

# Appendix 14.1: Type 5 & 6 Meter Asset Management Plan

Regulatory proposal for the ACT electricity distribution network 2019-24  
January 2018

Disclaimer: On 1 January 2018, the part of ActewAGL that looks after the electricity network changed its name to Evoenergy. This change has been brought about from a decision by the Australian Energy Regulator. Unless otherwise stated, ActewAGL Distribution branded documents provided with this regulatory proposal are Evoenergy documents.

# Type 5 & 6 Meter Asset Management Plan

Version 4.2 | Effective Date: 18/01/18

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# 1. EXECUTIVE SUMMARY

The Meter Asset Management Plan (MAMP) is required to comply with the National Electricity Rules and related Procedures under the Rules; and the ACT Electricity Metering Code.

The MAMP covers all Type 5 and 6 metering installations that are the responsibility of Evoenergy as the Local Network Service Provider. This includes both 1<sup>st</sup> and 2<sup>nd</sup> tier Connection Points.

Evoenergy has approximately 207,316 meters at Type 5 and 6 connection points. Based on the National Electricity Rules (NER), this MAMP covers the:

- **Test Plan for Meters and Low Voltage Current Transformers (LV CTs)**
- **Meter Replacement Program**
- **Inspection of Metering Installations**

The current review reflects the organisational structure changes, addresses testing of LV CT's on a sampling basis and also the updating the meter replacement strategy for Type 5 and 6 meters.

Appropriate resources and funding budgets are validated, and approved annually to operate the plan.

## 2. PREFACE & SCOPE

### 2.1. Preface

The MAMP has been prepared to meet AEMO's requirements for Evoenergy to operate as an accredited Type 5B and Type 6B metering provider. The document has been written in accordance with AEMO's guidelines on Metering Asset Management Plan (MAMP) to cover testing, inspection and replacement programs of metering assets installed on Evoenergy's network.

Following the Independent Competition and Regulatory Commission's Final Decision, Review of Metrology Procedures in December 2005, Evoenergy commenced the installation of Type 5 (interval) meters in March 2007. The Final Decision required Evoenergy to install interval meters on a new, replacement and customer requested basis.

This document signed by the General Manager Energy Networks, is the two (2) yearly review and update to changes in roles and responsibilities due to organisational restructure as of July 2017. Metering information is also updated to reflect current meter numbers and progression of testing regime.

On the 1<sup>st</sup> of December 2017, the Power of Choice legislation came into effect. From this time, responsibility for metering has passed to electricity retailers. This MAMP addresses this change and highlights areas that will be directly affected by the change of responsibility.

This MAMP is prepared for use by Evoenergy. The expenditure necessary for the implementation of the plan is included in the approved annual budgets of Evoenergy.

### 2.2. Scope

As defined in the Rules Chapter 7 and the National Metrology Procedure Part A, the Meter Asset Management Plan applies to the types of Metering Installations associated with Evoenergy Distribution network Tier 1 and Tier 2 connection points:

- **Type 5 Metering Installations: Meters and LV Current Transformers (where applicable)**
- **Type 6 Metering Installations: Meters and LV Current Transformers (where applicable)**

Evoenergy, as the Local Network Service Provider (LNSP) is the Rules delegated Responsible Person (RP) for Type 5 and Type 6 Metering Installations for both Tier 1 and Tier 2 connection points.

This document also outlines testing and inspection methodology to enable Evoenergy achieving and maintaining AEMO accreditation to be a Metering Provider in the National Electricity Market for Type 5B and Type 6B metering installations.

### 2.3. Definitions/Acronyms

TERM	DEFINITION
ACT	Australian Capital Territory
Evoenergy	Evoenergy Networks
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator (renamed from NEMMCO)
AER	Australian Energy Regulator
ANMI	Australian National Measurement Institute
AS	Australian Standard
COAG	Council of Australian Governments
CT	Current Transformer
CTTWG	Current Transformer Testing Working Group
ICRC	Independent Competition and Regulatory Commission
LNSP	Local Network Service Provider
LV CT	Low Voltage Current Transformer
MAMP	Meter Asset Management Plan
MCE	Ministerial Council on Energy
MRIM	Manually Read Interval Meter
NATA	National Association of Testing Authorities
NEM	National Electricity Market
NEMMCO	National Electricity Market Management Company Limited
NER	National Electricity Rules
NMI	National Market Identifier
Tier 1	If any electricity supplied through the national grid is purchased by a person at a connection point directly and in its entirety from the Local Retailer, the load at that connection point may be classified by that person as a first-tier load.

Tier 2	If any electricity supplied through the national grid is purchased by a person at a connection point other than directly from the Local Retailer or the spot market all electricity purchased by that person at that connection point may be classified by that person as a second-tier load.
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## 2.4. References

### 2.4.1. Australian Standards

DOCUMENT NUMBER	TITLE
AS 1199	Sampling procedures for inspection by attributes
AS 1284.1	General Purpose induction watt-hour meter
AS/NZS 1284.13	Electricity metering: In-service compliance testing
AS/NZS 3000	Electrical Installations (Australia/New Zealand Wiring Rules)
AS 62052.11	Electricity Metering Equipment (AC) – General Requirements, tests and test conditions
AS 62053.11	Electricity Metering Equipment (AC) – Particular Requirements- Electromechanical Meters for active energy (Classes 0.5, 1 and 2)
AS 62053.21	Electricity Metering Equipment (AC) – Particular Requirements - Static meters for active energy (Classes 1 and 2)
AS 62053.22	Electricity Metering Equipment (AC) – Particular Requirements - Static meters for active energy (Classes 0.2S and 0.5S)
AS 1675	Current Transformers – Measurement and Protection
AS60044.1	Instrument Transformers Part 1: Current Transformer
AS 1199	Sampling procedures for inspection by attributes
AS 1284.1	General Purpose induction watt-hour meter
AS/NZS 1284.13	Electricity metering: In-service compliance testing
AS/NZS 3000	Electrical Installations (Australia/New Zealand Wiring Rules)
AS 62052.11	Electricity Metering Equipment (AC) – General Requirements, tests and test conditions
AS 62053.11	Electricity Metering Equipment (AC) – Particular Requirements- Electromechanical Meters for active energy (Classes 0.5, 1 and 2)



