each region/season, resulting in 25 P$_R$ values across the five ToD segments and regions. An example output of P$_R$ for each region and ToD segment is shown in Table 5 below. In all other aspects, the P$_R$ calculation will be unchanged.

Table 5 Comparison of current average price (P$_R$) per region to P$_R$ by ToD segments – Winter 2025 [5]

	NSW	QLD	SA	TAS	VIC
P$_R$ under current methodology					
P$_R$	$103.64	$86.87	$103.52	$74.92	$86.76
P$_R$ by ToD under SSC and other proposed changes					
P$_R$ - Early morning	$ 71.23	$ 67.48	$ 76.90	$ 61.07	$ 62.04

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[5] These are the regional average prices per ToD for the 2025 winter season, with all proposed changes (using the Option 2 recalibration method) implemented in the Regional Model and the model calibrated to meet the 2% prudential standard.

	NSW	QLD	SA	TAS	VIC
P_R - Morning peak	$ 110.56	$ 89.11	$ 131.93	$ 87.39	$ 102.71
P_R - Middle of day	$ 66.42	$ 53.72	$ 81.83	$ 70.64	$ 68.16
P_R - Afternoon peak	$ 174.32	$ 153.75	$ 175.12	$ 91.61	$ 148.91
P_R – Late evening	$ 100.01	$ 97.83	$ 121.66	$ 71.74	$ 92.46

The proposed ToD methodology for calculating P_R improves MCL calculations by:

- Better incorporating market changes such as increased volatility and negative prices in the prudentials methodology, resulting in better prudential risk outcomes.

- Using P_R values in MCL calculations that better represent prices expected to prevail during different parts of the day, resulting in a more accurate calculation of market participant prudential requirements.

- Enabling a more nuanced calculation of each market participant's MCL depending on how their load is distributed throughout the day, resulting in an MCL that better reflects the market participant's prudential risks.

Calibrating the Regional Model under the ToD methodology

The Regional Model is calibrated by adjusting the VF percentiles to meet the 2% prudential standard. Currently this is modelled per region, i.e. VF% for region 1 is adjusted to calibrate model to meet the 2% prudential standard in region 1, resulting in one VFOSL and VFPM per region per season.

Under the ToD segmentation methodology, there are two options for calibrating the Regional Model:

- Option 1 – calibration to run across each ToD, treating that ToD segment as if it were a day for exceedance counting purposes, and resulting in a different VF percentile for each ToD (for a total of 25 VF percentiles across the five ToDs and five regions). This option is more complicated to understand and implement, and delivers a more conservative representation of prudential risks.

- Option 2 – calibration to run across the day by aggregating results from each ToD segment and counting the exceedance on a daily basis. This results in the same VF percentile applied to every ToD, with a total of five VF percentiles. This option is simpler to understand and implement and still gives an improved accuracy.

3.3.3. How the proposal meets the objectives

Moving to a ToD based calculation for volatility factors and average prices used in MCL calculations allows for a better representation of market participant prudential risks and ultimately a more accurate calculation of prudential requirements.

Additionally, due to the changing nature of the NEM, there are more instances of what previously would have been considered unlikely market participant activity, such as generation at negative prices, the effects of which the current methodology cannot accurately consider. The ToD methodology will better deal with these newer forms of market activity and better prudential requirements to meet the actual risk profile of market participants.

3.3.4. Alternative options

AEMO does not consider there to be other viable options for more accurately determining P_R going forward than to have a methodology based on segmentation of the day. There may be many options relating to how exactly that segmentation is done.

Options considered for the calibration methodology under ToD are outlined in Section 3.3.2 above.

<u>**Questions for participants:**</u>

- Are there any comments on the ToD segments proposed by AEMO ?

- Are there any unintended/adverse consequences of the ToD segments proposed?

- Should ToD segments differ by region (noting the added complexity this would bring), and if so why, and what should they be?

- Are there any comments/preferences with regard to the two calibration methodologies (Option 1 and Option 2) under ToD segmentation?

3.3.5. Relevant Procedure and Regional Model updates

The following updates will be made to enable a ToD methodology:

- CLP: update all RRP and P_R references for a ToD definition, inclusion of ToD segmentation and any methodology explanations.

- Clauses to be updated: 4.3.2, 4.3.3, 4.3.4, 5,6,7, 9.2.2, 9.3.2, 9.3.3, 9.3.4 and 9.3.5.

- Regional Model: reflecting the CLP, all relevant calculations to be completed at a ToD level.

3.4. Correcting TAS region data

3.4.1. TAS region data

As shown in Table 1, the TAS region has had a POE over 4% for many years (since 2016). This is primarily due to two factors:

- Data availability - the TAS region joined the NEM in 2006 (1999 for all other regions), resulting in a smaller data set being available to use in the Regional Model, and making it harder for the prudential standard to be met.

- Basslink outage - the lengthy Basslink outage over the 20 Dec 2015 to 13 June 2016 period produced many days where outstandings exceeded MCL in the TAS region. These exceedances remain in the POE calculation, making it impossible for the TAS region to meet the prudential standard.

Objectives of the proposed changes: Regional Model to calculate an accurate POE for the TAS region that is reflective of the actual prudential risk over time and gives AEMO the ability to set volatility factors congruent with the 2% prudential standard.

3.4.2. Description and effect of proposal

AEMO's previous analysis (Effectiveness of the NEM Prudential Settings Methodology Report - 2017[6]) indicated that if the effect of the 2016 Basslink outage is excluded, the 2% prudential standard could be reached.

AEMO proposes to amend the Procedures to remove the data from the TAS region for the Basslink outage days from the Regional Model as it is deemed outside of the scope of what the model is designed to consider. The Basslink outage was a one-off exogenous event that does not have a connection to market participant behaviour or prudential risks.

3.4.3. How the proposal meets the objectives

AEMO has modelled the removal of the Basslink outage related data in the Regional Model. The results indicate that the changes will allow the POE in the TAS region to meet the 2% prudential standard, under the SSC Rule settings.

