

# WEM PROCEDURE: FACILITY SUB-METERING

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### IMPORTANT NOTICE - EXPLANATORY NOTES

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## 1. INTRODUCTION

### 1.1. Purpose and scope

- 1.1.1. This WEM Procedure: Facility Sub-Metering (Procedure) is made in accordance with AEMO's functions under clause 2.1A.2(h) of the Wholesale Electricity Market Rules (WEM Rules).
- 1.1.2. The Electricity Industry Act 2004, the WEM Regulations and the WEM Rules prevail over this Procedure to the extent of any inconsistency.
- 1.1.3. In this Procedure, where obligations are conferred on a Rule Participant, that Rule Participant must comply with the relevant obligations in accordance with clause 2.9.7A or 2.9.8 of the WEM Rules, as applicable.
- 1.1.4. The purpose of this Procedure is to outline:
- the characteristics and requirements of Facility Sub-Metering, including accuracy requirements;
  - the procedures to be followed by Market Participants for auditing of Facility Sub-Metering;
  - the communication requirements and protocols between a relevant Market Participant and AEMO;
  - the processes to be followed by a Market Participant for providing Facility Sub-Metering information to AEMO;
- 1.1.5. Appendix A of this Procedure outlines the head of power clauses that this Procedure is made under, as well as other obligations in the WEM Rules covered by this Procedure.

### 1.2. Definitions

- 1.2.1. Terms defined in the Electricity Industry Act 2004, the WEM Regulations and the WEM Rules have the same meanings in this Procedure unless the context requires otherwise.
- 1.2.2. The following definitions apply in this Procedure unless the context requires otherwise.

**Table 1 Definitions**

Term	Meaning
Planned Facility Upgrade	Where a Market Participant is seeking a higher level of Certified Reserve Capacity than its existing Facility has demonstrated through normal market operation or a Reserve Capacity Test, due to works yet to be completed (known as an upgrade in WEMS).
Wholesale Electricity Market System or WEMS	An interface software that AEMO uses to administer and operate the Wholesale Electricity Market.
Interval Energy Data	The data that results from the measurement of the flow of electricity in a power conductor where the data is prepared and recorded by the metering installation in intervals which correspond to a Trading Interval or are submultiples of a trading interval.

### 1.3. Interpretation

- 1.3.1. The following principles of interpretation apply in this Procedure unless the context requires otherwise.
- (a) Clauses 1.3 to 1.5 of the WEM Rules apply in this Procedure.
  - (b) References to time are references to Australian Western Standard Time.
  - (c) Terms that are capitalised, but not defined in this Procedure, have the meaning given in the WEM Rules.
  - (d) A reference to the WEM Rules or WEM Procedures includes any associated forms required or contemplated by the WEM Rules or WEM Procedures.
  - (e) Words expressed in the singular include the plural and vice versa.
  - (f) A reference to a paragraph refers to a paragraph of this Procedure.
  - (g) A reference to a clause refers to a clause or section of the WEM Rules.
  - (h) References to WEM Rules in this Procedure in bold and square brackets [Clause XXX] are included for convenience only, and do not form part of this Procedure.
  - (i) Text located in boxes and headed as Explanatory Note X in this Procedure is included by way of explanation only and does not form part of this Procedure. The Procedure prevails to the extent of any inconsistency with the explanatory notes contained within it.
  - (j) The body of this Procedure prevails to the extent of any inconsistency with the figures, diagrams, appendices, schedules, annexures or attachments contained within this document.

### 1.4. Related documents

- 1.4.1. The documents in Table 2 are associated with this Procedure.

