

# FIVE MINUTE SETTLEMENT – NEM SETTLEMENT ESTIMATES POLICY CHANGES

ISSUES PAPER

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## EXECUTIVE SUMMARY

The publication of this Issues Paper commences the first stage of the Rules consultation process conducted by AEMO to consider proposed amendments to the NEM Settlement Estimates Policy (the Policy) under clause 3.15.12 of the National Electricity Rules (NER).

In November 2017, the AEMC made a final rule change that reduced the trading interval for financial settlement in the National Electricity Market (NEM) from 30 minutes to five minutes (5MS rule).<sup>1</sup> The AEMC's determination considered that five-minute settlement would improve price signals for more efficient generation and use of electricity, encourage efficient investment in capacity and demand response technologies, and improve bidding incentives.

The AEMC released a draft determination and draft rule on Global Settlement and Market Reconciliation (Global Settlement rule)<sup>2</sup> in August 2018 proposing to replace 'settlement by differencing' with a 'global settlements' framework. Under this framework, every retailer would be billed for a portion of unaccounted-for energy (UFE) in each local area, based on consumption by their customers within that area. The draft rule allows for Global Settlement implementation to occur in conjunction with the Five-Minute Settlement (5MS) implementation, to capitalise on synergies between the two projects from a systems perspective. As at the date of this Issues Paper, the final rule on Global Settlements is expected in early December 2018.

AEMO has prepared this Issues Paper to facilitate informed debate and feedback by industry on the necessary updates to the NEM Settlement Estimates Policy in line with the 5MS rule and (if made) the Global Settlement rule, together with general updates and improvements to the policy to reflect current AEMO's settlement systems and processes.

In summary, the key amendments proposed to the NEM Settlement Estimates Policy involve:

- Updates to estimates for settlement amounts (estimation now only required in case of the sustained failure of AEMO systems).
- Updates to estimates for prudential purposes (part of daily prudential calculation process), including replacement of references to 30-minute intervals with 5 minutes, and provision to incorporate UFE estimates.

AEMO invites stakeholders to suggest alternative options where they do not agree that AEMO's proposals would achieve the objectives of updating NEM Settlement Estimates Policy in line with the 5MS rule and the Global Settlement rule (if made). AEMO also asks stakeholders to identify any unintended adverse consequences of the proposed changes.

Stakeholders are invited to submit written responses on the issues and questions identified in this paper by 5.00 pm (AEST) on 21 January 2019, in accordance with the Notice of First Stage of Consultation published with this paper.

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<sup>1</sup> Final rule available at: <https://www.aemc.gov.au/rule-changes/five-minute-settlement>

<sup>2</sup> Rule change documentation available at: <https://www.aemc.gov.au/rule-changes/global-settlement-and-market-reconciliation>



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## 1. STAKEHOLDER CONSULTATION PROCESS

As required by clause 3.15.12 of the NER, AEMO is consulting on the NEM Settlement Estimates Policy (Policy) in accordance with the Rules consultation process in rule 8.9.

Note that there is a glossary of terms used in this Issues Paper at Appendix A.

AEMO’s indicative timeline for this consultation is outlined below. Dates may be adjusted depending on the number and complexity of issues raised in submissions and any meetings with stakeholders.

Deliverable	Indicative date
<b>Issues Paper published</b>	26 November 2018
<b>Submissions due on Issues Paper</b>	21 January 2019
<b>Draft Report published</b>	19 February 2019
<b>Submissions due on Draft Report</b>	5 March 2019
<b>Final Report published</b>	4 April 2019

Prior to the submissions due date, stakeholders can request a meeting with AEMO to discuss the issues and proposed changes raised in this Issues Paper.