This change will ensure that accurate volatility factors will be able to be calculated for the TAS region going forward, ensuring MCLs for the region are better aligned with prudential risks.

3.4.4. Alternative options

There were no alternative options considered.

> **Questions for participants:**
>
> - Are there any comments on the removal of problematic TAS region data to allow a more accurate calculation of volatility factors and POE for the region?

3.4.5. Relevant Procedure and Regional Model updates

The following updates will be made:

- CLP: inserting a clause into the Procedure allowing AEMO to remove anomalous periods of data from the Regional Model based on certain criteria.

- Regional Model: exclusion of data relating to the period 20 December 2015 to 13 June 2016 from the calculations for the TAS region.

3.5. Reflecting market participant risk profile in MCL calculations

3.5.1. The relative risks of market participants

Participant Risk Adjustment Factors (PRAFs) for load, generation and reallocations ($PRAF_{L,R}$ or $PRAF_{G,R}$ or $PRAF_{R,R}$) are calculated by AEMO and used to adjust the PM and OSL for a market participant to reflect their relative risk.

PRAFs are based on an analysis of the relationship between regional load, generation and reallocation profiles, regional prices and historic RRP per TI (see Clause 8 of the CLP for a detailed description of the calculations).

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[6] See at: https://aemo.com.au/-/media/files/electricity/nem/settlements_and_payments/prudentials/2017/report--effectiveness-of-the-nem-prudential-settings-methodology-2017v10.pdf?la=en

The purpose of PRAFs is to adjust the PM and OSL for a market participant to reflect their relative risk. However, with one PRAF value (for each of load, generation and reallocations) the current methodology is only a proxy for trading interval based calculations. With the changing nature of the market, i.e. increasing instances of negative prices and moving away from the traditional generation/load model, the current PRAF methodology may no longer be fit for purpose. Additionally, particularly for PRAFs for reallocations, the current methodology produces unexpected values when negative (or a combination of negative and positive) MWh reallocations are entered into AEMO's systems.

Objectives of the proposed changes: OSL and PM calculations to reflect market participant risk profile accurately, in a way that efficiently fits in with the Regional Model methodology.

3.5.2. Description and effect of proposal

AEMO proposes to amend the Procedures by removing PRAFs altogether and replacing them with a ToD level calculation of MCL. With average prices and volatility factors generated out of the Regional Model at a ToD level under the proposed changes, all MCL calculation can also be done at a ToD level.

Current MCL methodology (simplified), where calculations are done at a day level:

- MCL = OSL + PM

- OSL = Average Daily Load x Average Price x VFOSL x PRAF x 35

- PM = Average Daily Load x Average Price x VFPM x PRAF x 7

Proposed MCL methodology (simplified) with calculations done at a ToD level (and T_{OSL} updated to reflect the SSC Rule):

- MCL = OSL +PM

- OSL = $\sum_{ToD}$ [Load$_{ToD}$ x Average Price$_{ToD}$ x VFOSL$_{ToD}$] x 21

- PM = $\sum_{ToD}$ [Load$_{ToD}$ x Average Price$_{ToD}$ x VFPM$_{ToD}$] x 7

As all parts of the MCL calculation (load, price and volatility) are calculated at a ToD level, the proposed MCL methodology will better reflect market participant risk profiles, than using PRAFs. For example, if a market participant uses more load during a higher price ToD, their MCL will be higher. Conversely if a market participant's load occurs mostly in lower priced ToD's, their MCL will be lower.

3.5.3. How the proposal meets the objectives

Moving to a ToD level MCL calculation eliminates the need for PRAFs, simplifying the Procedures and AEMO systems while making MCL calculations more reflective of a market participant's risk profile.

3.5.4. Alternative options

AEMO considered calculating MCL at a TI level. However, when the TI level calculations were modelled, the outcomes were very similar to the outputs from the ToD level calculation. Thus, for procedure and system simplicity, AEMO's preferred option is the ToD level MCL calculation.

<u>**Questions for participants:**</u>

- Are there any comments on the ToD based methodology that is proposed to replace the use of PRAFs for MCL calculations?

- Are there any unintended/adverse consequences of the removal of PRAFs in MCL calculations?

3.5.5. Relevant Procedure and Regional Model updates

The following updates will be made to remove PRAFs and replace them with a ToD based MCL calculation:

- CLP: removal of clauses 8, 9.4.8 and 9.4.9 that deal entirely to PRAFs and an explanation of ToD MCL methodology.

- Clauses to be updated: 4.3.3, 4.3.4, 5, 6, 9.3.1, 9.3.2, 9.3.3, 9.4.6.

- Regional Model: no updates.

3.6. Using energy and absolute value of price in MCL calculations

3.6.1. Generating at negative prices

The NEM is under transition, with newer types of market participant categories and market participant types (batteries or hybrid models) and previously uncommon participant activities (generation at negative prices). Capturing the prudential consequences of these activities is difficult with the current MCL calculation methodology.

<u>Objectives of the proposed changes: MCL methodology to be able to capture activities such as generation at negative prices when determining prudential requirements.</u>

3.6.2. Description and effect of proposal

AEMO proposes to amend the Procedures to move to a credit or debit determination for MCL calculations for each market participant. This would be based on the market participant's TI level energy and reallocation profiles and the RRP. The methodology would use the absolute value of price – i.e. if a market participant has generation at a negative price, it would be considered equivalent to a load at a positive price, or debit energy, from a prudentials point of view.

AEMO proposes allowing both an increase or decrease in MCL for market participants based on this methodology change. Participant level analysis was undertaken which indicates that any MCL decrease under the proposed methodology only occurred for market participants who had a reduced prudential risk due to their activities in the NEM.

3.6.3. How the proposal meets the objectives

The proposed change would allow for negative pricing to be addressed for net generators. At the same time, it could provide a net reduction in MCL for net consumers. This would ensure that MCL levels for market participants were set commensurate with their prudential risks.

