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19 July 2024

Anna Collyer
Chair
Australian Energy Market Commission

Dear Ms Collyer

Request for settlements analysis – Shortening the settlement cycle

On 22 February 2024, the AEMC commenced consultation on a Rule Change Proposal (RCP) received from GloBird Energy (the proponent) to shorten the settlement cycle from 20 business days following the end of the billing period to 10 business days. This proposal included drafting that proposed settlement statements for Preliminary and Final would be posted by AEMO at 3 and 8 business days respectively. The proponent identified working capital effects and the reduction of shortfall events as key benefits of the proposed change.

AEMO submitted a response to the consultation paper that provided a response to consultation questions, including a high-level assessment of prudential impacts. AEMO's response also identified settlements and metering processes and issues that required further detailed consideration within the AEMC consultation process.

The AEMC has since engaged directly with AEMO to obtain further information to inform their draft determination.

This document presents AEMO's response as requested by the AEMC. The data has been provided to inform the AEMC consultation on the RCP only. It is a response to AEMC request only and does not represent AEMO's view in response to shorter settlement cycle consultation or any Draft Determination. Key information included:

- Role of AEMO – settlements processes
- Process and timings for generating settlement statements
- Exceptions
- Historical energy variance

AEMO welcomes further engagement on this document and is committed to responding to this Rule Change consultation process. If you wish to discuss this further please contact David Scott at David.Scott@aemo.com.au.

Yours sincerely,

Nicola Falcon
Acting Executive General Manager - Reform Delivery

Attachment 1 - Settlements analysis

Executive Summary

AEMO settlement obligations

AEMO has significant obligations and responsibilities for ensuring all transactions in the market are settled, with market generators paid for the provision of energy, and payment received from market customers. AEMO's settlement function underpins AEMO's role as market operator.

Maintaining a robust financial framework is central to creating an environment where market participants (participants) have confidence AEMO can execute the financial operations of energy markets in a way that supports the objectives of industry and government for the ultimate benefit of all customers. Participants' confidence and trust in AEMO's ability to settle the market is fundamental to ensuring market participation and competition in the NEM.

A key pillar of the financial framework is maintaining the integrity of the weekly settlement statement ensuring that it is both timely and accurate. This is a core function of AEMO and is required to meet both participant expectations for financial planning, and AEMO requirements for robust data to feed the Prudentials process.

Shorter settlement cycle

Changes contemplated under a shorter settlement cycle (SSC) need to include consideration of effects to AEMO's settlements and underlying metering processes required to produce timely and accurate settlement statements.

This document outlines settlements processes and investigates inaccuracy in statement amounts between Preliminary and Final statements which, under a shorter settlement cycle, would instead settle later - at the first revision stage of the settlement process. Decreasing the time between data receipt, Preliminary and Final statement generation, reduces the time available to correct errors, known as exceptions, and improve statement accuracy. This is an important consideration when assessing a shorter settlement cycle.

Any financial efficiency gained from a shorter settlement cycle from the prudentials perspective, will be affected by AEMO's ability to complete and publish settlement statements in the condensed timeframe and increased inaccuracy in settlement statement amounts. For stakeholders this may manifest as a trade-off between some reduction in working capital requirements and increased settlement amount uncertainty and variation at revision. In practice, increases in participant settlement variation at revision may also need to be considered in AEMO's assessment of prudential risk. For example, if statement variation under SSC increases the risk of participant shortfall, additional buffer may be required within Maximum Credit Limit (MCL) calculations to account for this risk.

This document should be considered as supporting information to the AEMC RCP consultation process. It does not include any information on the costs and timings to implement a shorter settlement cycle, or provide any indication whether or not AEMO is in favour of a SSC.

Analysis

The analysis provided in this document presents a historical view of energy variance between different stages of the settlement process. The variance between Preliminary and Final statements would settle at Revision 1 under the proposed shorter settlement cycle. This analysis is not a forecast of future energy variance with a shorter cycle but rather a representation of historical variance as a function of the NEM structure, data, systems, and processes prevailing at that time. The reduction of time between Preliminary and Final under a shorter settlement cycle will change the underlying settlements and metering processes and actual energy variance outcomes will be different from the historical view.

The analysis also shows average or expected energy variance – and does not present a worst case or stress scenario. While this provides insight into the current low levels of errors in settlement statement production, this has the potential to mask a large error or failure in statement production and publication. If a large error does occur, currently this may be resolved between Preliminary and Final statements, *before* money changes hands. Under a shorter settlement cycle, it would instead settle at a later revision, through special revisions, or even after dispute – i.e., *after* money has changed hands, resulting in an inefficiency in market settlement operations.