AS 1675	Current Transformers – Measurement and Protection
AS60044.1	Instrument Transformers Part 1: Current Transformer

#### 2.4.2. Acts, Codes and Rules

DOCUMENT NUMBER	TITLE
NER	National Electricity Rules, Chapter 7 – Metering
AEMO NEM v5.30	National Electricity Market - Metrology Procedure; Part A and Part B
Utilities (Electricity Metering Code) Determination 2015	ACT Electricity Metering Code 2015
AEMO No. ME_MP1943 V0005	Metering Asset Management Plan (MAMP) Information Paper
NER	National Electricity Rules, Chapter 7 – Metering
AEMO NEM v5.30	National Electricity Market - Metrology Procedure; Part A and Part B
Utilities (Electricity Metering Code) Determination 2015	ACT Electricity Metering Code 2015
AEMO No. ME_MP1943 V0005	Metering Asset Management Plan (MAMP) Information Paper

#### 2.4.3. Evoenergy Documents

DOCUMENT NUMBER	TITLE
SM11144	Evoenergy Service and Installation Rules
SM1123	Evoenergy Metering Type 5 and 6 Manual Version 1
SM1192	Asset Management Strategy
PR1175	CT Testing for CT Meter Installation
WF1157	CT Testing for CT Meter Installation
PR1141	In-service Meter Compliance Testing and Bulk Replacement
PR1141.4	CT Meter Visual Inspection Results

## 3. MAMP OVERVIEW

### 3.1. Summary of Meter Installations

As of 30 November 2017, Evoenergy has an active meter population of approximately 207,316 of types 5 and 6. Of these, there are 1,558 Low Voltage Current Transformer (LV CT) connected metering installations.

A summary of the installed population of meters and LV CT's as of 30 November 2017 is provided in the Table 1.

Evoenergy will not be installing new or replacement meters following the Power of Choice commencement date of 1 December 2017, and the transition period ending on 30 March 2018. New and replacement meters will be type 4 and the responsibility of retailers.

The installed base of types 5 and 6 meters will decrease from current levels over time.

**Table 1.** Summary of Metering Assets

YEAR	TYPE 5	TYPE 6	TOTAL METERS	% TYPE 5	LV CT'S
2015/16	69,220	133,678	202,898	34.1%	1,477
Installed Base 2017	89,043	116,715	205,758	43.2%	1,558

### 3.2. Summary of Meter Types

The range of meter types installed is presented in Table 2. More detailed lists of the number of meters by make, model and rating are also available, but not included in this MAMP.

**Table 2.** Summary of Meter Types

YEAR	single phase meter	poly phase meter	sub total
AMPY	731	7,471	10,509
EDMI	24	975	999
ELSTER	0	1	1
EMAIL	57,881	29,732	89,013
FERANTI	0	90	90
L+G	2,865	962	3,827
NILSEN	19,647	0	16,601

SECURE	68,242	9,063	79,305
WARBURTON FRANKI	0	7,532	7,532
OTHER SMALL FAMILIES	542	0	542
<b>GRANDTOTAL</b>	<b>149,932</b>	<b>55,826</b>	<b>205,758</b>

### 3.3. Summary of Low Voltage Current Transformers

A summary of the number of low voltage current transformers installed for metering installations by current transformer type is presented in Table 3.

**Table 3.** Summary of Low Voltage Current Transformers

CT TYPE	A	B	C	S	T	W	TOTALS
Ratio	150/5 300/5 600/5	400/5 800/5 1200/5	1000/5 2000/5 3000/5	200/5	800/5	1500/5	
Total LV CT's	352	314	25	797	31	39	1,558

### 3.4. Population Forecast

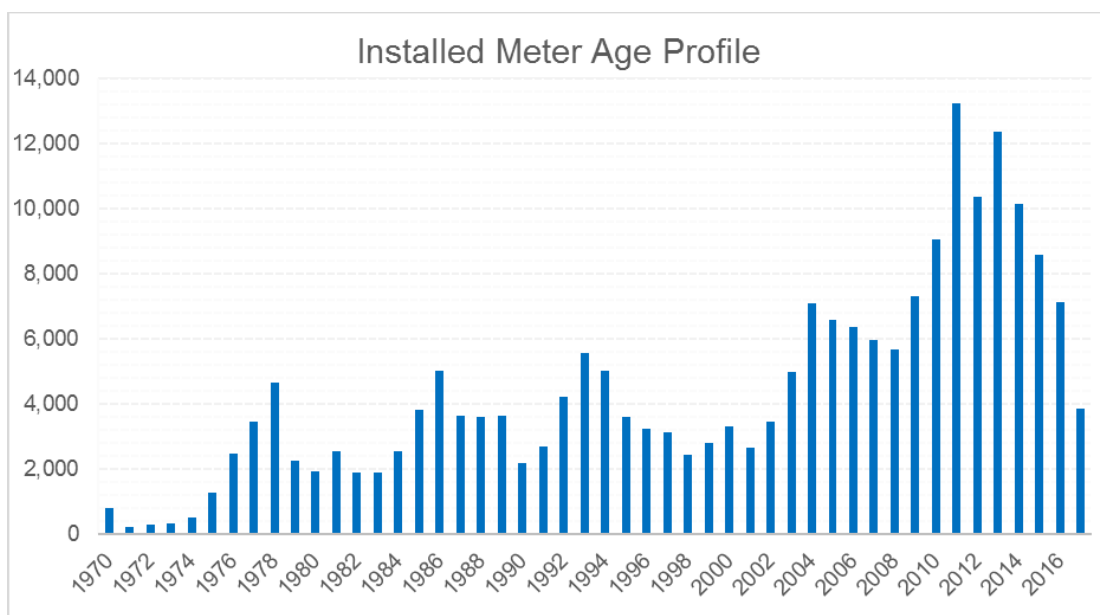
Following the commencement of Power of Choice legislation on the 1 of December 2017, all new meter installations will be the responsibility of the retailers. Evoenergy ceased accepting new metering requests on 1 December 2017 and will complete all requests by the completion of the transition period ending on 30 March 2018.

