

NEM SETTLEMENT ESTIMATES POLICY

PREPARED BY: ~~Settlements and Prudentials~~ Market Management

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NOTE: This mark-up is provided for information purposes only to assist Consulted Persons to identify proposed amendments to substantive provisions of this policy. Proposed amendments to introductory or background provisions are generally not change-marked.

~~This document is current to version 55-11 of the National Electricity Rules~~

Approved for distribution and use



~~Matt Zema~~ Audrey Zibelman
Chief Executive Officer

Date [TBA]13th March 2013

Version Release History

VERSION	DATE	COMMENTS
1	10 Aug 2012	Initial Version of NEM Settlement Estimates Policy. With effect from the Effective Date determined under clause 1, this Policy and the NEM Settlement Revisions Policy supersede the NEM Settlement Estimates and Revisions Policy version 3A, published on 15 November 2009.
1.1	13 Mar 2013	Minor amendments to NEM Settlement Estimates Policy to include effective date of 15 March 2013.
<u>2.0</u>	<u>1 July 2021</u>	<u>Re-arranged information to comply with AEMO new external Procedure template.</u> <u>Replaced Section 5 in version 1.1 with Section 2 in the current version.</u> <u>Updated references to half-hourly or thirty-minute to five-minute (<i>trading interval</i>).</u> <u>Updated to include UFE estimations for prudential purposes.</u>

Important Notice

~~This document has been prepared by AEMO as required by clause 3.15.12(c) of the National Electricity Rules (Rules), and has effect only for the purposes set out in the Rules. The Rules and the National Electricity Law (Law) prevail over this document to the extent of any inconsistency.~~

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Contents

1	Introduction	4
2	Purpose.....	4
3	Application.....	4
4	Legal and Regulatory Framework	4
5	Settlement Estimates for the Purpose of <i>Settlements</i>	4
5.1	Settlement Estimation Process	5
5.1.1	Estimation of <i>settlements</i> data following an EMMS failure	5
5.1.2	Estimation of <i>settlements</i> data following a communications failure	5
5.1.3	Estimation of settlements data in the absence of <i>preliminary statement</i> data	6
6	Settlement Estimates for the Purpose of Prudential Assessments	7
6.1	Settlement Estimation Process	8

GLOSSARY

- (a) In this document, a word or phrase *in this style* has the same meaning as given to that term in the National Electricity Rules.
- (b) In this document, capitalised words or phrases or acronyms have the meaning set out opposite those words, phrases, or acronyms in the table below.
- (c) Unless the context otherwise requires, this document will be interpreted in accordance with Schedule 2 of the *National Electricity Law*.

TERM	MEANING
BUDS	Back-Up Dispatch System
EMS	Energy Management System
EMMS	Electricity Market Management System
MDP	Metering Data Provider
MDM	Meter Data Management
MSATS	Market Settlement and Transfer Solution
<u>NER</u>	<u>National Electricity Rules</u>
<u>NMI</u>	<u>National Metering Identification</u>
SCADA	Supervisory Control and Data Acquisition
SRA	<i>Settlements Residue Auction</i>
TNI	Transmission Node Identifier
TNISF	Wholesale Connection Point Scaling Factor
<u>UFE</u>	<u>Unaccounted for energy</u>

1 Introduction

- (a) This NEM Settlements Estimates Policy (**Policy**) is made in accordance with clause 3.15.12(c) of the National Electricity Rules (**Rules**).
- (b) This Policy commences on and from 15 March 2013. This Policy supersedes AEMO's Settlement Estimates and Revisions Policy for the purpose of calculating *estimated settlement amounts* under clause 3.15.12(b) of the *Rules*.
- (c) This Policy may only be amended in accordance with clause 8.9 of the *Rules*.
- (d) If there is any inconsistency between this Policy and the *Rules*, the *Rules* will prevail to the extent of that inconsistency.

2 Purpose

The purpose of this Policy is to set out the principles and process for calculating *estimated settlement amounts* when normal processing is not possible.

This Policy also sets out AEMO's process for estimating settlement results for the purpose of prudential estimation under Rule 3.3.9.

3 Application

This Policy applies to AEMO.

4 Legal and Regulatory Framework

Clause 3.15.12(c) of the *Rules* require AEMO to develop the principles and the process to be applied in calculating the *estimated settlement amount* under clause 3.15.12(b), and make any necessary modifications to those principles and that process, in accordance with the *Rules consultation process*.