While at a high level the analysis indicates that a shorter settlement cycle represents a direct trade-off between a reduction in working capital requirements versus increased settlement at revision, the actual trade-off is likely to be more complex. This is because a longer settlement cycle provides opportunity to resolve problems prior to settlement, which a shorter settlement cycle will not. This complexity is difficult to quantify and is not shown in the analysis in this paper. Rather, it can be better understood with the description this document provides on how AEMO resolves errors (exceptions).

Future factors are not covered in this report

Changes in market conditions, including expected growth in market participants, customer demand, and energy and price variability will also affect the variance of customer settlement statements. Generator and customer load profiles becoming less predictable and the emergence of behind the meter solar, batteries and electric vehicles (EVs), is likely to increase the scale and complexity of metering data while requiring changes to substitutions and estimation methodologies undertaken to produce accurate weekly settlement statements.

The metering stock is changing with increasing remotely read meters and the currently active rule change for *accelerating smart meter deployment*. This has not been captured in this analysis. Remotely read interval data increases the accuracy of metering data earlier in the settlement cycle, however, while accumulation meters remain, legacy processes for producing settlement statements are required. These separate processes will have different potential points of error or failure in statement generation from today. As explained in this document, metering data errors can still occur with remotely read meters – so whilst these meters provide more accurate metering data, they do not eradicate data processing errors that can affect settlement statements.

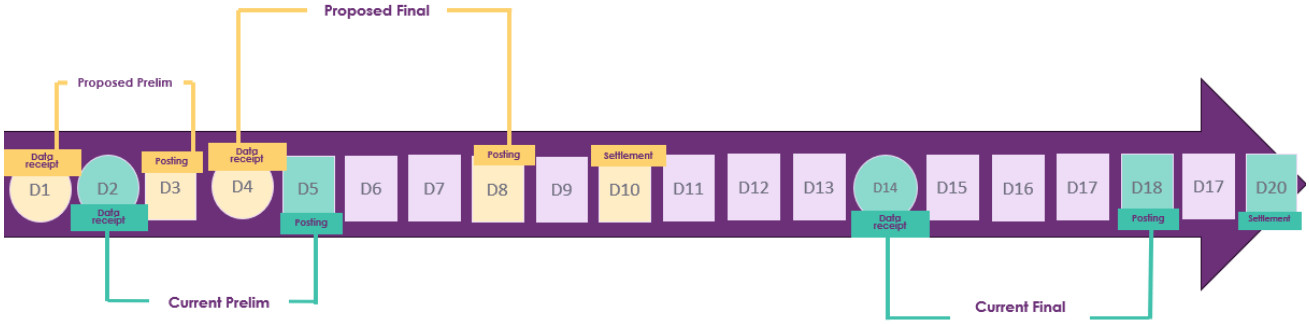
1 Settlement processes and errors

1.1 Settlement cycle

Figure 1 below shows the settlement cycle under the current and proposed shortened settlement cycle timelines. The day and number shown, represent the number of business days following the end of the billing week. For example, D1 is one business day after the end of the billing week.

The RCP proposed changes to NER 3.15.14 and NER 3.15.15 to bring forward the publishing of settlement statements for Preliminary and Final to D3 and D8 respectively. This changes the underlying metering data in Preliminary and Final.

Figure 1 Settlement cycle – Current and proposed



1.1.1 Data delivery

The dates for metering data receipt from Metering Data Providers (MDPs) are set out in AEMO's data delivery calendar[1]. This is reflective of the requirements within AEMO's MDP Service Level Procedures.[2] Although the RCP did not include specific changes to the MDP timing for metering data delivery, the date of metering data receipt included above is an example of a potential change to metering data delivery dates that may be required for statement generation under a shorter settlement cycle. This has not been discussed or proposed formally by AEMC, AEMO or MDPs.

Changing the date for Final settlement statement publication condenses the time available for metering data, data cleansing and analysis and statement processing. In doing so there are a range of ways to structure timing for MDP metering data delivery and statement processing and publication.

Any changes to MDP metering data delivery date required to implement a shorter settlement cycle require further assessment by MDPs of feasibility and costs associated with system and MDP process change. No change to MDP metering data delivery date would retain D2 for Preliminary metering data receipt and reduce the existing three days for AEMO data processing to one business day, leaving minimal room for data cleansing or analysis.

[1] AEMO, 2024, Data Delivery Calendar - https://aemo.com.au/-/media/files/electricity/nem/retail_and_metering/metering-procedures/2023/2024--data-delivery-calendar.pdf?la=en

[2] AEMO, 2023, Service Level Procedure - https://aemo.com.au/-/media/files/electricity/nem/retail_and_metering/metering-procedures/2023/service-level-procedure-mdp-services.pdf

1.1.2 Processing times

Figure 1 above shows the reduction in processing time for Preliminary and Final statements. A reduction in processing times reduces the time and buffer for AEMO to correct potential system issues, undertake re-runs and improve metering data estimation and exceptions management.