3.6.4. Alternative options

There were no alternative options considered.

> **Questions for participants:**
>
> - Are there any unintended/adverse consequences of using a credit or debit determination and the absolute value of price for MCL calculations for each participant?
>
> - Are there any comments on allowing both an increase and decrease in MCL under the proposed changes?

3.6.5. Relevant Procedure and Regional Model updates

The following updates will be made to enable net credit or debit determination and the absolute value of price for MCL calculations:

- CLP: update all sections load (ACE) and generation (ASOE) to reflect the value of debit energy and value of credit energy.

- CLP: update any relevant sections to indicate $P_{R,ToD}$ is the absolute value of price (RRP).

- Clauses to be updated: 5, 6 and others throughout the Procedures.

- Regional Model: reflects the same credit and debit energy and absolute value of price concepts.

3.7. Outcomes of proposed changes

AEMO proposes to amend the Procedures and the Regional Model in a variety of ways as discussed in Sections 3.1 to 3.6. These proposed changes are:

1. Reflecting the SSC Rule in the Procedures.

2. Improving Regional Model calibration and meeting the prudential standard.

3. Accounting for negative prices in the Regional Model.

4. Correcting TAS region data.

5. Reflecting market participant risk profile in MCL calculations.

6. Using energy and absolute value of price concepts when calculating MCL.

These changes have various interlinking effects on Regional Model outputs and market participant MCL calculations, with the objective of all changes to make MCL calculations more reflective of actual market participant prudential risk, with a view of meeting the 2% prudential standard.

3.7.1. Meeting the prudential standard

The POE for all regions under the proposed changes is shown in Table 6. As shown, implementing all the proposed changes to the methodology and the Regional Model makes it easier for the 2% Prudential Standard to be met and will give AEMO the flexibility to more easily calibrate the model to match market conditions going forward.

Table 6   POE - current methodology vs methodology with all proposed changes implemented

Region	POE actual (2024)	POE (under all proposed changes)
NSW	2.9%	2%
QLD	2.9%	2%
SA	2.1%	2%
TAS	5.2%	2%
VIC	3.2%	2%

3.7.2. MCL reductions - whole of market level outcomes

Implementing the SSC Rule will reduce the total MCL and hence total credit support required for the NEM. Additionally, the other proposed changes have a variety of different interlinking effects on MCL. AEMO's analysis of total MCL reductions from the SSC Rule implementation and the other proposed changes, in comparison to recent MCL seasons is shown in Table 7[7]. As shown, for these MCL seasons, the total MCL reductions are in the 37% to 38% range.

Table 7 Changes in total MCL under the SSC Rule and other proposed changes

Change in MCL	Summer 25	Winter 25
Historical MCL	1.57$Billion	1.91$Billion
MCL with the SSC Rule and other proposed changes implemented	0.98$Billion	1.20$Billion
Total reduction in MCL	$590Million (38%)	$710Million (37%)

3.7.3. MCL reductions - market participant level outcomes

As the proposed changes make prudential requirements more reflective of market participant behaviour, changes in MCL will be different for each market participant.

AEMO's analysis (looking at MCL seasons for 2022 to 2024) indicating market participant level MCL reductions under the proposed changes is shown in Table 8.[8]

As shown, the vast majority of market participants will have a decrease in MCL (or no change if their MCL is already zero). A small number of market participants will have an increase in their MCL. This increase will be almost exclusively for market participants who previously had an MCL of zero, but under the proposed methodology, their market behaviour is assessed as requiring prudential cover.

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[7] Using 'Option 2' for model calibration.

[8] Using 'Option 2' for model calibration.

Table 8 Changes in market participant MCL under the SSC Rule and other proposed changes (2023 to 2025)

Change in MCL	Average proportion of market participants across MCL seasons 2022-2024
Total number of market participants with no change or a decrease in MCL	95.8%
MCL reduced to 0	2.4%
MCL reduced by 50% or more	5.4%
MCL reduced by up to 50%	11.0%
No change (primarily market participants with 0 MCL prior)	76.8%
Total number of market participants with an increase in MCL	4.2%
Increase in MCL (MCL not zero prior)	0.2%
Increase in MCL (from MCL of zero)	4.0%

3.8. Case studies on changes in MCL

The analysis looking at the change in total MCL above provides a good indication of the effect of the SSC and other proposed changes to market participants' aggregate prudential requirements. AEMO also undertook analysis of the SSC and other proposed changes on an individual participant basis.

This analysis is backward looking, examining what would have happened to a market participant's prudential requirements if the SSC and proposed changes were implemented. Thus, while it can give a good indication of likely MCL outcomes, future market participant MCL will be based on forecast prices and volatility factors as well as market participant behaviour that could result in a different outcome for individual market participants.

The market participant level analysis is presented in the form of four generic scenarios below:

1. Small retailer with a decrease in MCL

2. Solar farm with an increase in MCL

3. Generator with debit reallocations increasing MCL

4. Battery with changing MCL

The figure attached to each scenario shows the MCL as it would be under the current methodology (MCL_current), the $ amount billed but not yet paid at any one time under the current methodology (Current Amount) and the MCL under the prosed changes (MCL_proposed changes).

If a market participant would like to understand how their specific MCL could change under the SSC and other proposed changes, they can contact AEMO on prudentials@aemo.com.au during the consultation timeframe.

3.8.1. Small retailer with a decrease in MCL

AEMO's analysis indicates that retailers will have a reduction in their MCL under the SSC and proposed changes. For a retailer, the bulk of the MCL reduction will likely be due to the reduced settlement timeframe. However, such a market participant could have further reductions in their MCL due to the time of day they use load, i.e. if they use more load at off peak times than at peak times, their MCL will be reduced by a greater amount due to the new ToD methodology.

An illustrative example of the MCL reduction for a small retailer is shown below in Figure 2. As shown, there is a stepdown in MCL (and hence credit support required), which would mostly be due to the SSC changes.