Settlement estimation for the purposes of the prudential assessment is a matter of importance to *Market Participants* and AEMO has documented the process for this estimation in this Policy.

5 ~~Settlement Estimates for the Purpose of Settlements~~ Process During System and Communications Failures

AEMO has developed IT systems and databases, business processes and Procedures to manage the risks of a range of system or communications outage incidents impacting normal ~~normal~~ settlement processess-operations.

In all these scenarios other than ~~except a~~ during ~~m~~Market suspensionSuspension events, AEMO can produce preliminary and final settlement statements without the need to calculate requirements for calculating estimated settlement amounts.

The objective of the estimation procedure is to provide ~~estimated settlement amounts~~ that maintain the cashflows between AEMO and Market Participants as accurately as possible under conditions of sustained failure of Metering Data Provider processing capability or AEMO IT systems.

A two-stage process is applicable to circumstances of complete and prolonged failure of Metering Data Provider or AEMO settlement processing capability. This process is described in detail in section 5.1.

The first stage is to use the data already presented in preliminary statements as the basis of estimated final statements. The second stage, for prolonged failures such that even preliminary-

~~grade settlement data has not been made available, derives estimates from historical metering for Market Customers and dispatch results for Market Generators.~~

~~The estimates take into account the regional dispatch prices and regional variations in demand for calculation of energy trading amounts. However ancillary services, Participant fees and other settlement transactions are translated directly from those in the base week.~~

~~When full facilities are restored and stabilised, AEMO will recalculate settlement amounts using the normal processing systems. These recalculated results will be presented as special revised settlement statements and adjustments will be carried through to final statements in accordance with the provisions of clause 3.15.19 of the Rules.~~

5.1 Settlement Estimation Process

~~The following process will be followed in the event that AEMO is unable to follow the standard processes due to data unavailability or systems failure.~~

5.25.1 Estimation of settlements data following an EMMS failure of EMMS

~~On the sustained failure of the EMMS, final statements are to be created by using the previously published preliminary statement for the particular billing period. The preliminary statements are already stored separately to the EMMS system. This process can operate for at least two weeks. If the failure continues past the period of published preliminary statements the process in (c) below should be used. Services will be 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 System Failure Procedure.~~

~~If AEMO is unable to operate the spot market due to EMMS failures AEMO will suspend the NEM in accordance with clause 9 of the Market Suspension and System Failure Procedure.~~

5.2 Estimation of settlements data following a Failure of Communications Impacting the Delivery of Metering Data

~~Clause 6 of the Service Level Procedure): for: Metering Data Provision Services) sets out an MDP's obligations in relation to system architecture and administration. If a system failure occurs the MDP must ensure that its metering data services database is restored to operational service within two business days in accordance with clause 6.3.5 of the above Procedure.~~

~~Clause 7.10.2 of the NER sets out MDP's obligations in relation to metering data management and storage. If MDP's MDP's metering data fails to meet the required validation rules prescribed in Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation AEMO will estimate and substitute the affected data in accordance with clause 7.11.2(c) of the NER and the MSATS Procedure: MDM Procedures.~~

5.3 Failure of MSATS

~~Services will be transferred to another back-up server on the same site or a back-up server on an alternative site.~~

5.4 Failure of EMMS and MSATS Supporting Databases

~~The relevant services will be transferred to another back-up server on the same site or a back-up server on an alternative site.~~

failure

On the sustained failure of communications and/or MDPs, *final statements* are to be produced from the EMMS system using *preliminary* data already loaded. This process can operate for at least two weeks. If the failure continues past the period of availability of *preliminary* data the process in (c) below should be used.

5.2.1 Estimation of settlements data in the absence of *preliminary statement* data

- a) An estimation process is required to create *preliminary statements* for each week commencing with the week in which the 'major failure' occurred. The *preliminary statements* should be based on the last week for which results are deemed to be reasonably accurate (typically the last complete week prior to the failure).
- b) The results of that base week, including any settlement surpluses, must remain balanced in dollar terms when scaled for the adjusted week, so that AEMO has no financial risk or residue. The simplest proposal would be to use the results of the base week as the estimate.
- c) The next achievable step for improvement in accuracy would be for scaling to be applied in recognition of variations to:
 - (dispatch) prices, and
 - (dispatched) energy share for scheduled generators.