1.1.3 Revisions

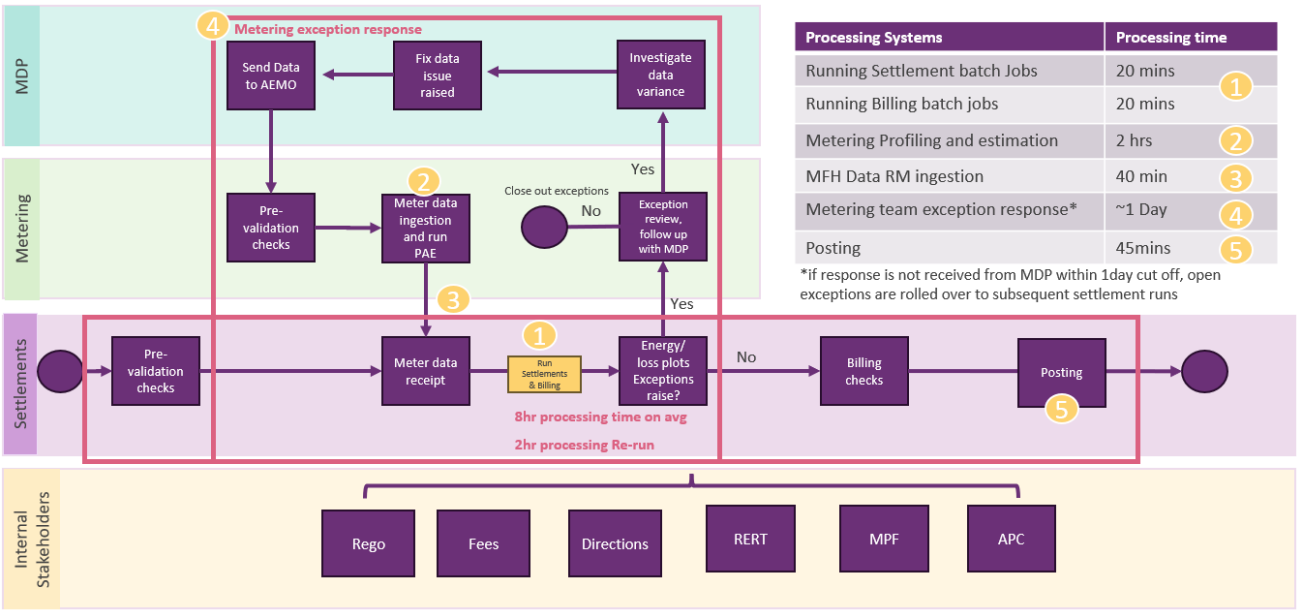
AEMO currently completes two Revisions to settlement statements: one at 20 weeks (R1) and one at 30 weeks (R2) following the end of the billing week. The current timing of Revisions is based on the timing of actual metering data received from accumulation meter reads and would likely need to be retained with the current level of smart meter coverage regardless of the date for Final settlement. Increased coverage of remotely read interval meters may enable consideration of changes to timings for revision. MDPs typically deliver metering data from remotely read interval meters to AEMO within two business days of collecting the metering data.

1.2 Statement processing

This section sets out the processes completed for each statement to be issued by AEMO. This process is repeated for both Preliminary and Final statements. Figure 2 below highlights the inputs and transfer of information between different teams and systems within AEMO. This process is completed to raise and resolve exceptions between AEMO and MDPs. To provide AEMC and stakeholders with indicative times for statement generation based on current processes to resolve exceptions prior to the next statement, AEMO has estimated processing times based on current Rule and meter data requirements as:

- Preliminary ~ 3 business days
- Final ~ 4 business days.

Figure 2 Settlement statement processing



A shorter settlement cycle decreases the time between metering data receipt and statement generation and limits time for AEMO and MDPs to work through and resolve exceptions before Final statement publishing. For

participants this would result in increased settlements at R1 as AEMO and MDPs must resolve exceptions after Final settlement. Settling the market at the proposed 10 business day (D8 for settlement statement posting) may result in settlement statement amounts being more closely reflective of current Preliminary (D5) than current Final (D20).

The shorter settlement cycle and any inability to complete required processes may also put pressure on AEMO's retail and settlement systems. For example, any reduction in time to resolve exceptions that leads to an increase in the occurrence of MDPs unable to deliver metering data, will require AEMO's retail systems to increase the volume of MSATS substitutions. This may in turn increase the requirements of AEMO's retail system profiling and aggregation functions.