AEMO has been and intends to continue consulting on the Policy through the Five-Minute Settlement (5MS) program engagement channels.<sup>3</sup> The relevant engagement channels include:

- Procedures Working Group (PWG)
- Systems Working Group (SWG)
- Settlements Focus Group

<sup>3</sup> For details on forums and groups specific to the 5MS program see: <http://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement>



## 2. BACKGROUND

### 2.1 NER requirements

There are two distinct applications for estimated settlement amounts outlined in the NER, and covered under the Policy:

- i. Clause 3.15.12(c) of the NER requires AEMO to develop the principles and the process to be applied in calculating the estimated settlement amount when normal processing is not available under clause 3.15.12(b). As AEMO maintains back-up capability for settlement data, this type of settlement estimation is only necessary under the sustained failure of AEMO systems that are required for settlements. It has never been invoked to date.
- ii. Clause 3.3.9 of the NER requires AEMO to calculate settlement amounts for inclusion in a Market Participant’s ‘outstandings’ to determine its prudential settings. The outstandings of a Market Participant is a net dollar amount payable by or to AEMO based on settlement amounts, including estimated settlement amounts for billing periods pending final statements. Market Participants are obliged under clause 3.3.11 of the Rules to maintain their outstandings below their trading limit. Failure to do so can result in AEMO issuing a call notice. This estimation is undertaken daily for each Market Participant.

### 2.2 Context for this consultation

#### 2.2.1 Overview of the Settlement Estimates Policy

The NEM Settlement Estimates Policy covers the two separate estimation processes just described.

The estimation of metering data is not part of the Policy. This is covered under the Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation,<sup>4</sup> which is being separately consulted on at:

<https://www.aemo.com.au/Stakeholder-Consultation/Consultations/Five-Minute-Settlement---Metering-Procedure-Changes-Package-1?Convenor=AEMO%20NEM>

Table 1 below describes the different types of estimations, and the relevant procedures.

Table 1: Differences in estimations for settlements, prudentials, and metering data

	Settlement amount estimation	Prudential estimation	Metering data estimation
Purpose	Estimates of settlement amounts when normal settlement processing is not available	Estimates of settlement amounts for prudential calculations	Estimates of metering data for a period that is equal to or greater than the next period
Calculation level	Applied to each Financially Responsible Market Participant at a Transmission Connection Point	Applied to each Financially Responsible Market Participant at a Transmission Connection Point	Applied to each NMI data stream that requires estimation
Applicable to	AEMO	AEMO	Meter Data Providers
NER	3.15.12	3.15.12	7.16.3, 7.16.4, 7.16.5
Procedure(s)	<u>NEM Settlement Estimates Policy</u>	<u>NEM Settlement Estimates Policy</u>	<u>Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation</u>
Relevance to	Relevant	Relevant	Not relevant

<sup>4</sup> AEMO. 2017. Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation. Available: [https://www.aemo.com.au/-/media/Files/Electricity/NEM/Retail\\_and\\_Metering/Load\\_Tables/Metrology-Procedure-Part-B-v60.pdf](https://www.aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Load_Tables/Metrology-Procedure-Part-B-v60.pdf)



### Estimates to calculate net settlement amount

The NEM Settlement Estimates Policy was established under clause 3.15.12(c) of the NER to explain how AEMO would estimate settlement amounts if necessary under conditions of sustained failure of the settlement processing system, communications, or Metering Data Provider (MDP) processing capability.

A two-stage approach for estimates for settlement purposes is defined in the current Policy. If preliminary statements are available, then data in these statements will be used as the basis of final statements.

For scenarios where preliminary statements are not available, estimates will be derived from:

- Historical metering for Market Customers.
- Dispatch results for Market Generators as stored in a server separate to the Electricity Market Management System (EMMS).

### Estimates for prudential purposes

Settlement amounts also need to be estimated for prudential purposes to monitor market participant outstandings (clause 3.3.9 of the NER) and the level of credit support required, for periods when final or preliminary settlement data is not available. Out of an average 30-day outstandings period, typically two days of settlements data is estimated using the 'scaled like-day energy method' set out in the Policy. The rest of the outstandings period is made up of estimates from interim meter data and preliminary and final settlements data.

The accuracy of the scaled like-day energy estimation methodology is discussed in section 3.2.1 of this Issues Paper.

## 2.2.2 Five-Minute Settlement

In November 2017, the AEMC made the 5MS rule. The rule reduces the trading interval for financial settlement in the National Electricity Market (NEM) from 30 minutes to five minutes, aligning with NEM dispatch.