Evoenergy expects a reduction in the meter asset base from this time onwards.

#### 3.4.1. New Installations

Between 2014 and 2015, meter installations increased by 3.3%. Since 2015, the number of type 5 and 6 meter installations has increased by 6,190, corresponding to an increase of 1.5% per year. As shown in Figure 1, there has been a sharp drop in yearly installations since 2012.

It is expected that the rate will continue over the next ten years with the implementation of Power of Choice in December 2017.



**Figure 1.** Installed Meter Age Profile

### 3.4.2. Solar Metering Demand

Between 2014 and 2017, there has been an average of 1,092 small scale solar PV installations per year in the ACT. This is expected to continue for the next two years, which will require the retailer to replace over 2000 meters by 2019.

### 3.4.3. Metering Asset Forecast

It is expected that the type 5 and 6 metering asset base will decline following the implementation of Power of Choice in December 2017. The decline of metering assets will result from the following factors:

- Replacement of meters that fail in service.
- Replacement of meter families that fail meter testing.
- Replacement of meters at customer small scale solar PV installations.
- Other meter removal and replacement performed by the retailer and customer.

All new meters installed including replacements will be the responsibility of the energy retailer and will be removed for the Evoenergy metering asset base. The forecast decrease in the asset base is shown below in Table 4.

**Table 4.** Metering Asset Base Decline Forecast

2016/17	2017/18	2018/19	2019/20
207,316	205,715	203,215	200,715

## 4. METER RETIREMENT

### 4.1. Ageing Meters and Small Meter Families

There are currently 19,179 active meters over 40 years old in the ACT, which will be replaced with Type 4 interval meters at the retailer's discretion or in the event of a meter failure.

These meters are divided into 13 models, shown below in table 4. These models are further divided into 86 families. Additionally, Evoenergy plans to retire several small meter families of any age, due to the high relative cost of testing meter families with small population sizes.

**Table 5.** Meter Models Installed between 1970 and 1977

Meter Model	Number of Installations
BAZ	344
M1	2,022
M2	3,822
SD	1,057
SDM	4,277
SDM-6DIGIT	141
SDML	2
SDP	305
TM2C	88
WF2	263
WF3S	4,013
WF3T	2,741
YL5	401
<b>TOTAL</b>	<b>19,179</b>

Evoenergy metering staff to of all direct meters. Energy Networks delivery branch qualified Technicians testing and meters. Under operating Evoenergy has testing 1,500 field each year.

Evoenergy previously connected (Type 5) that are purpose of being accumulation

Evoenergy's responsibility

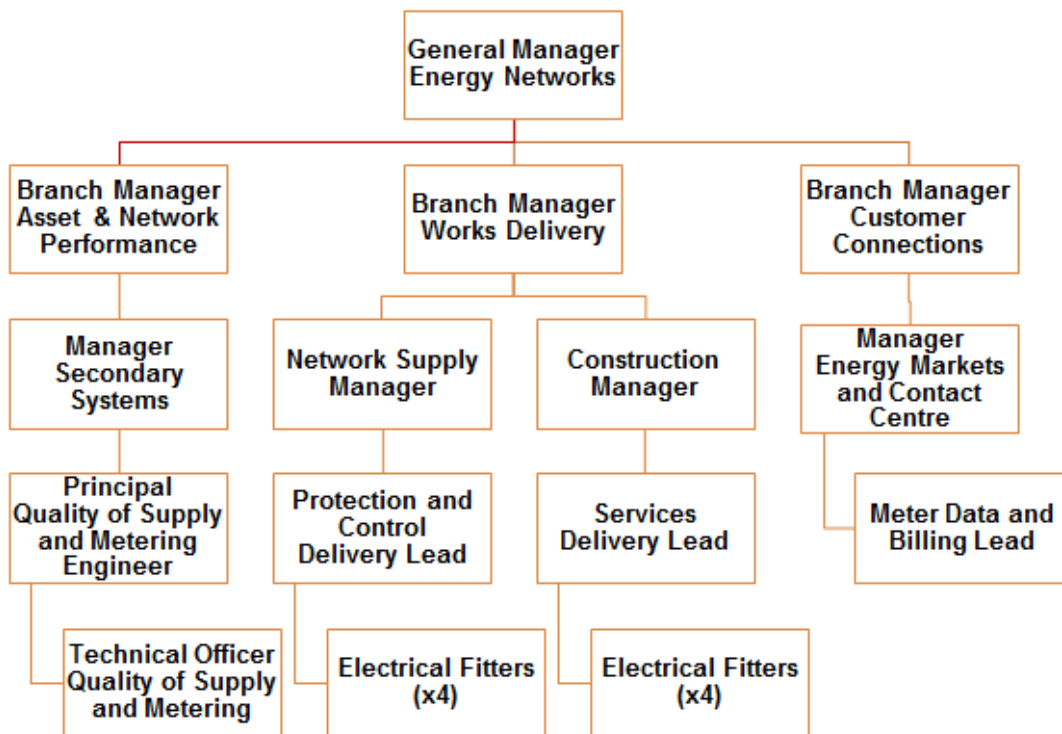
outlined below in figure 2. The Principal Quality of Supply and Metering Engineer, and the Technical Officer (Quality of Supply and Metering) oversee the management of all meter family tracking and services.