**Table 2 Related documents**

Reference	Title	Location
WEM Rules	WEM Rules	<a href="#">Economic Regulation Authority Website</a>
Metering Code	The Electricity Industry (Metering) Code 2012	<a href="#">State Law Publisher</a>
WEM Procedure	WEM Procedure: Certification of Reserve Capacity	<a href="#">WEM Website</a>
WEM Procedure	WEM Procedure: Reserve Capacity Testing	<a href="#">WEM Website</a>
WEM Procedure	Power System Operation Procedure: Commissioning Tests	<a href="#">WEM Website</a>

## 2. FACILITY SUB-METERING REQUIREMENTS

- 2.1.1. Facility Sub-Metering must be installed in a configuration sufficient, in combination with Meter Data Submissions, to calculate the contribution of each Separately Certified Component and associated Parasitic Loads to a Facility's Injection or Withdrawal.
- 2.1.2. Where Parasitic Loads for a Facility's Separately Certified Components are shared, the Market Participant must determine a methodology to associate Interval Energy Data to each Separately Certified Component.
- 2.1.3. Electrical losses associated with internal Facility reticulation and loads must be included in the methodology determined under paragraph 2.1.2, for each Separately Certified Component to the Injection or Withdrawal of the Facility.
- 2.1.4. The sum of associated Interval Energy Data for each Separately Certified Component using the methodology determined under paragraph 2.1.2 must equal the total metered energy of the Facility Meter Data Submissions.
- 2.1.5. Meters installed to meet the requirements of Facility Sub-Metering must be in accordance with the following requirements of the Metering Code:
- (a) Division 3.5 (2);
  - (b) Division 3.8;
  - (c) Division 3.9 (1),(3),(6),(7),(8),(9),(10) including Appendix 1 as applicable;
  - (d) Division 3.11A (1);
  - (e) Division 3.12; and
  - (f) Division 3.13.

- 2.1.6. For the purposes of paragraph 2.1.5, requirements of the Metering Code which are expressed to apply to a Network Operator are deemed to apply to Market Participants who are required to comply with this Procedure.
- 2.1.7. Meters installed for the purposes of Facility Sub-Metering must be capable of recording and providing five-minute bi-directional Interval Energy Data and must be configured to record and provide 30-minute Interval Energy Data.
- 2.1.8. Meters installed for the purposes of Facility Sub-Metering must have sufficient data storage capability to store Interval Energy Data for at least 35 days for each metering channel required as an input to the association methodology required under paragraph 2.1.2.
- 2.1.9. Meters must comply with the requirements of paragraph 2.1.8 when configured to record five-minute Interval Energy Data.
- 2.1.10. A Market Participant must store Facility Sub-Metering Interval Energy Data for at least seven years.

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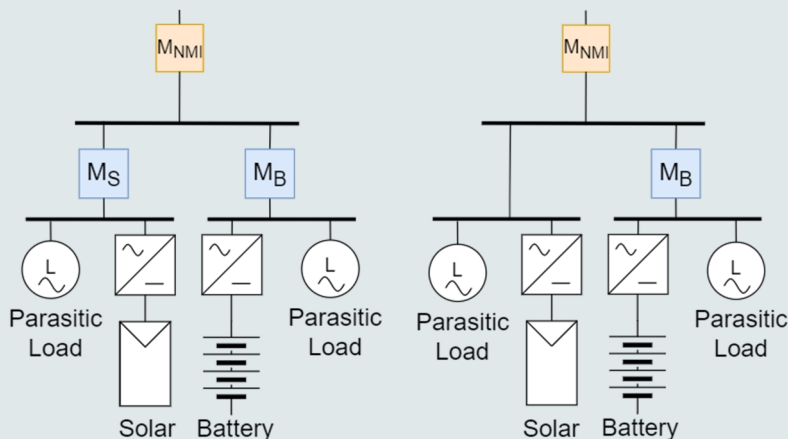
## E[A] Explanatory Note - Metering arrangements

### E[A1] Approach to capturing energy flows

A Facility Sub-Metering arrangement may achieve compliance with paragraph 2.1.1 of this Procedure using different configurations of metering. This explanatory note provides some examples of acceptable arrangements using different configurations of meters, including the use of Meter Data Submissions for the relevant Facility connection point.