### 2.2.3 Implementing Five-Minute Settlement

Five-minute settlement will commence in the NEM on 1 July 2021. Settlement across the NEM will then be based on five-minute trading interval prices. 5MS will change many NEM processes, including energy and ancillary service bidding, online dispatch, intervention pricing, the calculation of trading amounts, the calculation of the cumulative price threshold, and periodic energy metering.

AEMO is required to update and publish a number of specified relevant procedures by 1 December 2019, to apply from the 5MS commencement date.<sup>5</sup> While the Policy is not one of the specified procedures, AEMO's 5MS program has identified it as one of the publicly consulted documents that require amendment for 5MS implementation.

### 2.2.4 Global Settlement

The AEMC released a draft determination and draft Global Settlement rule in August 2018, proposing to replace 'settlement by differencing' with a 'global settlements' framework. The final Global Settlement rule is currently expected to be made in early December 2018.

The current 'settlement by differencing' framework has been in place since the start of NEM, where the local retailer is responsible for settling the value of any residual electricity supplied to a distribution area after deducting the loss-adjusted metered electricity consumed by market loads within that area. This

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<sup>5</sup> NER clause 11.103.2



means that the local retailer bears the cost and risk of all residual electricity losses in that area, known as unaccounted for energy (UFE).

Under the proposed 'global settlements' framework, every retailer is billed for the loss-adjusted and UFE-adjusted metered electricity consumed by their customers within that area.

The draft rule allows for global settlement implementation to occur in conjunction with 5MS implementation. This is to capitalise on synergies between the two projects in terms of system and process changes.

As settlement estimates for prudential purposes will need to take UFE amounts into account, this consultation includes a proposed change to the Policy reflecting the anticipated Global Settlement rule. With the final Global Settlement rule expected in December 2018, AEMO intends to incorporate any other changes from the final rule in the second stage of consultation.

### **2.2.5 Industry engagement on estimations procedure**

AEMO established the Procedures Working Group (PWG) to seek industry feedback on the appropriate amendments to procedures and other AEMO documents affected by 5MS.<sup>6</sup> The PWG is an open forum for industry stakeholders to contribute to the procedure development process.

Over August to November 2018, AEMO engaged with the PWG and circulated High Level Impact Assessments (HLIA)<sup>7</sup> on AEMO's approach to amending the Policy and the associated Settlement Estimation Guide. In October 2018, participants supported AEMO's proposal to organise a focus group to discuss the impact of 5MS and global settlement on AEMO's settlements and prudentials procedures. This Settlements Focus group will be held on 26 November 2018.

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<sup>6</sup> AEMO. 2018. Procedures Working Group. Available: <https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Five-Minute-Settlement/Procedures-Workstream/Procedures-Working-Group>

<sup>7</sup> AEMO. 2018. PWG Meeting Pack 2, page 37. Available: <https://www.aemo.com.au/-/media/Files/Electricity/NEM/5MS/Procedures-Workstream/PWG/2018/PWG-Meeting-Pack---27-Aug-18.pdf>



### 3. DISCUSSION

This section discusses proposed changes to the Policy resulting from the 5MS rule and the Global Settlement draft rule, and general improvements to reflect current NEM systems and processes, in relation to estimates for settlements and prudential purposes. Consideration has also been given to transitional arrangements.

AEMO will reformat the amended Policy in line with its current template for external procedures. As a result, some sections of the Policy are now updated under different headings. References to sections of the Policy in this Issues Paper are to the draft Policy as amended for the purposes of this consultation, unless stated otherwise. A table mapping the sections of the current and amended Policy can be found in section 4 of this Issues Paper.

#### 3.1 Estimates to calculate net settlement amount

Section 2 of the Policy sets out the estimation approach when AEMO cannot produce settlement statements due to systems or communications failure. This process has never been used in NEM settlement history and is no longer consistent with AEMO's IT capability and market processes to manage system and communication outages.

AEMO proposes to update this section of the Policy to reference other defined procedures that document the protocol in the event of systems or communications failure.