### 4.2. Ageing Meters and Small Meter Families

utilises its own carry out testing connected type 6 Evoenergy, division, works has 8 suitably Electrical capable of replacement of usual business conditions the capability of meters in the

technicians installed all direct interval meters intended for the read as type 6 time of use.

metering structure is



**Figure 2.** Evoenergy Organisational Chart – Metering Responsibilities

### 4.3. Financial and Company Policy

Evoenergy Energy Networks maintains Capex and Opex budget allocations for the implementation of the MAMP that includes the Program of Works (PoW) for testing, replacement and inspection of metering installations.

Program and project approvals are approved annually through by the General Manager Energy Networks.

#### **4.4. Review Period**

The MAMP is to be reviewed and updated at least every two (2) years or as required to ensure that it is up-to-date with the market requirements.

If the review identifies that the maintenance strategy needs to be amended, the MAMP will be resubmitted to AEMO for approval. The current review reflects the Power of Choice implementation, organisational structure changes and the review of the meter replacement strategy.

# 5. TESTING AND REPLACEMENT STRATEGY

## 5.1. Testing Process and Capability

The purpose of the Meter Test Plan is to test the metrological functions and determine the measurement accuracy performance of meters and instrument transformers.

In-service compliance testing is used to determine whether a population of electricity meters, installed in service for a number of years, is continuing to operate in accordance with the design specifications and requirements of regulatory authorities.

All Evoenergy meter (Type 5 and 6) and current transformer tests are carried out in situ; which requires the disconnection of the load and electricity supply to the customer for a short time: up to 30 minutes for three phase meters and less time for single phase meters.

Evoenergy has sufficient staff resources to support a type 6 meter test program of 1,000 meters per annum. Evoenergy carries out in-service testing to AS/NZ 1284.13 – Electricity Metering – In-service compliance testing.

While it's not preferred, meters can also be removed from service and sent to the manufacturer for testing if the portable testing equipment is unavailable.

The test methodology used by Evoenergy is detailed in the document SM1123; Evoenergy Metering Type 5 and Type 6 Manual. Evoenergy follows AS/NZ 1284.13. This standard describes two approaches: testing by variables and testing by attributes.

Testing is initially carried out by the variables method, and the results checked for normality using Minitab software. If the normality criterion is met then the results will stand. If not, then further tests are carried out by the attributes method.

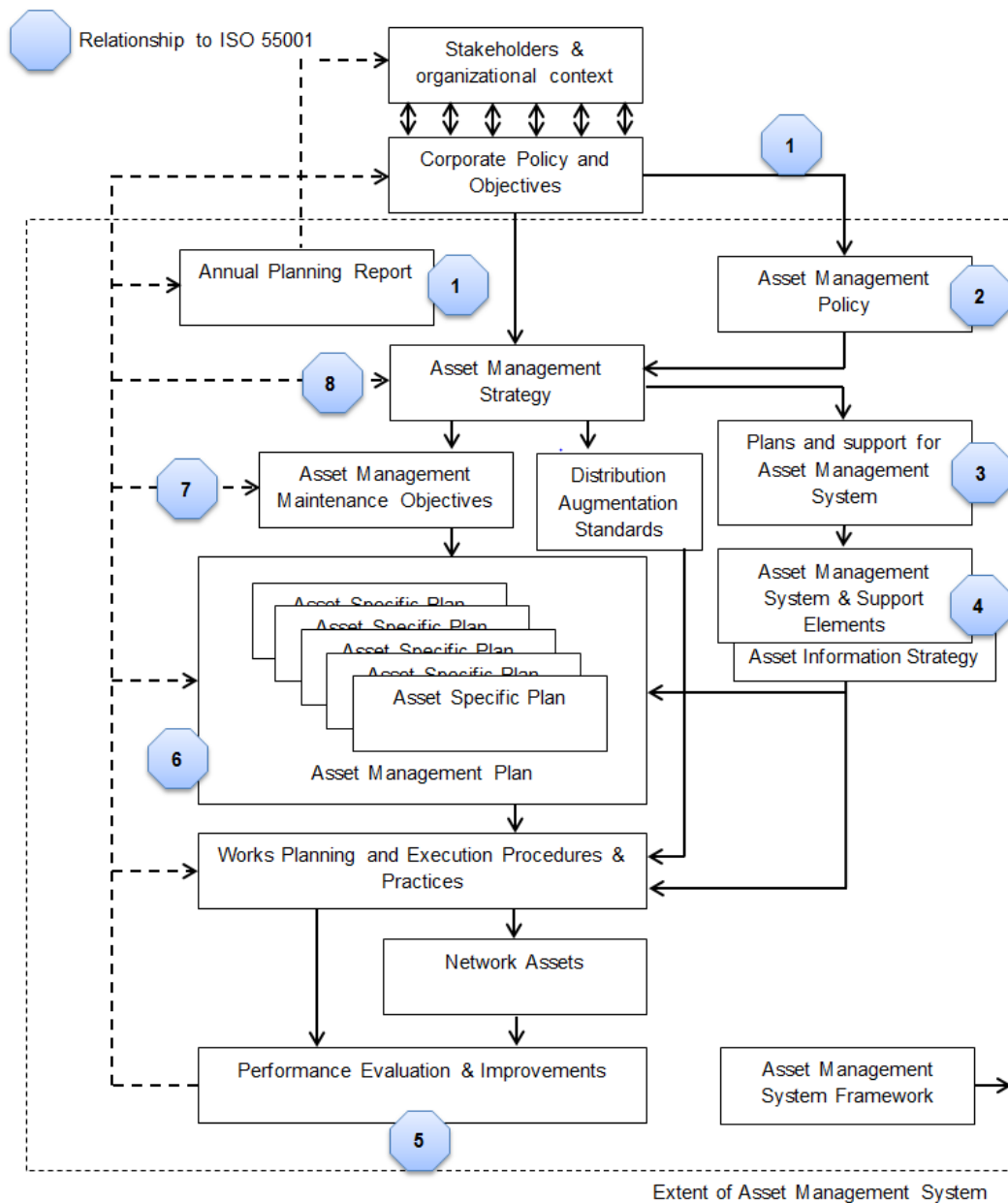
LV CTs are tested for Ratio Error and Phase-angle Error as per Rules requirements in accordance to their Standard of manufacture.