**Figure 2   Change in MCL for a small retailer**
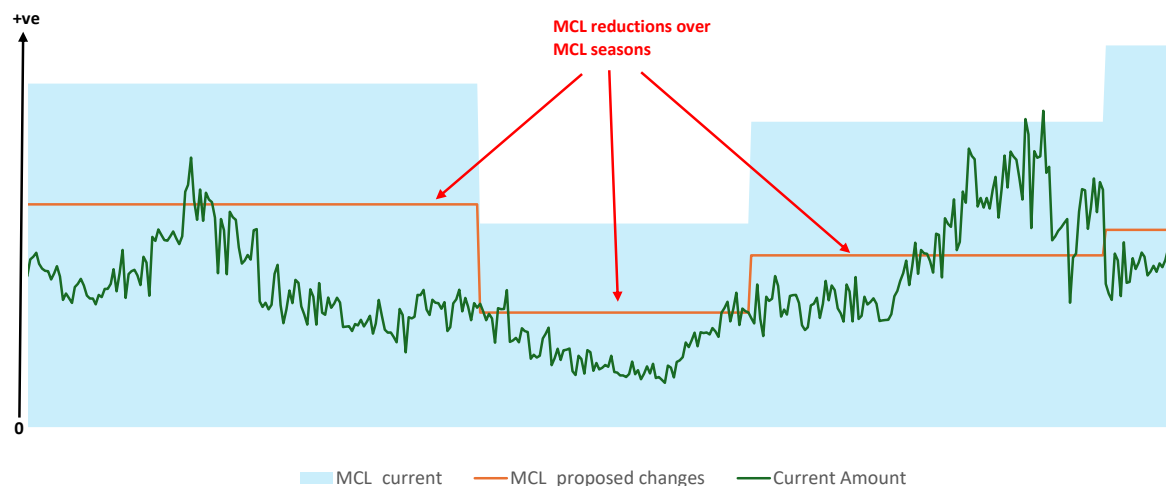
3.8.2. Solar farm with an increase in MCL

Under the current prudential settings and methodology for calculating MCL, most solar farms, for a majority of time periods, have an MCL of zero. As such, their MCL requirements would not be affected by the SSC changes alone. AEMO's analysis indicates that under the proposed ToD and credit/debit energy methodology changes, if a solar farm generates a large amount of energy during negative price trading intervals, this will affect their MCL calculations. Under some circumstances such participants could end up with an increase in MCL at certain time periods.

An illustrative example of a solar farm with an increase in MCL is shown in Figure 3. In this scenario, under the proposed changes, while the market participant mostly has an MCL of zero, over some time periods the market participant would have a non-zero MCL requirement due to their generation patterns. This would represent an increase in the prudential requirements compared to the current settings and most likely necessitate them providing credit support.

Figure 3   **Change in MCL for a solar farm**

Legend: MCL_current — MCL_proposed changes — Current Amount
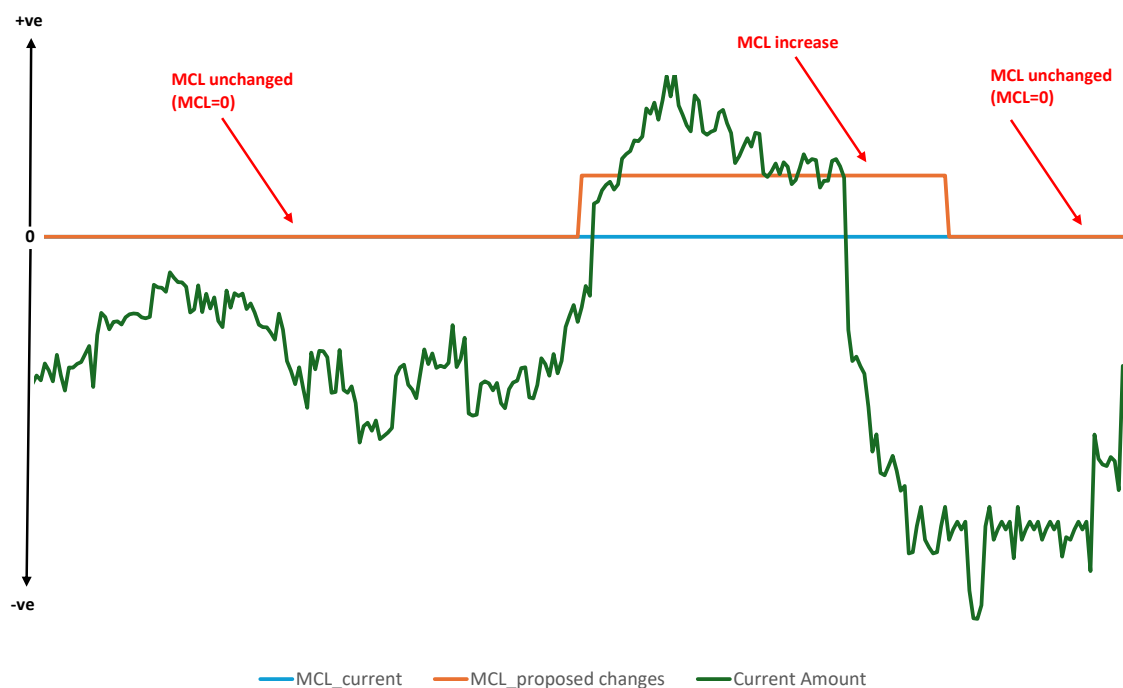
3.8.3. Generator with debit reallocations increasing MCL

Most generators under the current methodology have an MCL of zero. Under the proposed changes however, some generators could end up with an increased in MCL if they have debit reallocations. As debit reallocations are currently entered in per day (i.e. they are the same across all parts of the day), such debit reallocations when viewed through the ToD framework could result in an increase in MCL for some generators and them having to provide credit support.