##### 3.1.1 Estimation of settlements data following EMMS failure

Section 2.1 of the Policy relates to estimations of settlements data following a failure of AEMO's electricity Market Management System (EMMS). The current Policy provides that a sustained failure of the EMMS would result in final statements being created based on preliminary statements that were stored outside the EMMS.

AEMO has since improved its IT capability and proposes amending Section 2.1 to say that EMMS failures will result in:

- Services being transferred to another back-up server on the same site or a back-up server on an alternative site in accordance with clause 3 of the Market Suspension and Systems Failure Procedure.<sup>8</sup>
- Suspension of the NEM in accordance with clause 9 of the Market Suspension and System Failure Procedure if AEMO as a last resort.<sup>9</sup>

##### 3.1.2 Estimation of settlements data following a communications failure

Section 2.2 of the Policy relates to estimations of settlements data following a communications failure. The current Policy provides that a sustained failure of communications would result in final statements being created based on preliminary statements stored outside the EMMS.

AEMO has since developed comprehensive procedures detailing Metering Data Provider (MDP) obligations in relation to system architecture and administration. Proposed amendments to Section 2.2 are:

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<sup>8</sup> AEMO. 2017. Market Suspension and Systems Failure. Available: [http://www.aemo.com.au/-/media/Files/Electricity/NEM/Security\\_and\\_Reliability/Power\\_System\\_Ops/Procedures/SO\\_OP\\_3706---Failure-of-Market-or-Market-Systems.pdf](http://www.aemo.com.au/-/media/Files/Electricity/NEM/Security_and_Reliability/Power_System_Ops/Procedures/SO_OP_3706---Failure-of-Market-or-Market-Systems.pdf)

<sup>9</sup> Ibid





- Additions referencing clause 6 of the Service Level Procedure: Metering Data Provision Services procedure.<sup>10</sup> This provides that if system failure occurs the MDP must ensure that its metering data services database is restored to operational service within two business days.
- Additions referencing clause 7.10.2 of the NER, which sets out MDP obligations in relation to metering data management and storage.
- Additions referencing MDP metering data requirements to meet the validation rules prescribed in the Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation.<sup>11</sup> If the MDP's metering fails to meet the validation rules, AEMO will estimate and substitute the affected data in accordance with clause 7.11.2(c) of the NER and the Market Settlements and Transfer Solution (MSATS) Procedure: MDM Procedures.<sup>12</sup>

### 3.1.3 Estimation of settlements data in the absence of preliminary statement data

The current Policy includes provision for estimations of settlements data in the absence of preliminary statement data. AEMO proposes removing this section as preliminary statements can now be produced without the need to calculate estimated settlement amounts. This is because the required input data for preliminary settlements can be procured from back-up servers in all scenarios other than a market suspension.<sup>13</sup>

### 3.1.4 Failure of MSATS

Section 2.3 is a proposed addition to the Policy. This section highlights that MSATS failures will result in services transferred to another back-up server on the same site or a back-up server on an alternative site.

### 3.1.5 Failure of EMMS and MSATS Supporting Databases

Section 2.4 is a proposed addition to the policy. This section highlights that failures of EMMS and MSATS supporting databases will result in relevant services transferred to another back-up server on the same site or a back-up server on an alternative site.

#### Questions

- Do participants agree with the proposed changes to estimates of net settlement amounts for settlement statement purposes? If not, why?
- Are there other relevant issues that have not been considered?
- What is an alternative approach to estimating settlement amounts in any relevant scenario? How would it be implemented?

## 3.2 Estimates for prudential purposes

Section 3 of the updated Policy relates to settlement estimates used for prudential assessments. It sets out the hierarchy of data and estimation methodology used for calculating settlement estimates for monitoring Market Participants' outstandings when actual metering data is not available.

<sup>10</sup> AEMO. 2017. Service Level Procedure: Metering Data Provision Services. Available: [http://aemo.com.au/-/media/Files/Electricity/NEM/Retail\\_and\\_Metering/Metering-Procedures/2017/SLP-MDP-Services.pdf](http://aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Metering-Procedures/2017/SLP-MDP-Services.pdf)

<sup>11</sup> AEMO. 2017. Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation.