Figure E[1] provides a simplified line diagram for a hybrid solar photovoltaic and battery energy storage system. The arrangement shown on the left of the figure includes metering at both Separately Certified Components ( $M_S$  and  $M_B$ ), where meter  $M_S$  captures all generation from the solar photovoltaic component of the Facility and the meter  $M_B$  captures all import and export from the battery energy storage system. The arrangement on the right of the figure uses a single meter  $M_B$  to capture import and export from the battery energy storage system, meaning the generation from the solar photovoltaic component can be calculated by subtracting the energy associated with meter  $M_B$  from the Meter Data Submission for the Facility ( $M_{NMI}$ ).

**Figure E[1] Example metering arrangements**

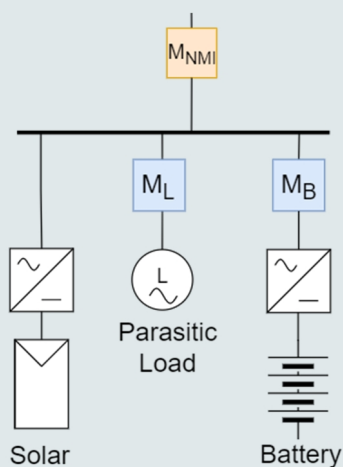


### E[A2] Approach to parasitic loads

Parasitic loads associated with each Separately Certified Component do not necessarily need to be separately metered for the purposes of Facility Sub-Metering. Options for the calculation and apportioning of auxiliary loads to meet the requirements of paragraphs 2.1.2 and 2.1.3 may include allocating the metered energy of parasitic loads in proportion to the absolute value of metered energy from each Separately Certified Component. Figure E[2] shows an example where parasitic loads for the entire Facility are metered by  $M_L$ . In this example, the parasitic loads ( $M_L$ ) may be allocated according to the absolute values of the calculated contribution of the Solar component and the Battery component (metered by  $M_B$ ).



**Figure E[2] Example metering arrangements for shared parasitic loads**



### **E[A3] Approach to internal Facility losses**

The calculation of electrical losses due to internal Facility reticulation may be calculated using several approaches depending on the Facility Sub-Metering arrangement. Where the Facility employs Facility Sub-Metering which is netted off the Meter Data Submissions for the Facility, these losses are captured in the calculated contribution for the unmetered component of the Facility (figure E[1], right). Where the Facility Sub-Metering captures the energy contribution for each Separately Certified Component of the Facility (and parasitic loads) the difference between the sum total of the Facility Sub-Metering and Meter Data Submissions should be subtracted from the Facility Sub-Metering (figure E[1], left).

## **3. THE COMMUNICATION REQUIREMENTS AND PROTOCOLS BETWEEN A MARKET PARTICIPANT AND AEMO**

- 3.1.1. Facility Sub-Metering data must be submitted in accordance with the WEM Rules to AEMO by email to [wa.capacity@aemo.com](mailto:wa.capacity@aemo.com) in .txt or .csv format.
- 3.1.2. Facility Sub-Metering data submitted under paragraph 3.1.1 must include separate Interval Energy Data for each Separately Certified Component in accordance with the methodology determined under paragraph 2.1.2.
- 3.1.3. Facility Sub-Metering data submitted by a Market Participant in accordance with paragraph 3.1.1 must include interval meter data for all Trading Intervals of each Trading Day for which data is being provided.
- 3.1.4. AEMO may only use data provided from Facility Sub-Metering for the purposes of the processes specified in clause 2.29.13 of the WEM Rules.
- 3.1.5. Where a Market Participant provides data under paragraph 3.1.1, AEMO may assess the accuracy of the submitted data by analysing other data available to it, including:
  - (a) Meter Data Submissions;

- (b) SCADA data;
  - (c) Charge Level of the Electric Storage Resource;
  - (d) weather data, including, but not limited to, ambient temperature, solar irradiance and wind speed at the Facility's location;
  - (e) AEMO estimates for sent-out energy for intermittent generating systems in accordance with clause 7.13.6 of the WEM Rules; and
  - (f) any other data AEMO reasonably expects may allow verification of Facility Sub-Metering data.
- 3.1.6. Where AEMO reasonably considers that any data assessed under paragraph 3.1.5 is or may be inaccurate, or has any other reason to consider that the Facility Sub-Metering may not be in accordance with the requirements set out in this Procedure, AEMO may request an audit of the Facility Sub-Metering in accordance with paragraph 4.4.1.