An illustrative example of a generator with debit reallocations having an increase in MCL (from zero) is shown in Figure 4. It is often the case that such generators match their debit reallocations to their needs. Thus, they may be expected to change the way they provide reallocations to be in line with the proposed methodology, so as to reduce their MCL requirements (i.e. enter reallocations according to a profile). As such, these generators would be unlikely to provide debit reallocations in a way where they would need to provide credit support, unless they expressly chose to.

Figure 4   Change in MCL for a generator with debit reallocations
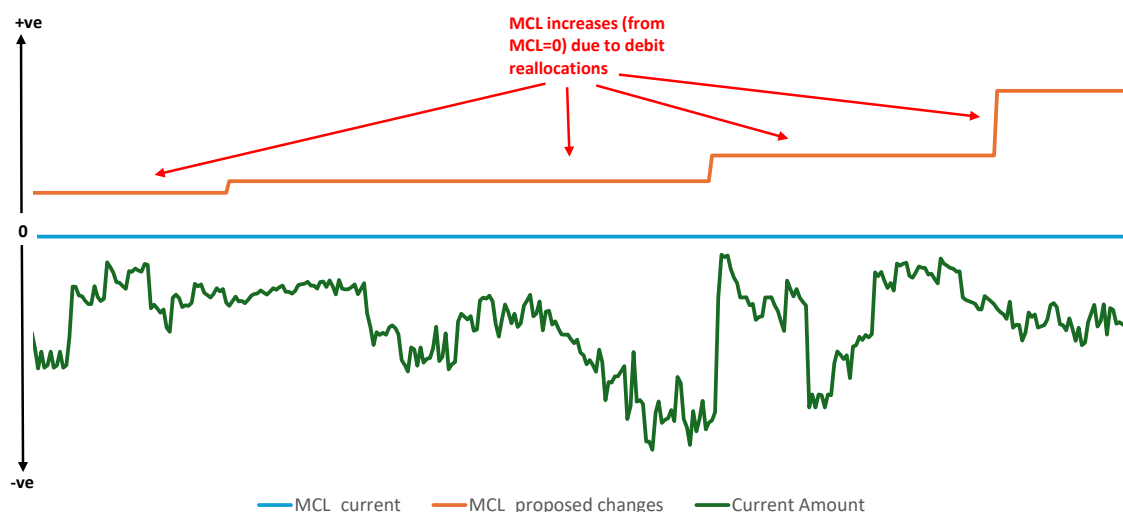

3.8.4. Battery with changing MCL

Batteries often have an MCL of zero once they are fully operational, but can, depending on their charge/discharge patterns have an MCL greater than zero. The SSC and other proposed changes could affect the MCL of batteries, but that affect (whether an increase or decrease) is purely dependant on the charge and discharge patterns across the ToD segments used for MCL calculation.

An illustrative example of a battery having both an increase and decrease in MCL is shown in Figure 5. As indicated, these change in MCL would be dependent on charge/discharge behaviour across the ToD segments. AEMO would expect that the participant would optimise their behaviour in relation to the proposed methodology to best fit their needs.

Figure 5   Change in MCL for a battery
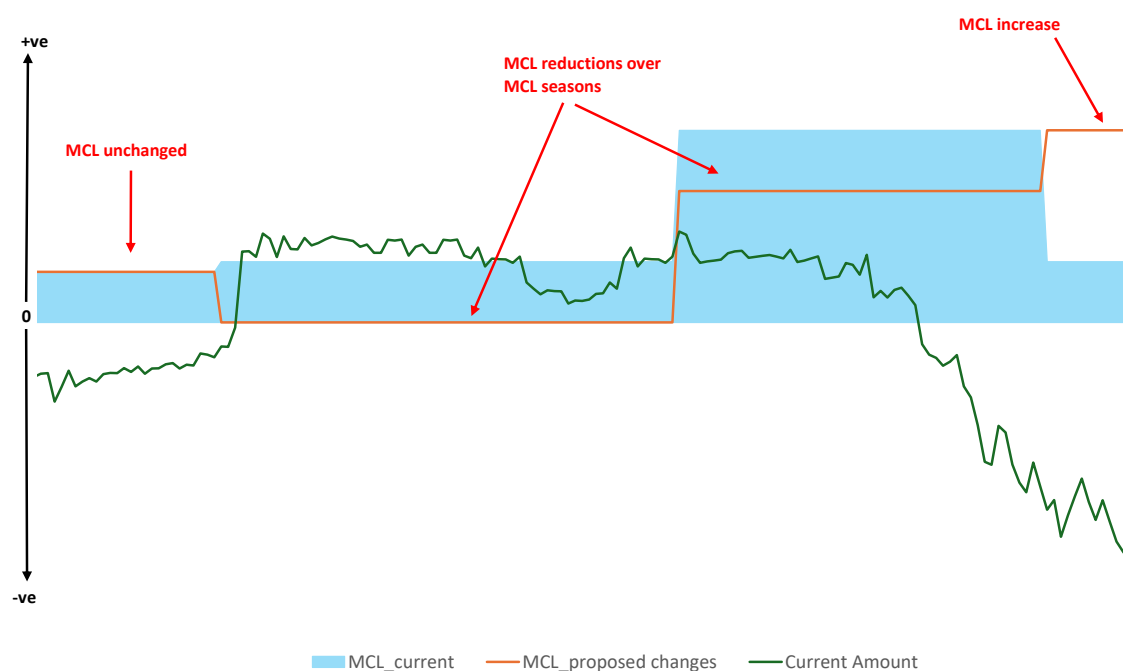
3.9.   Proposed effective date

The SSC Rule comes into effect on 9 August 2026.

AEMO proposes having a 10 week transition period (9 August 2026 to 10 October 2026) during which time
AEMO could choose to assess a market participants' MCL either using the current methodology or the new
methodology (with SSC and other changes). The decision on which methodology is used during the transition
period would be based on whether the market participants outstandings align with the shorter settlement cycle
and the MCL calculation methodology appropriately reflects their prudential risks.