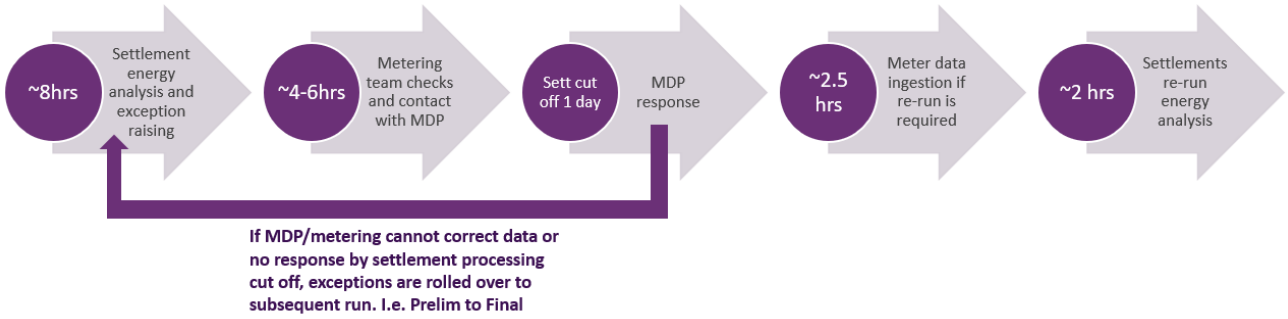
1.3 Exceptions

A key part of generating settlement statements is the identification and management of exceptions. This section provides further detail on the exceptions and the exception management process that seeks to resolve errors prior to statement generation. Exception management is AEMO's way of tracking metering data errors, anomalies and inconsistencies when performing weekly processing. Common causes for metering data errors within the current settlement cycle include:

- Missing metering data
- Accumulated metering data profiling
- Zero substitutes
- Communications faults
- Incorrect data streams
- Configuration errors

As shown in Figure 2 above, raising, and resolving exceptions as part of the process to generate statements is a shared process between AEMO settlements and metering teams, and MDPs. Metering data checks are completed on a connection point level per participant, as well as on regional consumption and generation. Figure 3 below demonstrates the high-level process for managing and resolving exceptions between settlement runs.

Figure 3 Exception timeline



1.3.1 Number of exceptions

Figure 4 below summarises the number of exceptions raised by run type over each billing week for calendar year 2022 and 2023. The bar graph shown below is a count of the number of exceptions raised or identified in

each run type. On average 16 exceptions are raised in Preliminary (blue bars) and 10 exceptions are raised in Final (orange bars).

While AEMO seeks to correct meter data errors raised as exceptions before the settlement statement run, if the metering data cannot be corrected, exceptions are rolled over to the subsequent run. These exceptions rolled over to the following run are not included in the count below. The chart shows the count at a Transmission Node Identifier (TNI) level, the transmission connection point to the distribution network. For example, the blue columns are a count of the number of exceptions raised in Preliminary data received. AEMO then undertakes the above exception management and statement generation processes (Figure 2 and 3) to resolve exceptions before the Preliminary statement in published. The orange bars below are a count of the new or additional exceptions raised in the data received for Final.

Figure 4 Number of exceptions by run type

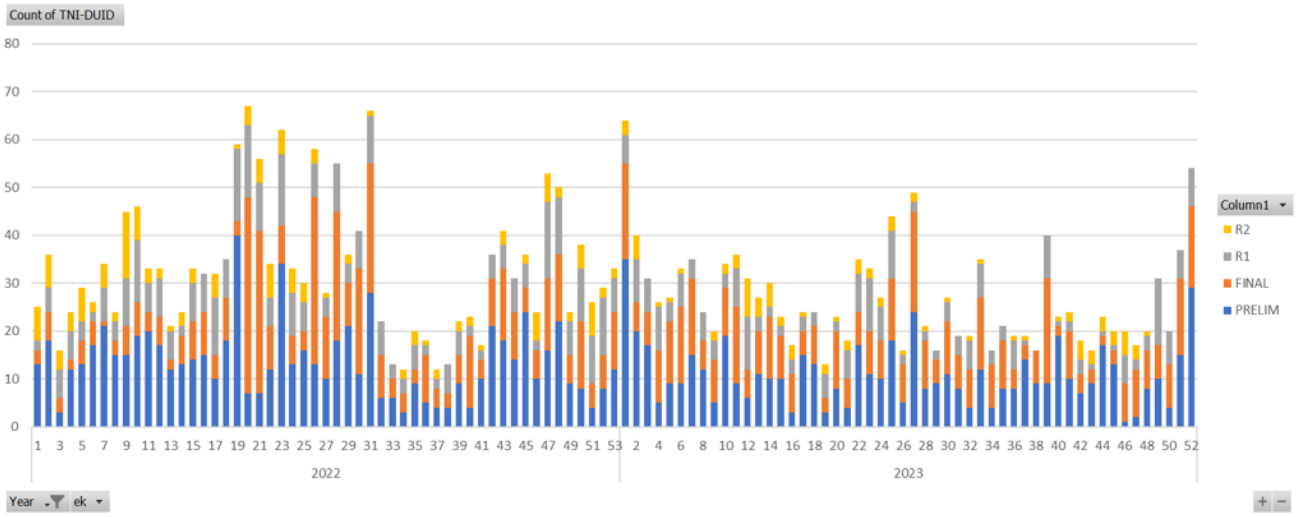


Table 1 below shows the average number of exceptions raised and closed in settlement runs for Preliminary and Final. On average AEMO closes 70% of the exceptions raised before the next statement run. This means 70% of the exceptions that are raised in the metering data received for Preliminary are typically closed before the Preliminary statements are finalised and provided to participants. The remaining 30% are rolled over to the next run and AEMO generally resolves these before the Final statement is published. The number of exceptions varies between weeks and across participants.

