



Metrology Procedure

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Full Name	Job Title	Date
Prepared By: Tim Forsyth	Technology & System Lead	[insert]
Reviewed By: Dean Tanner	Network Operations Manager	[insert]
Approved By: Jason Good	General Manager – CE	[insert]

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1. GENERAL

1.1 SCOPE

This Metrology Procedure: comes into effect on the day that the Authority publishes its approval under the Metering Code; applies to Code Participants and ORRE; and covers the full extent of a Metering Installation.

1.2 PURPOSE

This Metrology Procedure is made under Part 6 of the Metering Code. The purpose of this Metrology Procedure is to provide guidance in relation to: the installation of Metering Installations on the Network; the measurement of electricity consumed or transported at a point on the Network; the collection and communication of Energy Data.

1.3 DEFINITIONS

Term	Description
Ocean Reef Renewable Energy	Ocean Reef Renewable Energy Pty Ltd is a subsidiary of Zenith Energy Operations Pty Ltd.
Access Contract	means the Microgrid Electricity Transfer Access Contract published by ORRE on its website from time to time.
Act	means the <i>Electricity Industry Act 2004</i> (WA).
Actual Value	has the meaning given to it in the Metering Code.
AEMO	means the Australian Energy Market Operator Limited.
AS	followed by a designation, means a standard so designated published by Standards Australia Limited.
Authority	means the Economic Regulation Authority established under the <i>Economic Regulation Authority Act 2003</i> (WA).
Business Day	means a day that is not Saturday, Sunday or a public holiday in Perth, Western Australia.
Code Participant	has the meaning given to it in the Metering Code.
Connection Point	has the meaning given to it in the Metering Code and applies in respect of the Distribution System.
CT	has the meaning given to it in the Metering Code.
Current	in connection with the flow of electricity, means the flow of electricity in a conductor.
Customer	has the meaning given to it in section 3 of the Act.
Distribution Licence	means the licence DL9 issued to ORRE by the ERA.
Distribution System	has the meaning given to it in the Act and applies to the electricity infrastructure owned and operated by ORRE pursuant to the Distribution Licence at Ocean Reef Marina.
End User	means the person supplied with electricity for the purposes of consumption at a Connection Point.
Energy Data	has the meaning given to it in the Metering Code.
Energy Data Verification Request Form	has the meaning giving to it in clause 5.20(1) of the Metering Code.

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Term	Description
Estimate or Estimation	has the meaning given to it in the Metering Code.
Good Electricity Industry Practice	means the exercise of that degree of skill, diligence, prudence and foresight that a skilled and experienced person would reasonably and ordinarily exercise under comparable conditions and circumstances consistent with applicable written laws and statutory instruments and applicable recognised codes, standards and guidelines.
Instrument Transformer	means a CT or a VT.
Meter	means a device which measures and records electricity production and consumption.
Meter Reading	means the collection of an Actual Value from a Meter.
Metering Code	means the <i>Electricity Industry (Metering) Code 2012</i> (WA).
Metering Installation	has the meaning given to it in the Metering Code.
Metering Installation Measurement Elements	means AS 62052.11, AS 62053.21 and AS 62053.22 as applicable.
Metering Point	has the meaning given to it in the Metering Code.
Metrology Procedure	means this document.
National Electricity Law	means the instrument of that name scheduled to the <i>National Electricity (South Australia) Act 1996</i> (SA).
National Electricity Rules	means the rules made under the National Electricity Law.
National Measurement Act	means the <i>National Measurement Act 1960</i> (Cth) and any regulations made under that Act.
Network	means the Distribution System operated by ORRE at Ocean Reef Marina, Western Australia and that is not part of the electricity network owned and operated by Western Power.
ORRE	means Ocean Reef Renewable Energy Pty Ltd.
Registry	means the part of the metering database which contains Standing Data in accordance with the Metering Code.
Service Level Agreement	means a written agreement that sets out the terms and conditions under which ORRE must provide Metering Services to a User, whether or not that agreement also contains other provisions governing the parties' rights, liabilities and obligations.
Scheduled Meter Reading	means the date on which a Meter is scheduled to be read in accordance with this Metrology Procedure.
Standing Data	has the meaning given to it in the Metering Code and comprises the items specified in Table 2 of clause 4.3(1) of the Metering Code.
Substitute	has the meaning given to it in the Metering Code and Substitution has a corresponding meaning.
Supply	means the delivery of electricity.
Trading Interval	means a "30-minute metering interval" as that term is defined in the Metering Code.
User	in respect of a Connection Point, means a person who has an Access Contract in respect of the Connection Point.
Validation	has the meaning given to it in the Metering Code.
Verification	has the meaning given to it in the Metering Code.