4. Drafting for proposed changes

In summary, the following changes are proposed:

- Updating T$_{OSL}$ to 21 days (MCL calculation and Regional Model) and making any other changes necessary to reflect the SSC Rule in the Procedure.

- Incorporating a calibration factor in the Regional Model allowing for recalibration when the volatility factor is above 100%.

- Moving to a ToD segmentation methodology for volatility factor and P$_R$ calculations in the Regional Model.

- Removing problematic TAS region data from Regional Model calculations.

- Replacing PRAFs with ToD level calculations for MCL.

- Using a credit or debit determination and absolute value of price for MCL calculations.

AEMO has not provided a mark-up of the Credit Limit Procedures at this stage. This will be provided with AEMO's draft report on the consulted proposal, after considering feedback from the first stage of consultation.

5. Summary of issues for consultation

Submissions may be made on any matter relating to the proposals discussed in this consultation paper. In particular AEMO would welcome comment and feedback on the following matters:

1. Reflecting the SSC Rule in the CLP

- Are there any comments on the length of the TOSL chosen for calculating the OSL component of the MCL under a shorter settlement cycle (i.e. TOSL = 21 days)?

- Are there any comments relating to the proposed changes to MCL under extreme market conditions?

- Are there any comments relating to the proposed changes related to new entrants, MNSPs and DRSPs?

2. Improving Regional Model calibration and meeting the prudential standard

- Are there any comments on the updated Regional Model to reflect a 21 day TOSL and the updated calibration methodology?

3. Accounting for negative prices in the Regional Model

- Are there any comments on the ToD segments proposed by AEMO ?

- Are there any unintended/adverse consequences of the ToD segments proposed?

- Should ToD segments differ by region (noting the added complexity this would bring), and if so why, and what should they be?

- Are there any comments/preferences with regard to the two calibration methodologies (Option 1 and Option 2) under ToD segmentation?

4. Correcting TAS region data

- Are there any comments on the removal of problematic TAS region data to allow a more accurate calculation of volatility factors and POE for the region?

5.   Reflecting market participant risk profile in MCL calculations

- Are there any comments on the ToD based methodology that is proposed to replace the use of PRAFs for MCL calculations?

- Are there any unintended/adverse consequences of the removal of PRAFs in MCL calculations?

6.   Using energy and absolute value of price concepts when calculating MCL

- Are there any unintended/adverse consequences of using a credit or debit determination and the absolute value of price for MCL calculations for each participant?

- Are there any on allowing both an increase and decrease in MCL under the changes?

7.   Other

- Is there any additional clarifying information required in the Procedures for implementing the SSC Rule, and the improvements proposed by AEMO?

- Are there any unintended/adverse consequences of the proposed changes as described in the Procedures?

- Are there any comments regarding the proposed transition period over which AEMO can choose the most appropriate methodology (current or new) by which to assess market participant MCL?

Appendix A. Glossary

Term or acronym	Meaning
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator Limited
CF	calibration factor
CLP	Credit Limit Procedures
MCL	Maximum Credit Limit
NEM	National Electricity Market
NER	National Electricity Rules
OSL	outstandings limit
PM	prudential margin
POE	probability of exceedance
PRAF	participant risk adjustment factor
Procedures	The Credit Limit Procedures
RRP	regional reference price
SSC	Shortening settlement cycle
TI	trading interval
ToD	time of day
T_{OSL}	outstandings limit time period
VF	volatility factor
VFOSL	outstandings limit volatility factor
VFPM	prudential margin volatility factor

Appendix B. ToD Segmentation methodology

The selection of the specific times for ToD segmentation was based on analysis of TI level data, with the aim of better representing the risk associated with price volatility in the NEM. This approach acknowledges that high prices and high volatility are typically concentrated during the afternoon peak.

The following analysis was undertaken:

1) The distribution of prices over the past two years were plotted (see Figure 6). Despite regional differences in behaviour, five distinct time periods could be established that satisfactorily accommodated all regions across the different seasons.

2) Energy demand was analysed, particularly the impact of rooftop solar during the middle of the day, which alters the demand-supply balance and consequently affects price volatility. The goal was to capture the high volatility periods observed during the morning and afternoon peaks, characteristic of the well-known "duck curve" in demand profiles (see Figure 7).

3) The standard deviation of each interval was used as a proxy for volatility, with the primary aim to accurately represent changes in price volatility throughout the day (the alignment of time periods with the demand profile was a secondary consideration). After assessing the entire market, the time periods were selected and further analysis was conducted to verify their suitability for each region and season (see Figure 8).

4) When analysing each region and season in greater detail, it was established that the winter season exhibits a well-established morning peak across all regions (see Figure 9).

From all the data points from the above analysis the following ToD segmentation was chosen:

     a. Early Morning (EM) - 00:00 to 05:59

     b. Morning Peak (MP) - 06:00 to 09:59

     c. Middle of day (MD) - 10:00 to 15:59

     d. Afternoon Peak (AP) -16:00 to 19:59

     e. Late Evening (LE) - 20:00 to 23:59

This ToD segmentation is used both in the Regional Model when determining volatility factors and calibrating the model to meet the 2% prudential standard and when calculating market participant MCLs.

Why the ToD methodology eliminates the need for PRAFs

PRAFs were designed to address the varying risk levels for participants, i.e. a market participant that has a majority of its load (debit energy) during peak times will have a higher MCL, compared to one with load during low volatility periods. Using the ToD methodology eliminates the need for PRAFs and simplifies the calculation of participant behaviour, avoiding the complexity of calculating volatility factors for 288 intervals each season.