Table 1 Average exceptions by run type

Run type	Ave No. Raised	High week	Count of High weeks	% Closed	Time to close remaining
PRELIM	16	20 - 40	19	70%	10% closed by final, 20% close at R2
FINAL	10	15- 25	10	70%	30% closed by R2

AEMO's settlements and retail systems are designed to manage and resolve this level of exceptions based on the existing time between statements. A shorter settlement cycle reduces this time between metering data receipt and statement publishing, to resolve errors and close exceptions. For participants without resource and technology uplift this may result in increased number of exceptions being unresolved until R1.

2 Statement variance analysis

This section sets out analysis of participant statement variance between run types. This information has been requested by the AEMC to consider the accuracy of settlement statements under differing timeframes. Information presented has been averaged at the regional level and anonymised to maintain participant confidentiality.

Data analysis information and approach

Settlement runs

The metering data variance in energy (MWh) amounts is calculated based on settlement statement runs. These are reflective of the metering data and statement amounts at the below:

- Initial – internal only
- Prelim – posted 5 business days
- Final – posted 18 business days
- Revision 1 (R1) – 20 business weeks
- Revision 2 (R2) – 30 business weeks

Variance calculation

The variance shown is the average variance between each settlement run for each billing week. This is calculated based on 5-minute interval data that has been aggregated to the billing week at both the regional and individual participant level.

The variance is presented as either an average MWh variance across all participants in the region or at the individual participant level as a percentage of the MWh for each participant settlement run.

Graphs 5 – 8: MWh variance across all participants in the region

- MWh variance(F-P) = Average per region (participant MWh at Final – participant MWh at Prelim)

Graphs 9-11: percentage variance of customer statement

- Percentage variance (F-P) = (participant MWh at Final – participant MWh at Prelim)/participant MWh at Final

Period

2 years - all billing weeks (1-52) across 2022 and 2023 were analysed. Data presented below is a subset of this period. The data represents normal and relatively stable market conditions. Significant outliers, such as during market suspension in June 2022, have been removed.

Customer energy only

Only registered market customer participant id (PID) energy has been included in the MWh calculations and graphs. This excludes all statements to all generators. This also excludes all cost recovery and payments for non-energy costs, including ancillary services, RERT, compensation and fees.

2.1 Energy variance per region

This section shows average energy variance between settlement runs. Each column represents one billing week and is the average energy variance for participants in the region. The average variance in MWh between billing runs is shown by the stacked colours. The graphs present NSW, SA, TAS & QLD separately from VIC due to the coverage of remotely read interval meters changing the profile of energy variance in VIC.

2.1.1 NSW, SA, TAS & QLD

Figures 5 to 8 below show the largest energy variance between settlement statements occurs between R1 and F. This is primarily due to the receipt of actual meter reads from manually read accumulation meters prior to R1. Accumulated metering data is collected and delivered on quarterly metering reading cycles. Depending on the point in the meter read cycle, the accuracy of metering data improves progressively between Final and R1 as the manual collection process obtains actual meter readings. The R1 process will typically pick up the entire quarter collection of manual meter reads. The timing of 20- and 30-week R cycles also allow customer transfers to be captured and allocated to correct retailers for the relevant billing week.

The second largest variance is between Final and Preliminary. This is due to the settlement processing, analysis and resolution of metering data errors as set out in Section 1 of this paper. For accumulation meters there is minimal increase in volume of actual meter readings between Preliminary and Final. Although, the energy variation between Final and Preliminary is less than the variance between Final and R1, it is of a similar order of magnitude. Reducing the time available under a shorter settlement cycle to analyse variation and resolve exceptions before Final, results in participant variance between Final and R1 increasing to the aggregate of the yellow (F-P) and green (R1-F) bars as shown on the graphs below. For participants, this leads to an increase in resettlement at R1.

Typically, the variance between R1 and R2 is due to resolving any final exceptions and receipt of any remotely read metering installation data that were missed in the previous quarterly read. The below graphs highlight anomaly spikes in R2 – R1 variance which are driven by the final resolution of exceptions leading to spikes in unaccounted for energy (UFE).