Evoenergy operates type 5 and 6 meter infrastructure in line with the ISO 55001 as shown in Figure 3. This MAMP is an Asset Specific Plan (ASP), as is also shown in the Asset Management Framework.

The Asset Management Objectives form a bridging document between the Asset Management Strategy and the Asset Specific Plans, within the Asset Management System, and provide alignment with Evoenergy's Asset Management Policy and with the overall Organisation Strategic Plan.









Evoenergy has extended its Asset Management Objectives from the Asset Management Strategy as we consider the two elements to be inherently linked and to ensure integration between the objectives and the strategy.





**Figure 3.** Evoenergy Asset Management Framework

Clause numbers are referenced to ISO 55001:

	4.1	Understanding the organisation and its context
	4.2	Understanding the needs and expectations of the stakeholders
	5.1	Leadership and commitment
	5.3	Organisational roles, responsibilities and authority
	5.2	Policy
	4.4	Asset management system
	6.1	Actions to address risks and opportunities for the asset management system
	7.1	Understanding the organisation and its context
	7.2	Competence
	7.3	Awareness
	7.4	Communication
	7.5	Information Requirements
	7.6	Documented Information
	8.2	Management of change
	9.1	Monitoring, measurement, analysis and evaluation
	9.2	Internal audit
	9.3	Management review
	10	Improvement
	8.1	Operational planning and control
	8.2	Management of change
	8.3	Outsourcing (control)
	6.2.2	Planning to achieve asset management objectives
	8.3	Outsourcing (scope)
	4.3	Determining the scope of the asset management system
	6.2.1	Asset management objectives

## 5.2. Sample Selection

Evoenergy's meter data management system (Velocity) is used to select a random sample of installed meters that are to be field-tested, such that its accuracy for reading electricity usage is compliant in accordance with NER.

Where measured quantities are involved, variables sampling will be used provided the data can be verified as being reasonably normally distributed.

For non-measured quantities, where data is not found to be normally distributed, attributes sampling will be used.

The sample size requirements for attributes and variables sampling of meters in accordance with AS 1199 – Sampling Procedures for Inspection by Attributes and AS/NZS 1284.13 – Electricity Metering In-service compliance testing, presented in Table 6.

While the Rules require that populations are based on the year of manufacture, Evoenergy uses the year of purchase. The year of manufacture is not available in Evoenergy records and is not shown on the meter nameplate for some meter types.

Experience has shown the year of purchase and the year of manufacture are normally the same year.

The meter sample populations are not divided into sub-populations based on environmental or installation conditions. The ACT has a dry, non-corrosive environment.

There are no significant environmental or installation variations that warrant separation of meters into separate populations based on their location.

If a sample fails for any reason, then the Principal Quality of Supply and Metering Engineer responsible for electricity meter testing shall either:

- Re-define the populations, redo the entire compliance verification procedure on the alternate populations, and complete the final analysis using the data from the second sample.

**Or**

- Deem the population to have failed and instigate the replacement of the entire population with new meters.

Where a meter fails an accuracy test, the retailer will be notified and it will be their responsibility to replace that meter within the timeframes as per AEMO documentation.

All inspections, testing and auditing of metering installations are carried out as per the guidelines stipulated in the National Electricity Rules section 7.6.

**Table 6.** Population Size vs. Sample Size for Sample Testing of Meters

Population Size	Variables Sample Size	Attributes Sample Size
2 – 8	3	2
9 – 15	3	3
16 – 25	4	5
26 – 50	5	8
51 – 90	7	13
91 – 150	10	20
151 – 280	15	32
281 – 400	20	50
401 – 500	25	50
501 – 1,200	35	80
1,201 – 3,200	50	125
3,201 – 10,000	75	200
10,001 – 35,000	100	315
35,001 – 150,000	150	500
150,001 – 500,000	200	800

### 5.3. Testing Plan

Evoenergy will provide testing for the existing type 5 and 6 meter fleet and implement a testing program as summarised below. Meter replacement obligations will reside with the energy retailer.

The test equipment used by Evoenergy is suitable for the intended purpose of meter testing. For the testing of polyphase meters, a polyphase meter test set is used. All direct connected and low voltage CT connected meters will be sample tested as per AS/NZ 1284.13.

The objective of the routine sample monitoring is to confirm that all proactive measures to assure the integrity and accuracy of metering data delivered to the market has been effective.

**Table 7.** Meter Testing Program Plan

At 30 June	2017	2018	2019	Total
Number of Type 6 Direct Connected Tests	1,000	1,000	1,000	3,000
Number of CT and Whole Current Connected Type 5 Tests	20	20	20	60
Number of Evoenergy Low Voltage Current Transformer Tests	150	140	140	430

#### **5.4. Inspection Plan**

National Electricity Rules Table S7.6.1.3 requires Type 5 and 6 metering installations to be inspected when the meter is tested. Rules S7.6.2 (f) states that a typical inspection may include:

- Check the seals, compare the pulse counts.
- Compare the direct readings of meters.
- Verify meter parameters and physical connections.
- Current transformer ratios by comparison.

All Evoenergy test and inspection procedures address these requirements.