Other variations considered to be beyond the scope of the estimate process are variations to:

- energy share per *Market Participant* for customer load because a significant amount of MDP data may be unavailable;
 - *ancillary services* because of the complexity of the calculations outside the EMMS; and
 - *Participant fees* because they are relatively insignificant in magnitude.
- d) To provide the data for the base week, a copy of the relevant participant data is to be maintained on an independent system. The base data needed includes:-
 - half-hourly *trading interval* prices per region (PBr);
 - half-hourly *generation dispatch* targets, aggregated to a single value per *Market Participant* (GDBp);
 - half-hourly customer *trading amount* for each *Market Participant* (CABp);
 - half-hourly generator *trading amount* for each *Market Generator* (GABp);
 - *settlements residue* for each auction participant and *Network Service Provider* (RABp);
 - *billing period* total amount for *ancillary services*, *Participant fees* other miscellaneous transfers (MTBp); and
 - reference region for each *Market Generator* (r).
 - e) For the week of the estimate, the half-hourly *generation dispatch* targets (GDEp) and half-hourly *trading interval* prices (PEr) from EMMS (if available) or the BackUp Dispatch System (BUDS) are required as input.

~~f) The scaling factor (SF) which gives the energy weighted ratio between total energy payments for each trading interval in the estimate week compared to the corresponding trading interval from the base week is defined as:~~

$$\text{SF} = \text{sump}(\text{GDEp} \times \text{PEr}) / \text{sump}(\text{GDBp} \times \text{PBr})$$

~~The estimated customer amount for each Market Participant for each half-hour is:~~

$$\text{CAEp} = \text{CABp} \times \text{SF}$$

~~The estimated global Generator energy amount (GAE) is:~~

$$\text{GAE} = \text{sump}(\text{GABp}) \times \text{SF}$$

~~The estimated participant Generator energy amounts are:~~

$$\text{GAEp} = \text{GAE} \times (\text{GDBp} \times \text{PEr}) / \text{sump}(\text{GDBp} \times \text{PEr})$$

~~All of the above are half-hourly trading interval calculations. The billing period totals are calculated by summing the results across all trading intervals in the billing period.~~

~~The balance between energy payments, receipts and residues can be maintained if the residue amounts are also scaled appropriately.~~

~~The estimated global residue amounts (RAE) are:~~

$$\text{RAE} = \text{sump}(\text{RABp}) \times \text{SF}$$

~~The estimated participant residue amounts are:~~

$$\text{RAEp} = \text{RABp} \times \text{SF}$$

~~The estimated miscellaneous transfers per Market Participant (MTEp) are assumed to be independent of reference price and generation loading patterns, and may be estimated directly:~~

$$\text{MTEp} = \text{MTBp}$$

6 Settlement Estimates for the Purpose of Prudential Assessments

Under clause 3.3.9 of the [NER Rules](#) AEMO is required to determine the *outstandings* of a *Market Participant* as a dollar amount. The *outstandings* is a key value used in the prudential assessment of a *Market Participant*. *Market Participants* are obliged under clause 3.3.11 of the [NER Rules](#) to maintain their *outstandings* below their *trading limit*. Failure to do so can result in AEMO issuing a *call notice*.

The value of a *Market Participant's outstandings* can be considered to be the aggregate of the absolute value of net *settlement amounts* payable in respect of any *billing period*, or part of a *billing period*, that has occurred but not yet been settled less security deposit funds held by AEMO in respect of the *Market Participant*.

Under clause 3.3.9 of the [NER Rules](#), the amounts used in the calculation of a *Market Participant's outstandings* are the actual *settlement amounts* for *billing periods* where *final statements* have been issued by AEMO or AEMO's reasonable estimate of the *settlement amounts* for *billing periods* (where *final statements* have not been issued).

In practice, AEMO uses preliminary billing runs in the assessment of a *Market Participant's outstandings* where these are available. For days where no preliminary billing run has been performed a *settlement* estimation process is required. The process followed by AEMO to estimate *settlements* data for the purposes of prudential assessment is described below.

6.1 UFE for Global Settlements

Where initial *metering data* and/or preliminary and final settlement data is available, AEMO will include the *Market Participant's* allocation of UFE in the settlement estimation for prudential purposes. Where no *metering data* is available, the UFE component will be assumed to be zero.