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Term	Description
VT	has the meaning given to it in the Metering Code.

2. PROVISION OF METERING INSTALLATIONS

2.1 *INSTALLATION OF METERS*

ORRE will design and install Metering Installations in accordance with:

- the Metering Code;
- Good Electricity Industry Practice;
- the terms of a Service Level Agreement; and
- this Metrology Procedure.

ORRE anticipates that it will only be required to design and install Type 4 Metering Installations that comply with the requirements of the Metering Code, given the characteristics of the Network, unless otherwise agreed pursuant to a Service Level Agreement or as otherwise required by the Table 3A of Appendix 1 of the Metering Code.

2.2 *REQUIREMENTS UNDER NATIONAL MEASUREMENT ACT AND USE OF STANDARDS*

Meters used in Metering Installations will comply with all applicable specifications or guidelines specified by the National Measurement Institute under the National Measurement Act and must also meet all requirements of Australian Standards and International Standards, including Metering Installation Measurement Elements AS 62052.11, AS 62053.21 and AS 62053.22.

CTs for Metering Installations must comply the requirements of AS 60044.1, AS 60044.3 (combined transformers) and must also comply with any applicable specifications or guidelines specified by the National Measurement Institute under the National Measurement Act.

VTs for Metering Installations must meet the requirements of 60044.2 (Inductive VT), AS 60044.3 (combined transformers), AS 60044.5 (Capacitor VT) and AS 1243 (three-phase VT) and must also comply with any applicable specifications or guidelines (including transitional arrangements) specified by the National Measurement Institute under the National Measurement Act.

CTs and VTs will comply with the current Australian Standards or International Standards described above that applied as at the date of installation.

Meters used at a Connection Point will have a valid pattern approval issued under the authority of the National Measurement Institute or, until relevant pattern approvals exist, a valid type test certificate issued by a National Association of Testing Authorities (NATA) accredited laboratory or a body recognised by NATA under the International Laboratory Accreditation Cooperation (ILAC) mutual recognition scheme.

A visible display will be provided to display, at a minimum, the cumulative total energy for each register measured by that Metering Installation.

Any programmable settings available within the Metering Installation, or any peripheral device that will affect the resolution of displayed or stored data, must meet the relevant requirements of AS

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62052.11, AS 62053.21 and AS 62053.22 and must comply with any applicable specifications or guidelines specified by the National Measurement Institute under the National Measurement Act.

2.3 ENERGY DATA

Interval periods in respect of Energy Data will be based on Trading Intervals or parts of a Trading Interval:

- the end of each interval for a 15-minute interval period must be on the hour, on the half-hour and on each quarter of an hour (AWST time); and
- the end of each interval for a 30-minute interval period must be on the hour and on the half-hour (AWST time), in accordance with the Metering Code.

2.4 ALARM SETTINGS

Where a Meter supports alarm functionality, ORRE will enable the following alarms:

- power failure / Meter loss of Supply for instrument transformer connected Metering Installations only;
- VT or phase failure;
- cyclic redundancy check error; and
- time tolerance.

3. MINIMUM SERVICES

3.1 ROUTINE TESTING AND MINIMUM SERVICE LEVELS

ORRE will ensure that the Meters on its Network are systematically sampled and tested for accuracy in accordance with AS 1284.13.

Metering Installations must be tested and inspected in accordance with clause 7.9 and Schedule 7.6 of the National Electricity Rules.

4. ENERGY DATA

4.1 METER READING

ORRE will:

- read at least 95% of commissioned Meters every morning by 9am AWST time;
- transfer Energy Data to the metering database no later than two Business Days after the date for a Scheduled Meter Reading or at such other time as specified in the applicable *service level agreement*;
- by the fifth Business Day in each month, deliver Validated meter reading data for each day in the prior month for 98% of commissioned meters, or where necessary, up to 2% of Substituted, or Estimated data.

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4.2 *STANDING DATA*

ORRE will store Standing Data in respect of a Metering Installation in accordance with clause 4.3 of the Metering Code.

Where ORRE receives a request to provide Standing Data to a Customer, ORRE will provide such data in accordance with clauses 5.17 and 5.17A of the Metering Code.

4.3 *ENERGY DATA STORAGE*

Energy Data will be stored in the Metering Database, in accordance with the Metering Code.

Any discrepancies between the Energy Data held in a Metering Installation and the Energy Data held in the Registry will be resolved in accordance with clauses 4.4 and 4.5 of the Metering Code.