Figure 5 Energy variance - NSW

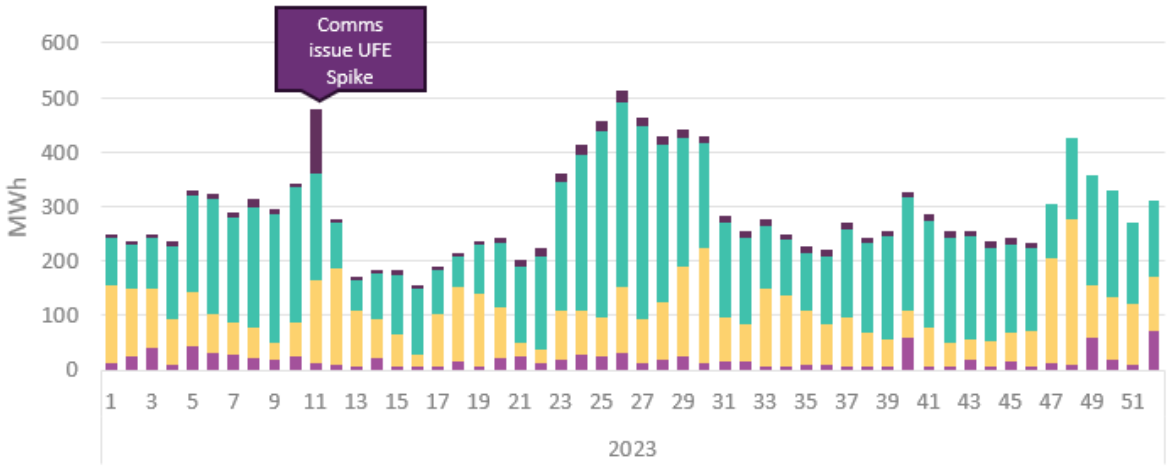


Figure 6 Energy variance - TAS

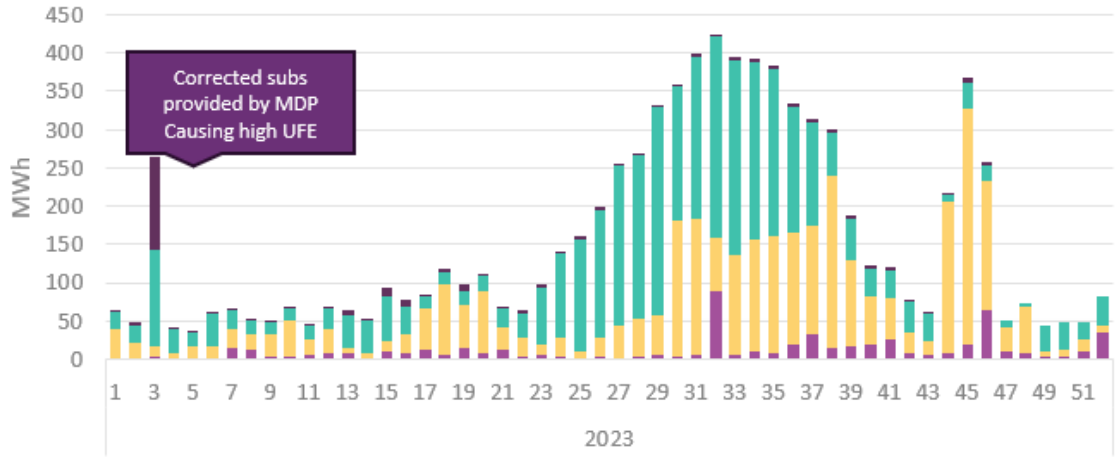


Figure 7 Energy variance - QLD

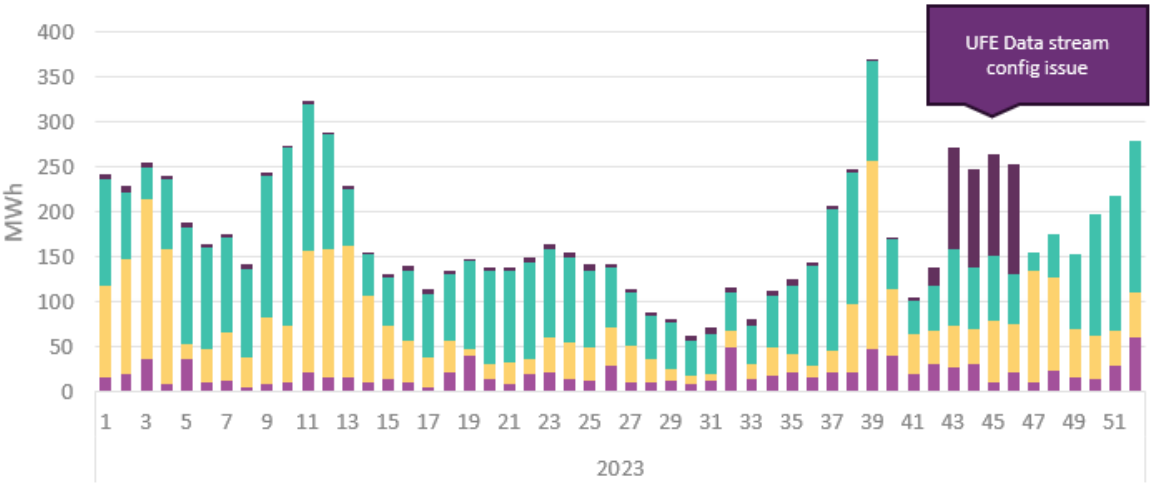
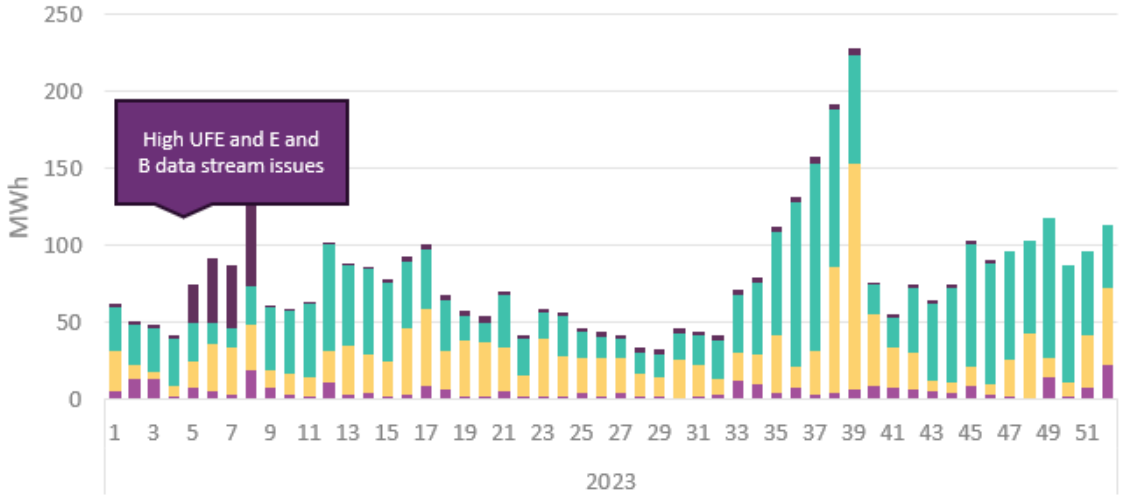


Figure 8 Energy variance - SA

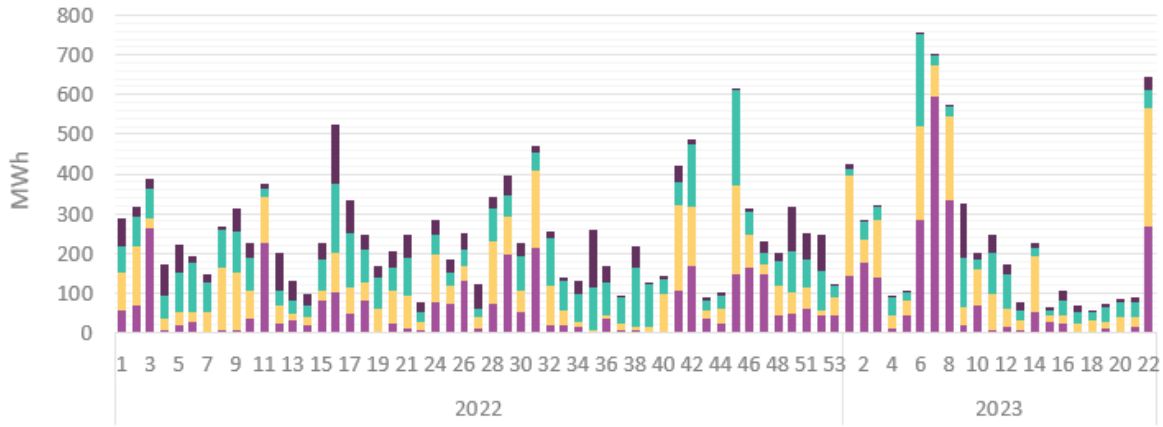


2.1.2 VIC

Although VIC has a high penetration of remotely read interval meters, energy variance across the region remains between statement runs. This is largely due to the accumulation meter profiling processes that are required for legacy manual read meters that remain in VIC. As shown in Figure 9 below this may occur in early settlement statement runs.