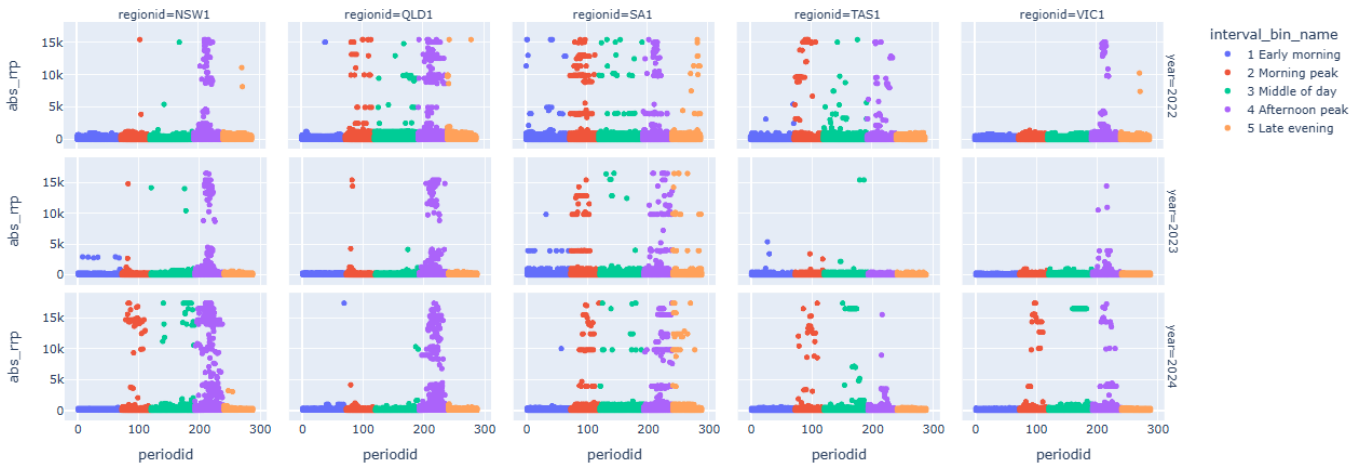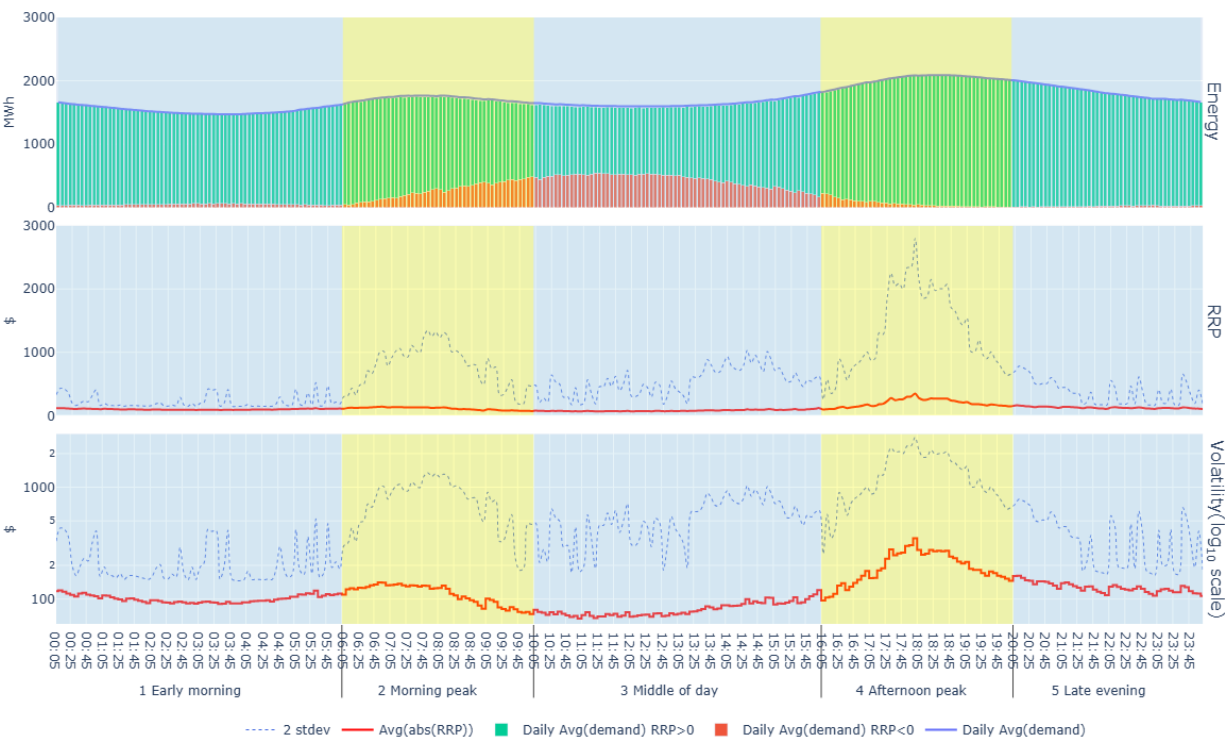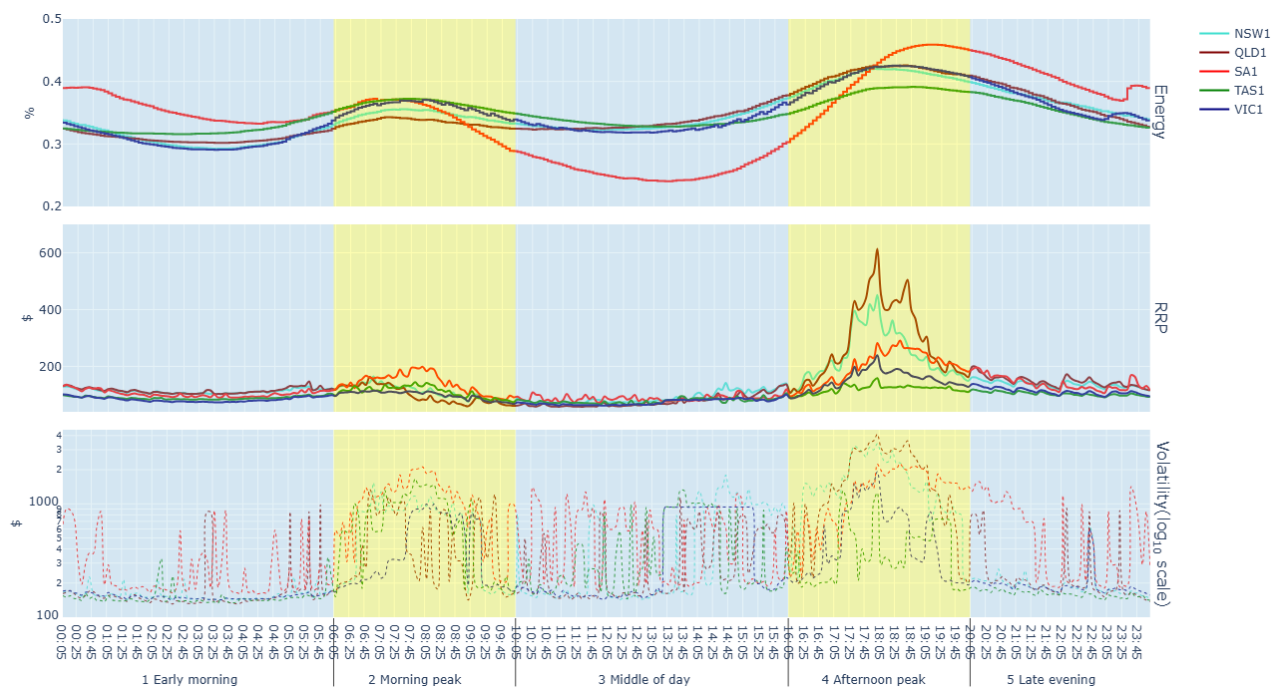**Figure 6**   **Time of Day Region Data (2022 to 2024)**