## **4. AUDITING OF FACILITY SUB-METERING**

### **4.1. Initial Audit of Facility Sub-Metering**

- 4.1.1. A Market Participant who is required to install Facility Sub-Metering in accordance with clause 2.29.12 of the WEM Rules for a Facility that is yet to enter service or a Planned Facility Upgrade must undertake an audit of its installed Facility Sub-Metering prior to the date specified in clause 4.1.26 of the WEM Rules.
- 4.1.2. A Market Participant undertaking an audit of its Facility Sub-Metering in accordance with paragraph 4.1.1 must verify that the installed Facility Sub-Metering is in accordance with the requirements specified in paragraph 2 and the communication requirements specified in paragraph 3 by submitting information required under paragraph 4.1.3 and providing a submission of Facility Sub-Metering data in accordance with paragraph 3.1.1.
- 4.1.3. An audit of a Market Participant's Facility Sub-Metering under paragraph 4.1.1 must be carried out and outlined in a report, prepared and signed by a suitably qualified independent engineer and include the following information:
- (a) the identity of the Facility;
  - (b) as constructed single line diagrams of the Facility identifying all major electrical and generation components and metering installations;
  - (c) documents detailing the specifications for all installed electricity meters, including manufacturer datasheets or documents which demonstrate compliance with the requirements of paragraphs 2.1.5, 2.1.7, 2.1.8 and 2.1.9;
  - (d) commissioning documentation for all installed metering infrastructure;
  - (e) documents describing the process of calculating the contribution of each Separately Certified Component and associated parasitic Loads to the Facility's Injection or Withdrawal using the Facility Sub-Metering data and Meter Data Submissions; and
  - (f) documents detailing the Market Participants processes for the acquisition, storage and communication to AEMO of Facility Sub-Metering data.

- 4.1.4. A Market Participant must submit the report specified under paragraph 5.1.3 to AEMO by email to [wa.capacity@aemo.com.au](mailto:wa.capacity@aemo.com.au).
- 4.1.5. Where AEMO is unable to assess whether the Market Participant for the Facility or Planned Facility Upgrade has verified its Facility Sub-Metering in accordance with paragraph 4.1.2 by reviewing the report provided under paragraph 4.1.4, AEMO may request additional information from the Market Participant, specifying a time and date for the information to be provided.
- 4.1.6. A Market Participant must provide information requested by AEMO under paragraph 4.1.5 by the time and date specified by AEMO.
- 4.1.7. AEMO must assess whether the Market Participant for the Facility or Planned Facility Upgrade has installed Facility Sub-Metering meeting that meets the requirements specified in paragraph 2 and the communication requirements specified in paragraph 3 by reviewing and confirming, the following information:
- (a) documentation provided in accordance with paragraphs 4.1.3 and 4.1.6;
  - (b) facility Sub-Metering Data submitted in accordance with paragraph 3.1.1;
  - (c) consulting with the Network Operator, if required; and
  - (d) taking any other actions it deems necessary to assess the compliance of the proposed Facility Sub-Metering.

within 10 Business Days of receiving the specified information under paragraph 4.1.3, or the additional information under paragraph 4.1.5, as applicable and notify the Market Participant of its assessment by email.

- 4.1.8. Where AEMO assesses, in accordance with paragraph 4.1.7, that a Market Participant has not verified its Facility Sub-Metering, the Market Participant may re-submit information in accordance with paragraph 4.1.2, as required.