<sup>12</sup> AEMO. 2017. MSATS Procedure: MDM Procedures. Available: [http://aemo.com.au/-/media/Files/Electricity/NEM/Retail\\_and\\_Metering/Market\\_Settlement\\_And\\_Transfer\\_Solutions/2017/MSATS-Procedures-MDM-Procedure-V33.pdf](http://aemo.com.au/-/media/Files/Electricity/NEM/Retail_and_Metering/Market_Settlement_And_Transfer_Solutions/2017/MSATS-Procedures-MDM-Procedure-V33.pdf)

<sup>13</sup> A market suspension by AEMO would be implemented in accordance with clause 9 of AEMO's Market Suspension and Systems Failure Procedure. op.cit.

The current methodology behind the Policy performs the settlement estimation calculation at a 30-minute resolution. The 5MS rule updates the definition of a trading interval to five minutes, resulting in misalignment with the current methodology.

In implementing 5MS, AEMO considered three approaches to the settlement estimation methodology as highlighted in Table 2 below:

*Table 2: Proposed options to update settlement estimates for prudential assessments*

	<b>Options considered</b>	<b>Benefits</b>	<b>Drawbacks</b>	<b>Comments</b>
1	Leave methodology unchanged and continue to perform calculation at 30-minute level	Potentially lower cost than other options	Less accurate than other options,	Would not reflect the transition to 5MS and likely to have undesirable consequences
2	Leave methodology unchanged but perform calculation at a five-minute level	More accurate than option (1)	Some cost	AEMO's preferred option. Reflective of change to 5-minute time interval
3	Fundamental review and development of new methodology	Potentially more accurate than option (2)	Significant cost to develop methodology and potential benefits currently unknown	Analysis indicates that current methodology is still fit for purpose

AEMO's preference is for option 2. This option does not change the underlying methodology but updates the calculation process to be performed at the five-minute level. This is consistent with 5MS, with low implementation risks and costs. It requires minimal amendments to the Policy document.

A fundamental change to the methodology is not recommended. AEMO's analysis as below indicates that the current methodology is fit for purpose.

### 3.2.1 Accuracy of scaled like day energy estimates

AEMO has analysed the accuracy of the current scaled like-day energy settlement estimation methodology. Since this methodology was last updated in 2014, approximately 95% of the total like-day energy estimates were accurate to +/- 25%. This analysis was calculated at a trading interval level and taken on aggregate.

Typically, two days out of an average 30 days of Market Participant outstandings are estimated through this methodology (or approximately 6%). After two days, these estimates are overwritten firstly with interim metering data and then preliminary and final settlements data.

There is only potential for a material impact on Market Participants if they are trading close to their outstandings limit, and an inaccuracy in the scaled like-day estimation increases their outstanding to a point where they breach their trading limit. If a Market Participant believes their prudential requirements have been materially impacted by the scaled like-day estimation not accurately reflecting their actual energy use for a given day, they can request AEMO to review their settlement estimate. In such a case, AEMO would re-evaluate the settlement estimate based on any additional data available in the MSATS system.

AEMO believes that within the bounds described above and the limitation on the extent that estimates can materially impact market participants, the accuracy of the scaled like-day estimation methodology is satisfactory, and the methodology remains fit for purpose. To ensure that this remains the case, the accuracy of the estimation will be monitored through an internal review process and reassessed again after 5MS is implemented in July 2021.

**Questions**

- Do participants agree with the proposed changes to estimates for prudential purposes, why?
- Are there other relevant issues that have not been considered?
- What is an alternative approach to perform settlement estimates for prudential purposes? How would it be implemented?

### 3.3 Potential effect of Global Settlement

#### 3.3.1 Background on UFE

Under the draft rule for Global Settlement, all retailers will be billed for a proportion of the UFE in a local area, based on the electricity consumed by their customers within that area. The AEMC estimates UFE to account for 0.003 - 1.1% of total generation.<sup>14</sup> This figure is indicative only and is itself based on approximations.