4.4 *GENERAL VALIDATION, SUBSTITUTION AND ESTIMATION REQUIREMENTS*

ORRE will Validate, Substitute and Estimate in respect of Energy Data in accordance with the Metering Code.

4.4.1 **ORRE will undertake Substitution in the following circumstances:**

- Where ORRE becomes aware of a failure of the Meter that affects the quality of the Energy Data.
- If better Actual Value is unexpectedly recovered from the Metering Installation and a final Substitution has been undertaken in accordance with the circumstance outlined above, ORRE must replace the final Substituted Energy Data with the Actual Values and maintain a record of the reason.
- ORRE must undertake final Substitutions following a Meter replacement.
- If a User notifies ORRE that the Energy Data is erroneous and that a final Substitution is required.
- ORRE may replace existing final Substituted Energy Data with new final Substituted Energy Data in accordance with this Procedure.
- Where ORRE has found Actual Values to be erroneous.
- To the extent ORRE is otherwise permitted to undertake substitution under the Metering Code.

Substitution and Estimation types will be undertaken in accordance with Appendix 3 of the Metering Code.

4.4.2 **Summary Table of Substitution and Estimation Types**

Type	EST or SUB	Short Descriptor
Type 12	SUB	Calculated
Type 14	SUB	Like Day
Type 15	SUB	Ave Like Day
Type 16	SUB	Agreed

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Type 17	SUB	Linear
Type 18	SUB	Alternative
Type 51	SUB or EST	Previous Year
Type 52	SUB or EST	Previous Read
Type 53	SUB	Revision
Type 54	SUB	Linear
Type 55	SUB	Agreed
Type 56	SUB or EST	Prior to First Read - Agreed

4.5 ENERGY DATA VERIFICATION REQUESTS

Where a Code Participant requests Verification of Energy Data under clause 5.20(3) of the Metering Code using an Energy Data Verification Request Form, ORRE must use all reasonable endeavours to verify the Energy Data, and inform the requesting Code Participant of the result of the Verification and provide the verified Energy Data to that Code Participant:

- as soon as possible after completing the Verification; and
- in accordance with clause 5.20(4)(b) of the Metering Code, no later than five Business Days after receiving the Energy Data Verification Request Form, or in accordance with the applicable Service Level Agreement.

4.6 METERING OF BI-DIRECTIONAL ELECTRICITY FLOWS

Eve's Meters (both single phase and three phase) will be capable of measuring bi-directional electricity flows in accordance with Good Electricity Industry Practice.

5. TEST AND AUDIT REQUESTS

Where a Code Participant reasonably requests a test or audit of:

- the accuracy of a Metering Installation; and
- the Energy Data from the Metering Installation; and
- the Standing Data for the Metering Installation,

ORRE will conduct a test or audit of the items under the request in accordance with this Metrology Procedure and any applicable Service Level Agreement.

Where the request is to assess the accuracy of the Metering Installation, the Metering Installation will be tested in accordance with clause 5.21 of the Metering Code to ensure compliancy with the applicable accuracy requirements.

If a test or audit shows that the accuracy of the Metering Installation or information from a Meter associated with the Metering Installation does not comply with the requirements under the Metering Code, ORRE must:

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- advise the affected parties as soon as practicable of the errors detected and possible duration of the existence of the errors; and
- restore the accuracy of the Metering Installation in accordance with the applicable Service Level Agreement; and
- (acting in accordance with Good Electricity Industry Practice) make corrections to Energy Data, up to a maximum of 12 months before the test of audit, to take account of errors referred to in clauses 6.3.1 and 6.3.2 and to minimise adjustments to the final settlement account.

The original stored error correction data in a meter must not be altered except during accuracy testing and calibration of a Metering Installation.

A Code Participant must not make a request under clause 5.21(1) of the Metering Code that is inconsistent with any Service Level Agreement.

6. CHARGES

ORRE may only impose a charge for the testing of the Metering Installation, or auditing of information from the meters associated with the Metering Installation, or both, in accordance with the applicable Service Level Agreement between it and the User.

7. DATA SUBSTITUTION

7.1 SUBSTITUTION RULES

ORRE will apply the following rules when performing a Substitution:

- ORRE will obtain clear and concise identification as to the cause of any missing or erroneous metering data for which Substitutions are required.
- For Connection Points where embedded generation is installed ORRE may:
 - directly undertake type 12 Substitutions if metering data has failed Validation.
 - undertake type 16 or 18 Substitutions following consultation and agreement with the affected User that the Substituted metering data is an accurate reflection of the Energy Data concerned.