6.16.2 Settlement Estimation Process

The following is a hierarchy of available data which is to be applied for the purposes of determining *settlement* estimates where no preliminary billing run data is available. AEMO will develop and implement a set of data quality, *Market Participant* and wholesale connection point data parameters and validations to determine the highest level in the hierarchy that is of sufficient quality to be applied in the estimation of *settlement amounts*.

Energy data can be split into three broad categories for the purposes of *settlements* estimation. These are *generation* for *Market Generators*, *load* for *Market Generators* and *load* for *Market Customers*. For each of these three categories the *settlement* estimates are to be based on the following data sources in a decreasing order of preference relating to the accuracy of the data source.

Hierarchy of Data for Estimating *Generation* for *Market Generators*

1. Actual *metering data*

A billing run is to be performed for each calendar day which will pick up the latest *metering data* available for all days for which there is yet to be a preliminary billing run.

2. SCADA data

Generation estimated directly from the *NEM dispatch* process with application of a static *regional* scaling factor to correct SCADA data for differences in point of measurement to meter data. SCADA data is used for *scheduled generators* and *semi-scheduled generators*, and *non-scheduled generators* that have data available.

AEMO will review the static *regional* scaling factors annually and publish them on the AEMO website, and notify *Market Participants* when the factor is changed.

Hierarchy of Data for Estimating *Load* for *Market Generators*

1. Actual *metering data*

A billing run is to be performed each calendar day which will pick up the latest *metering data* available for all days for which there is yet to be a preliminary billing run.

2. Estimated data based on like-day *energy*.

Load is estimated by scaling *energy* from a like-day for which actual *metering data* is available and applying a scaling factor derived from *regional dispatch* data.

Hierarchy of Data for Estimating *Load* for *Market Customers*

1. Actual *metering data*

A billing run is to be performed each calendar day which will pick up the latest *metering data* available for all days for which there is yet to be a preliminary billing run.

2. TNI SCADA data

If there is a single *Market Participant* consuming *energy* at the TNI then the SCADA data can be utilised where a one-to-one (SCADA to *connection point*) mapping is available. *Market Participants* can request AEMO to consider their suitability for using TNI data.

3. Estimated data generated for each *NMI* by the MDP in accordance with the *Metrology Procedure Part B: Metering Data Validation, Substitution and Estimation*.~~Metering Data Provision Procedures.~~

4. Estimated data generated for each *NMI* by MSATS in accordance with the [MSATS Procedure: MDM Procedures, Metering Data Management Procedures](#).
5. Estimated data based on like-day *energy* and wholesale connection point scaling factors (TNISFs)

To estimate the previous day *energy*, a wholesale *connection point* scaling factor (TNISF) is applied to the like-day data for the *Market Participant*. The TNISF is calculated for each trading interval based on net *energy* purchase at the connection point and represented by the following equation.

$$TNISF = \frac{\text{Wholesale EMS Energy Previous day}}{\text{Wholesale EMS Energy Like day}}$$

This estimation relies on a sufficient mapping between the wholesale *connection points* and the SCADA data in EMS.

6. Estimated data based on like-day *energy* and *regional* scaling factors with a *Market Participant* specific calculation refinement.

The like-day five-minute *regional* scaling factor (SF) applied to the like-day data for the *Market Participant* (described in 7 below) can be refined through the use of linear regression as illustrated below.

$$\text{Market Participant SF} = [\text{Regional Scaling Factor} \times \alpha] + \beta$$

The two parameters α and β are *Market Participant* and TNISF specific and, where sufficient correlation between *Market Participant* and total *energy* at a *connection point* occurs, can be used to improve the *regional* scaling approach.

7. Estimated data based on like-day *energy* and *regional* scaling factors

To estimate the previous-day *energy*, a half-hourly five-minute *regional* scaling factor (SF) is applied to the like-day data for the *Market Participant*. The SF is calculated based on the *regional dispatch* data and is represented by the equation below:

$$\text{Regional Scaling Factor} = \frac{\text{Regional Dispatch Previous day}}{\text{Regional Dispatch Likeday}}$$

In the above hierarchy, a like-day is the same day from the most recent *billing period* for which data from a preliminary billing run is available.