## **4.2. Subsequent auditing of Facility Sub-Metering**

- 4.2.1. Where AEMO, requests a test or audit of a Market Participant's Facility Sub-Metering in accordance with paragraphs 3.1.6 or 4.4.5, AEMO must specify the tests or audit to be undertaken and the time and date for completion of the test or audit.

- 4.2.2. A Market Participant must undertake, using a suitably qualified independent engineer, the tests or audit specified by AEMO under paragraph 4.2.1.
- 4.2.3. The Market Participant must complete the test or audit by the time and date specified by AEMO under paragraph 4.2.1, unless the Market Participant reasonably considers that undertaking the test or audit by that time or date will endanger persons or equipment.
- 4.2.4. A Market Participant who considers that the timing of the test or audit will endanger persons or equipment must contact AEMO to arrange a suitable time for the test or audit.
- 4.2.5. A Market Participant must submit to AEMO a report, prepared and signed by a suitably qualified independent engineer, which documents the results of the test or audit undertaken in accordance with paragraph 4.2.2, within 10 Business Days of completing the test or audit.
- 4.2.6. Where AEMO is unable to determine whether the Market Participant for the Facility meets the Facility Sub-Metering requirements upon reviewing the report provided under paragraph 4.2.5, AEMO may request additional information from the Market Participant, specifying a time and date for the information to be provided.
- 4.2.7. A Market Participant must provide information requested by AEMO under paragraph 4.2.6 by the time and date specified by AEMO.
- 4.2.8. AEMO must, within 10 Business Days of receipt of a report provided in accordance with paragraph 4.2.5 or where relevant additional information provided in accordance with paragraph 4.2.7, assess whether a Market Participant's installed Facility Sub-Metering meets the requirements of this Procedure, and must notify the Market Participant of the results of its assessment including, where relevant, any items which do not meet the requirements of this Procedure.

### **4.3. Market Participant identification of outages or malfunctions**

- 4.3.1. A Market Participant who becomes aware of a malfunction of its Facility Sub-Metering, or any of its components, must advise AEMO as soon as practicable and submit a rectification plan in accordance with paragraph 4.4.1 of the Procedure.

### **4.4. Rectification of Facility Sub-Metering**

- 4.4.1. Where a Market Participant has been notified by AEMO that its Facility Sub-Metering may not meet the requirements of this Procedure in accordance with paragraph 4.2.8, or that a Market Participant notifies AEMO of a malfunction under paragraph 4.3.1, it must submit to AEMO a rectification plan within 10 Business Days of its notification or upon being notified by AEMO under paragraph 4.2.8.
- 4.4.2. A rectification plan must include:
- (a) details of the rectification work to be undertaken in order for the Facility Sub-Metering to meet the requirements of this Procedure; and

- (b) the date and time by which the Facility Sub-Metering will be rectified, which must be less than 40 Business Days, unless otherwise agreed with AEMO in writing.
- 4.4.3. A Market Participant must undertake rectification works, in accordance with the rectification plan submitted to AEMO.
- 4.4.4. A Market Participant must, within one Business Day following completion of rectification works undertaken in accordance with paragraph 4.4.3, notify AEMO of the completion of works.
- 4.4.5. Where AEMO receives a notification under paragraph 4.4.4, AEMO may request a test or audit in accordance with paragraph 4.2.1 to verify the Facility Sub-Metering is in accordance with this Procedure.

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## APPENDIX A. RELEVANT CLAUSES OF THE WEM RULES

Table 3 details:

- (a) the head of power clauses in the WEM Rules under which the Procedure has been developed; and
- (b) each clause in the WEM Rules requiring an obligation, process or requirement be documented in a WEM Procedure, where the obligation, process or requirement has been documented in this Procedure.

**Table 3 Relevant clauses of the WEM Rules**

Clause
2.29.12.
2.29.13.
2.29.14.
2.29.15.(a)
2.29.15.(b)
2.29.15.(c)
2.29.15.(d)
4.9.3
4.13.10B
4.25
Appendix 9