AEMO's Net System Load Profile (NSLP) process profiles the metering data collected from manually read accumulation meters and the forward estimates provided by MDPs, to convert all accumulation meter readings into energy consumption per 5-minute trading interval required for settlement.[3] The reduction in manually read accumulation meters in VIC, significantly decreases the volume of metering data used for NSLPs. In doing so, when NSLPs are then applied to the remaining accumulation meters, this may result in significant fluctuations and spikes in energy amounts. AEMO has consulted on a change to NSLP process to address this issue, to be effective from September 2024.[4]

Figure 9 Energy variance - VIC



2.2 Energy variance per participant

A shorter settlement cycle will have a varied impact on participants' settlement statements and is dependent on their customer base, load profile, metering types and any behind the meter generation. The following Figures show the existing energy variation between settlement statement runs as a percentage of participant statement energy. This percentage is calculated on a participant level and presented below as the percentage of participant statements where their percentage of energy variance between settlement statement runs is within the defined threshold tranches. The majority of energy MWh variation between all run types sits around 1% of their energy statement amounts.

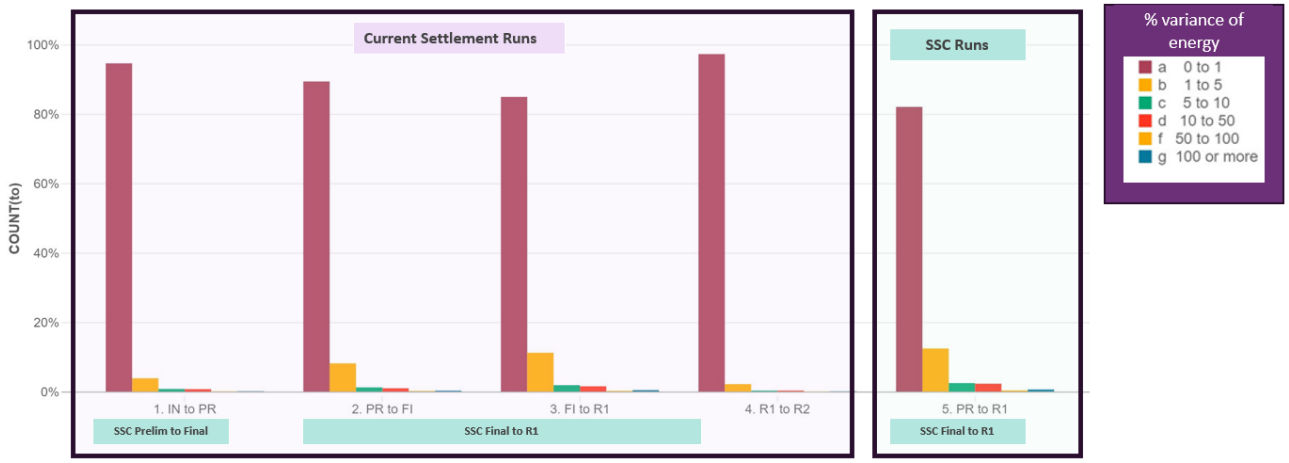
Based on the proposed dates under a shorter settlement cycle, Figure 10 has recalculated the energy variance between Final and R1 for a shorter settlement cycle from historical data. The SSC run box below, shows a decrease in the occurrence of participant statement variance from Final to R1 being at <1% and an increase in the occurrence and risk of variation sitting in all tranches greater than 1%. For participants the variation between Final and R1 under a shorter cycle may be estimated as the aggregate of energy variance

[3] AEMO | Load Profiles
[4] AEMO, 2023, Retail Electricity Market Procedures Consultation - AEMO | July 2023 Retail Electricity Market Procedures Consultation

under the existing process from Preliminary to R1 – that is Preliminary to Final *and* Final to R1. In practice, participants will be required to resettle the increased energy variance at R1.

Figure 10 below shows the percentage of participant statements with a <1% energy variation between Final and R1 reduces to approximately 82% of all participant statements. This is a reduction from approximately 86% of participant statements under the current settlement cycle.

Figure 10 Energy variance - proportion of participant statements



The data shown above is not an estimate of energy variance and impact on customer statements under a shorter settlement cycle as it is based on historic statement amounts, settlement processes and metering data quality. Condensing the time to generate statements due to a shorter settlement cycle increases the settlements at R1.

Figure 11 below shows the two-year analysis period at a participant level and selects only instances where there is an energy variation between statements of greater than 5% of statement quantity. Each stacked row is a count of the number of instances for that participant where the statement variation was greater than 5% of statement quantity. There is significant variability between participants in how often their settlement amounts vary by greater than 5% of the energy included. A participant's size and customer energy profile, including metering types, mean they may be more likely than others to experience larger volumes of energy variation between settlement statements than others. For example, a smaller retailer with varying customer numbers or type, may have increased settlement statement inaccuracy and more settlement variance at the first revision under the proposed shorter settlement cycle.

Figure 11 Energy variation per participant - greater than 5% of statement