As current transformer meter testing is carried out using AS/NZ 1284.13, all current transformer installations that are not inspected as part of routine testing will be inspected as set out in the National Electricity Rules, Tables S7.6.1.1 and S7.6.1.2 presently this is every five years.

The inspection results will be used to update the CT family Type classifications in asset management register.

#### **5.5. Meter Replacement Plan**

Evoenergy will adopt a run-to-failure strategy to drive meter replacements. Only meters that fail in service or meter families that fail meter testing under the Testing Plan will be replaced. Meter replacement work orders will be sent to the energy retailer.

#### **5.6. Current Transformer (Low Voltage) Testing Plan**

There are 1,472 sites with low voltage current transformers for which Evoenergy is the responsible person. LV CT details and location are held in Gentrack Velocity.

The table below lists total number of each Type and their date of purchase. Instrument transformer details, such as Type, will be updated as part of the LV CT Visual Inspection Program that Evoenergy is currently implementing as part of five yearly inspection programs.

As per the AER Compliance bulletin issued in December 2011, Evoenergy has opted to test ten per cent of its LV CT meters across all family types each year. LV CTs are tested every 5 years, ensuring all meters are tested at least once in a 10 year period.

**Table 8.** Current Transformer – Types and Purchase Dates

Manufacturer	Type	Purchase Date	Number
EMAIL	Q4CT	2003	4
EMAIL	Q4CT	2004	4
EMAIL	Q4CT	2005	34
EMAIL	Q4CT	2006	7
AMPY	EM5300CT	2006	108
AMPY	EM5300CT	2007	197
AMPY	EM5300CT	2008	49
AMPY	EM5300CT	2009	203
AMPY	EM5300CT	2010	40
AMPY	EM5300CT	2015	1
EDMI	ATLASMK10ECT	2002	1
EDMI	ATLASMK10ECT	2007	1
EDMI	ATLASMK10ECT	2010	185
EDMI	ATLASMK10ECT	2013	134
EDMI	ATLASMK10ECT	2014	145
EDMI	ATLASMK10ECT	2015	55
EDMI	ATLASMK10ECT	2016	207
EDMI	ATLASMK10ECT	2016	207
EDMI	ATLASMK10ECT	2017	183
<b>TOTAL</b>			<b>1,558</b>

## 6. TEST DELIVERY

This section outlines how the testing strategy is to be delivered to the relevant standards and procedures.

### 6.1. Direct Connected Meters

Item	Details
Asset Information	The details of all Evoenergy metering installations are maintained in Gentrack Velocity.
Period between Inspections	When meter is tested as per S7.6 & S7.6.1.3.
Task Workflow	Per process outlines in Meter Family Register.
Type of Test	Per Procedure 3.13 in SM1123, Evoenergy Metering Type 5 and 6 Manual
Period between Tests	The period between tests will be as required by AS/NZ 1284.13
Test Volumes per Year	Refer to Table 7 – Meter Testing Program Plan. This table summarises the full details of the meter testing and replacement program stored in the spreadsheet Meter Family Register. This spreadsheet is used to manage the meter testing program.
Compliance Process	Per the requirements of the National Electricity Rules.
Applicable Standards	AS 1284.1, AS 62052.11, AS 62053.21, AS 1284.13.
Test Equipment used and Traceability of Test Equipment	The test equipment used by Evoenergy comprises of: <ul style="list-style-type: none"> <li>▪ 2 x MTE Check System 2.3.</li> <li>▪ 1 x MTE PTS 2.3.</li> <li>▪ 1 x MTE PTS 2.3C.</li> <li>▪ 1 x EDMl Genius</li> <li>▪ 1 x EDMl Mk6N Genius</li> </ul> <p>All test equipment will be calibrated by an NATA accredited laboratory, have the appropriate calibration labels and all calibration certificates will be stored in a central location. Test certificates filed with Metering and Services section in works delivery branch.</p>
Testing Uncertainty Requirements	The maximum allowable level of testing uncertainty for Type 5/6 active meters is: <ul style="list-style-type: none"> <li>• 0.3/cosØ% tested in the field, and</li> <li>• 0.2/cosØ% tested in laboratory</li> </ul> <p>Refer Rules Table S7.6.1.1</p>
Test Resources	Works Delivery Branch
Management of Compliance Failure	Refer section 8.1

## 6.2. Current Transformer Connected Meters

Item	Details
Asset Information	<i>The details of all Evoenergy metering installations are maintained in Meter Asset Management system – Gentrack Velocity.</i>
Period between Inspections	The maximum period between inspections is 5 years as per S7.6 & S7.6.1.3.
Task Workflow	Per process outlines in Meter Family Register.
Type of Test	Per Procedure 3.16 in SM1123, Evoenergy Metering Type 5 and 6 Manual
Period between Tests	The period between tests will be as required by AS/NZ 1284.13.
Test Volumes per Year	Refer to Table 7 – Meter Testing Program Plan. This table summarises the full details of the meter testing and replacement program stored in the spreadsheet Meter Family Register. This spreadsheet is used to manage the meter testing program.
Compliance Process	Per the requirements of the National Electricity Rules.
Applicable Standards	AS 1284.1, AS 62052.11, AS 62053.21, AS 62053.22, AS 1284.13.
Test Equipment used and Traceability of Test Equipment	The test equipment used is a PTS 2.3C test set. All test equipment will be calibrated by a NATA accredited laboratory, have the appropriate calibration labels and all calibration certificates will be stored in a central location. Test certificates are kept with our contractor and routine audit verify currency and compliance.
Testing Uncertainty Requirements	The maximum allowable level of testing uncertainty for Type 5/6 active meters is: <ul style="list-style-type: none"> <li>▪ 0.3 / cosØ% - whether tested in the field or a laboratory</li> </ul> Refer Rules S7.6.1.1
Test Resources	Refer section Refer section 5.1.
Management of Compliance Failure	Refer section Refer section 6.4.



