

# NEM SETTLEMENT ESTIMATES POLICY

PREPARED BY: Settlements and Prudentials

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Approved for distribution and use



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Date 13<sup>th</sup> 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.

### Important Notice

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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 .....	5
6	Settlement Estimates for the Purpose of Prudential Assessments .....	6
6.1	Settlement Estimation Process .....	7

## 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
SCADA	Supervisory Control and Data Acquisition
SRA	<i>Settlements Residue Auction</i>
TNI	Transmission Node Identifier
TNISF	Wholesale Connection Point Scaling Factor

## 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

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.

### 5.1.1 Estimation of *settlements* data following an EMMS failure

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.

### 5.1.2 Estimation of *settlements* data following a communications 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.

### 5.1.3 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:

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

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

$$CAEp = CABp \times SF$$

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

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

The estimated participant *Generator* energy amounts are:

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

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:

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

The estimated participant residue amounts are:

$$RAEp = RABp \times SF.$$

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:

$$MTEp = MTBp$$

## 6 Settlement Estimates for the Purpose of Prudential Assessments

Under clause 3.3.9 of the *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 *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 *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 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 meter 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. 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. AEMO will review the static regional scaling factors annually and publish them on the AEMO website, and notify participants when the factor is changed.

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

1. Actual meter 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 meter 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.

3. Estimated data generated for each *NMI* by the MDP in accordance with MDP procedures.

4. Estimated data generated for each *NMI* by MSATS in accordance with the MDM 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 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 *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  $\alpha$  and  $\beta$  are *Market Participant* and TNI 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 *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.