Once Global Settlement is implemented (if the rule is made), the flow of energy data from MSATS to EMMS will include UFE data separate to raw energy data.

#### 3.3.2 UFE Estimates for prudential purposes – meter data available

After Global Settlements is implemented, where initial metering data and/or preliminary and final settlement data is available, the UFE component will be included in the settlement estimation for prudential purposes.

#### 3.3.3 UFE Estimates for prudential purposes – scaled like-day energy estimation

Where no meter data is available, typically a scaled like-day estimate is used for settlement estimation for prudential purposes. For these days, the UFE component will be assumed to be zero. This considers that this estimate would have very little effect on prudential estimates for the following reasons:

- Low materiality of UFE.
- The scaled-like day estimation process only applies to a small part of prudential estimates (typically two out of 30 days, or 6%).

AEMO considered estimating this UFE component using a scaled like-day estimate. This is not recommended given the associated system costs and low materiality of this UFE component.

**Questions**

- Do participants agree with the proposed approach to estimate UFE, why?
- Are there other relevant issues that have not been considered?
- What is an alternative approach to estimate UFE? How would it be implemented?

### 3.4 Transitional arrangements

AEMO has considered transitional arrangements for settlement estimations. This is in relation to the short period when settlement estimations will involve the 5MS and Global Settlement cutover date of 1 July 2021. Settlement estimates during this period will involve both 30-minute settlement data and five-minute settlement data.

<sup>14</sup> AEMC. 2018. National Electricity Amendment (Global Settlement and Market Reconciliation) Rule. pg.13.



These arrangements will apply at a system level and will be managed internally by AEMO. As they are not expected to have an impact on market participants, AEMO does not consider any changes to the Policy are necessary.



#### 4. DRAFTING FOR PROPOSED CHANGES

To help stakeholders and other interested parties respond to this Issues Paper, AEMO has published a draft of the NEM Settlement Estimates Policy incorporating the changes AEMO proposes for consultation.

Note that AEMO has adopted a new document format for procedures. A clean version of the draft NEM Settlement Estimates Policy, and a change-marked version following the old format are available at: <http://aemo.com.au/Stakeholder-Consultation>.

A table mapping the old and new sections is provided in Table 3 below:

*Table 3: Mapping of sections in previous (version 1.1) and updated (version 2.0) of the NEM Settlement Estimates Policy*

<b>NEM Settlement Estimates Policy</b>	
<b>Old Policy (version 1.1)</b>	<b>Updated Policy (version 2.0)</b>
Glossary	Section 1.2.1
Section 1	Section 1.1
Section 2	Section 1.1
	Section 1.3 (new)
Section 3	Removed
Section 4	Removed
Section 5	Section 2
Section 6	Section 3



## **5. SUMMARY OF MATTERS FOR CONSULTATION**

In summary, AEMO seeks comment and feedback on the following amendments following the 5MS rule change and potential Global Settlements rule change:

1. Proposed amendments to estimates for settlement amounts, including any other potential approaches.
2. Proposed amendments to estimates for prudential requirements, incorporating UFE, including any other potential approaches.

Stakeholders are invited to submit written responses on the changes following the format of the Stakeholder Response Template. This is available at: <http://aemo.com.au/Stakeholder-Consultation>.

Submissions on these and any other matter relating to the proposal discussed in this Issues Paper must be made in accordance with the Notice of First Stage of Consultation published with this paper by 5.00 pm (AEST) on 21 January 2019.



## APPENDIX A - GLOSSARY

Term or acronym	Meaning
<b>AEMC</b>	Australian Energy Market Commission
<b>AEMO</b>	Australian Energy Market Operator
<b>EMMS</b>	Electricity Market Management System
<b>IT</b>	Information Technology
<b>NEM</b>	National Electricity Market
<b>NER</b>	National Energy Rules
<b>MDP</b>	Metering Data Provider
<b>MDM</b>	Metering Data Management
<b>MSATS</b>	Market Settlement and Transfer Solution
<b>UFE</b>	Unaccounted for Energy