### 6.3. Current Transformers (Low Voltage)

Evoenergy has developed a testing program for the testing of current transformers. The table below details the available information for the facilitation of the testing program's and its ongoing development.

Item	Details
Asset Information	There are 1,472 sites with low voltage current transformers.
Period between Inspections	When meter is tested and the maximum period between inspections is 5 years as per S7.6 & S7.6.1.3.
Task Workflow	Per process outlines in Meter Family Register.
Type of Test	Per Procedure 3.16 in SM1123, Evoenergy Metering Type 5 and 6 Manual. <i>Current transformer</i> tests are secondary injection tests. Refer to Rules S7.3.2. (a). Evoenergy may develop a proposal for consideration by AEMO to use an alternate test method for low voltage current transformers.
Period between Tests	The maximum period between tests is 10 years. Burden tests will be performed when meters are tested, when the CT's are Tested or when changes are made. All CT's associated with the meter will be tested. Refer Rules Table S7.3.2.
Test Volumes per Year	Refer to Table 7 – Meter Testing Program Plan. Evoenergy commenced its CT testing program in April 2008 and involves testing all current transformers.
Compliance Process	As per the requirements of the National Electricity Rules.
Applicable Standards	AS60044.1.
Test Equipment used and Traceability of Test Equipment	The test equipment, Omicron CT Analyser, will be calibrated by accredited laboratories, have the appropriate calibration labels and all calibration certificates will be stored in a central location. Test certificates filed on in Evoenergy's AIMS SharePoint

Testing Uncertainty Requirements	<p>The maximum allowable level of testing uncertainty for Type 5/6 Current Transformers is:</p> <ul style="list-style-type: none"> <li>• 0.1% for laboratory testing, and</li> <li>• 0.2% for field testing.</li> </ul> <p>Refer Rules Table S7.6.1.1.</p>
Test Resources	Works Delivery Branch
Management of Compliance Failure	Refer section 6.4.

### 6.4. Large Family Failure

Evoenergy considers a family group of more than 2,000 meters a “large” meter family. Evoenergy has 102,153 meters in this category as shown in Table 9.

**Table 9.** Large Meter Families

Manufacturer	Type	Purchase Date	Number
EMAIL	SDM	1981	2,013
EMAIL	M3	1985	2,816
EMAIL	M3	1986	4,126
EMAIL	M3	1987	2,940
EMAIL	M3	1988	3,003
EMAIL	M3	1989	3,255
EMAIL	M3	1992	2,901
EMAIL	M3	1993	2,755
EMAIL	M3	1994	2,577
EMAIL	M3	2002	2,472
EMAIL	M3	2003	2,077
EMAIL	M3	2005	2,162
EMAIL	M3	2006	2,067
NILSEN	EMS2100	1993	2,417
NILSEN	EMS2100	1994	2,455

AMPY	EM3332	2007	2,259
AMPY	EM3332	2008	2,160
AMPY	EM3332	2009	2,069
SECURE	I-CRED400-102	2007	3,412
SECURE	I-CRED400-102	2008	2,307
SECURE	I-CRED400-102	2009	3,042
SECURE	I-CRED400-101	2010	2,560
SECURE	I-CRED400-102	2010	5,736
SECURE	I-CRED400-101	2011	6,275
SECURE	I-CRED400-102	2011	7,676
SECURE	I-CRED500B	2012	5,316
SECURE	I-CRED500B	2013	6,464
SECURE	I-CRED500B	2014	9,454
SECURE	SPRINT 200	2014	3,387
<b>Total</b>			<b>102,153</b>

Should a large meter family fail, Evoenergy will raise a bulk meter fault notification in Velocity which will send the bulk notification to the appropriate retailer.

The retailer must then implement a malfunction rectification program and timeframes as soon as practicable after they become aware of the malfunction.

## 7. MANAGEMENT OF TESTING EQUIPMENT

Evoenergy has three single-phase test sets for testing of meters, so that if equipment is away being calibrated or repaired, the testing program will not be impeded. The organization has two three phase test sets which can also be utilised for testing single phase meters.

Evoenergy has one Omicron CT Analyser used for testing of Current Transformer's. All meter test equipment used by Evoenergy is calibrated by a NATA accredited laboratory, at 12 month intervals.

The NATA accredited meter testing service provider notifies Evoenergy that the meter test equipment is due for calibration and sends Evoenergy a formal quotation. Additionally all metering test equipment is recorded in Evoenergy's test and tag database named ProTrac.

This database is periodically interrogated by the Principal Quality of Supply and Metering Engineer to ensure that all metering test equipment is within its certified calibration due date.

ProTrac is updated as equipment is calibrated and NATA calibration reports are received. Programmed audits via Evoenergy's Always Safe systems will ensure that all test equipment used for meter testing is calibrated and within its certification due date.

The Omicron CT Analyser is calibrated by Omicron Australia and ProTrac is used as described above for the management of this piece of test equipment's calibration certificate.

Every metering test set has a calibration label fitted with details of the testing laboratory where it was tested, calibration date, due date and report number.

Calibration reports are electronically scanned and stored on the network drive, [energynetwk\Common\Metering test equipment\\_Calibration reports](#) and the original hard copy, (where required) of the report is filed to a registry file with Secondary Systems.

## **8. ADDITIONAL REQUIREMENTS**

### **8.1. Outages and Malfunctions**

Where Evoenergy becomes aware of an outage or malfunction, Evoenergy will advise the Metering Data Provider and Responsible Person as soon as practicable.

If an outage or malfunction occurs to a metering installation, isolation and/or repairs will be made as soon as practicable.

If the repairs are made within 10 business days of detection, the retailer will make any necessary substitutions to the metering data.