If Energy Data cannot be collected from a Metering Installation or Substituted within the required timeframes, ORRE may undertake type 19 Substitutions as an interim until Energy Data can be collected from the Metering Installation or Substituted.

ORRE may only undertake Substitution types 14, 15, 16, 17 or 18 where Substitution type 12 is not applicable or cannot be carried out.

ORRE may perform all Substitution types except type 16 or 18 without the agreement of the affected User. ORRE may change the quality flag to an existing type 16 or 18 Substitution without seeking further agreement from the affected User.

ORRE must notify the affected User within two business days of the Substitution being carried out. Notification is to be achieved via the applicable Energy Data file.

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ORRE must ensure that all Substituted Energy Data is replaced with Actual Values when it becomes available.

7.2 SUBSTITUTION TYPES

Type 12 - Calculated

To perform a type 12 Substitution, ORRE must calculate the Energy Data to be Substituted where they relate to a single unknown feed to a node based on the other known energy flows to or from that node.

Type 14 - Like Day

To perform a type 14 Substitution, ORRE must Substitute missing or erroneous Energy Data using the nearest equivalent day or like day method, as detailed in Table 1.

TABLE 1

TYPE 14	
Substitution Day	Nearest Equivalent Day or Like Day (in order of availability)
Monday	Monday ##
Tuesday	Tuesday## Wednesday## Thursday## Wednesday# Thursday#
Wednesday	Wednesday## Tuesday# Thursday## Thursday# Tuesday##
Thursday	Thursday## Wednesday# Tuesday# Wednesday## Tuesday##
Friday	Friday##
Saturday	Saturday##
Sunday	Sunday##
Substitutions for like day to be as detailed above, unless:	
(a)	No Energy Data is available on the first listed day, the next listed preferred day is to be used. If there is no other suitable listed day, or no Energy Data is available on any of the listed days type 15 Substitution must be used.
(b)	The Substitution day was a public holiday, in which case the most recent Sunday is to be used.
(c)	The Substitution day was not a public holiday and the listed day is a public holiday, then the next listed preferred day that is not a public holiday is to be used.
#	Occurring in the same week as the Substitution day.
##	Occurring in the week preceding that in which the Substitution day occurs

Type 15 - Average Like Day

To perform a type 15 Substitution, ORRE may Substitute the missing or erroneous Energy Data with the average like day method, as detailed in Table 2.

Table 2

TYPE 15

The Energy Data to be Substituted will be calculated using an average of the Energy Data from each corresponding interval from the preceding four weeks, or any part of those. This averaging technique may be applied in either of the following ways:

- (a) Where the averaged Energy Data is used to provide the value for the Energy Data requiring Substitution.
- (b) Where the averaged Energy Data is used to provide the profile and is scaled to a pre-determined consumption value for the Energy Data to be Substituted

However, if *data* is required to be *substituted* for a public holiday then the most recent available Sunday will be used.

Type 16 - Agreed Method

Where ORRE is required to undertake Substitution for any period greater than 15 days, ORRE must consult and use reasonable endeavours to reach an agreement with the applicable User. This may include changes to existing Substitutions for any period where those affected parties have directed that, as a result of information from or about the applicable site or End User, the original Substitutions are in error and a correction is required.

Type 17 - Linear Interpolation

To perform a type 17 Substitution, ORRE may Substitute Energy Data for consecutive intervals up to, but not exceeding two hours, by using simple linear interpolation.

Type 18 - Alternative

To perform a type 18 Substitution, ORRE may use an alternative method of Substitution subject to agreement with the relevant User. The specifics of this Substitution type may involve a globally applied method or a method where an adjusted profile is used to take into account local conditions that affect consumption (e.g. local holiday or End User shutdown), or where alternative Energy Data may be available for quality checks and minor adjustments of an Estimated profile, such as using data from the Registry.

8. GENERAL DATA VALIDATION REQUIREMENTS

Validation requirements for all Meters

ORRE will manage systems and processes in accordance with Appendix 2 of the Metering Code.

9. VALIDATION AS PART OF THE REGISTRATION PROCESS

Validation of Metering Installations with Remote Acquisition of Energy Data

ORRE will carry out the following Validations after any installation or change to a Metering Installation prior to the distribution of any Energy Data:

- for instrument transformer connected Metering Installations, the Metering Installation is recording Energy Data correctly.
- for whole current Metering Installations, the Energy Data correctly pertains to the Metering Installation.

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