Figure 7   **Energy price and volatility in the NEM (October 2021 to April 2025)[9]**
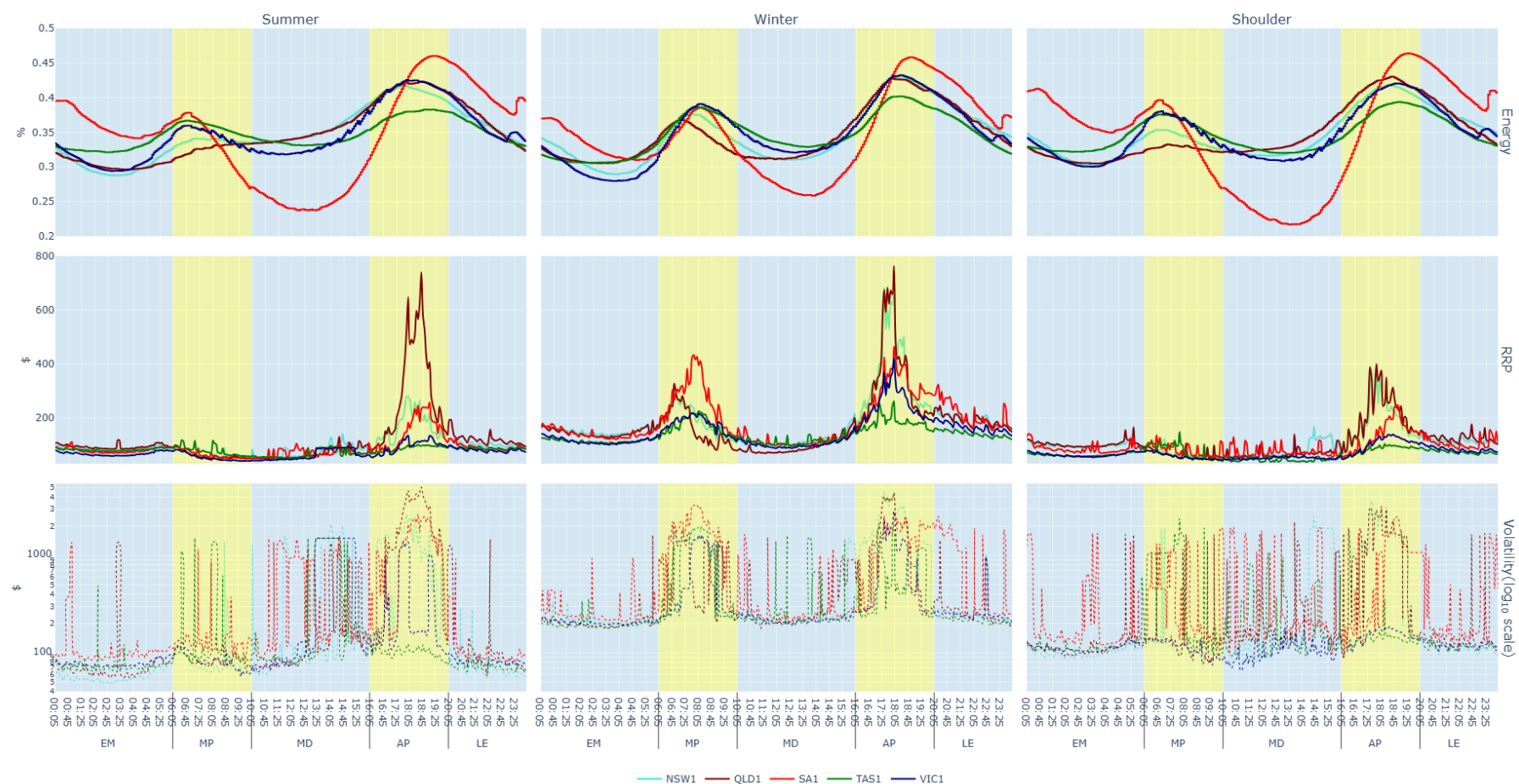

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[9] Volatility is depicted using a proxy measure of two standard deviations

Figure 8   **Time of day region data – energy, price and volatility (October 2021 to April 2025)[10]**

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[10] Energy is normalised to a percentage to facilitate easier comparison of regional profiles. Volatility is depicted using a proxy measure of two standard deviations.

Figure 9   Time of day region data observed per season energy, price and volatility (October 2021 to April 2025)[11]