If the repairs cannot be made within 10 business days of detection, the Metering Coordinator will apply to AEMO for an exemption (per AEMO's Exemption Request Procedure) and will provide AEMO with a plan for the rectification of the metering installation.

Non-critical failures would be programmed for repair. Critical failures, which affect the accuracy or safety of the installation, would be rectified as soon as practicable.

AEMO's Exemption Request Procedure would be used as necessary. Where a meter is replaced, relevant Participants are notified via an MSATS notification.

### **8.2. Availability of Test Results**

All test results are available upon request.

### **8.3. Time Settings**

As per NER 7.10, The Metering Provider must set the times of clocks of all metering installations with reference to Eastern Standard Time to a standard of accuracy in accordance with schedule 7.4 relevant to the load through the connection point when installing, testing and maintaining metering installations."

All meters' clocks are set to Eastern Standard Time (EST) as part of their factory configuration and verified by the meter technician at time of installation.

Time clocks for Type 5 Manually Read Interval Meters (MRIM) are synchronised every time the meters are accessed while downloading the metering data.

# APPENDICIES

## Appendix A – Meter Family Register

This excerpt is from the Meter Family Register spreadsheet, in tab 3. Family Summary and History, which can be found at Evoenergy's network drive – [energynetwk\Common\Asset and Network Performance\Secondary Systems](#). Here all data regarding the previous testing, current status, and future testing is logged, stored, and produced. Data taken directly from Gentrack Velocity is entered into this spreadsheet, and using the results of previous tests and data, determines when future testing / works will be required.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Family	Quantity	Class	Initial / Ongoing	Previous Test Year	Previous Test ID	Previous Number Tested	Previous Notes	Test / Replace	Next Test Period	Notes	Action Person	Action Date	
2	1	2	3	4	5	6	7	8	9	10	11	12	13	
3	1970EMAILBAZ	344	General Purpose	Ongoing	2010				Replace	8				
4	1970EMAILM1	1003	General Purpose	Ongoing	2015				Replace	Auto				
5	1970EMAILM2	2	General Purpose	Ongoing	2010				Replace	8				
6	1970EMAILSD	1057	General Purpose	Ongoing	2010				Replace	8				
7	1970EMAILSDM	113	General Purpose	Ongoing	2015				Replace	Auto				
8	1970EMAILSDM-6DIGIT	2	General Purpose	Ongoing	2010				Replace	8				
9	1970EMAILSDP	301	General Purpose	Ongoing	2010				Replace	8				
10	1970FERANTITM2C	88	General Purpose	Ongoing	2010				Replace	8				
11	1970L&GCM170XF6	1	General Purpose	Ongoing	2010				Replace	8				
12	1970L&GYL5	1	General Purpose	Ongoing	2010				Replace	8				
13	1970SECUREI-CRED500BNET	1	General Purpose	Ongoing	2010				Replace	8				
14	1970SECURESPRINT200	1	General Purpose	Ongoing	2010				Replace	8				
15	1970WARB&FRANKWF2	263	General Purpose	Ongoing	2010				Replace	8				
16	1970WARB&FRANKWF3S	1602	General Purpose	Ongoing	2015				Replace	Auto				
17	1971EMAILM1	247	General Purpose	Ongoing	2015				Replace	Auto				
18	1971EMAILM2	3	General Purpose	Ongoing	2011				Replace	Auto				
19	1971EMAILSDM	91	General Purpose	Ongoing	2015				Replace	Auto				
20	1971EMAILSDM-6DIGIT	15	General Purpose	Ongoing	2011				Replace	Auto				
21	1971L&GYL5	14	General Purpose	Ongoing	2015				Replace	Auto				
22	1971WARB&FRANKWF3S	434	General Purpose	Ongoing	2015				Replace	Auto				
23	1971WARB&FRANKWF3T	3	General Purpose	Ongoing	2011				Replace	Auto				
24	1972EMAILM1	306	General Purpose	Ongoing	2016				Replace	Auto				
25	1972EMAILM2	1	General Purpose	Ongoing	2012				Replace	Auto				

This excerpt is from the Meter Family Register spreadsheet, in tab *0. Instructions*, which can be found at Evoenergy’s network drive – [energynetwk\Common\Asset and Network Performance\Secondary Systems](#). It outlines the high level process for the testing and replacement of metering families.

	A	B
1	<b>Process for Identifying Testing and Replacement</b>	
2		
3	<b>Step</b>	<b>Description</b>
4	1	Metering Technical Officer or Principal Engineer extracts latest meter data and updates sheet "1. Raw Meter Data"
5	2	Meter families to be replaced or tested are identified in sheet "3. Upcoming T&R" along with the sample size
6	3	Sample for each meter family is generated using Velocity
7	4	Velocity creates work orders in CityWorks
8	5	Field staff complete meter test and enter data in Cityworks (replacement will be done aswell until 1st of December 2017)
9	6	Test / replacement results are verified by the Metering Technical Officer or Principal Engineer
10	7	Results of tests / replacements are updated in sheet "4. Family Summary and History"
11		
12		



## Appendix B – Metering Test Equipment Details

Calibration documentation for all meter testing equipment listed below can be found at Evoenergy's Network Drive at, [energynetwk\Common\Asset and Network Performance\Secondary Systems](#).

- Meter Testing Units

Manufacturer	Type	Number of Units	Single or Three Phase	Test Set Uncertainty
MTE	Check System 2.3	2	Single and Three Phase	±0.1%
MTE	PTS 2.3	1	Three Phase	±0.1%
MTE	PTS 2.3C	1	Three Phase	±0.1%
EDMI	Genius	1	Single Phase	±0.2%
EDMI	Mk6N Genius	2	Single Phase	±0.2%

- Current Transformer Testing Units

Manufacturer	Type	Number of Units	Test Set Uncertainty
Omicron	CT Analyser	1	±0.1%