

Asset Management Plan

Type 5 and 6 Metering Services

February 2018

Supporting Document 17.1.1

Executive Summary

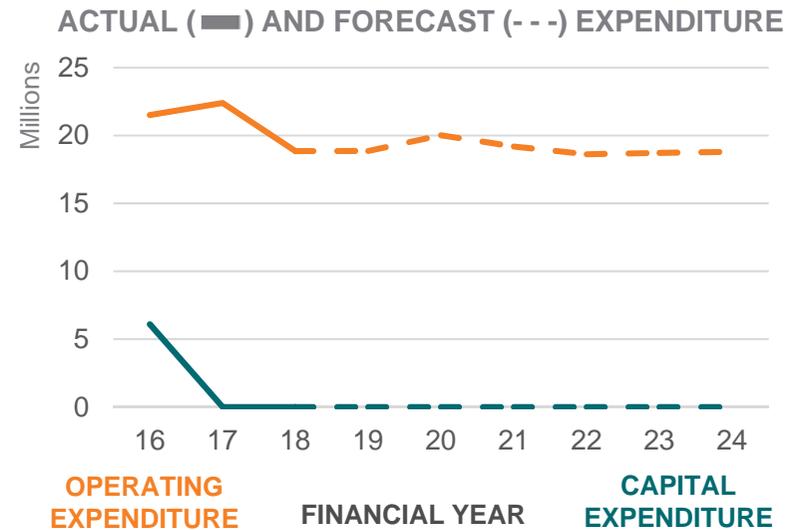
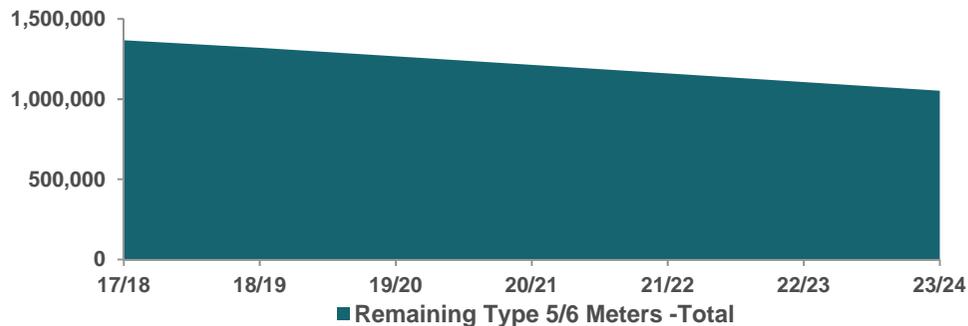
Metering Services included within this asset management plan:



> Essential's role during the period covered by this plan is limited to testing, inspecting, reading and providing data on existing Type 5 and 6 metering installations. Essential no longer installs new or replacement meters.

Power of Choice Implications

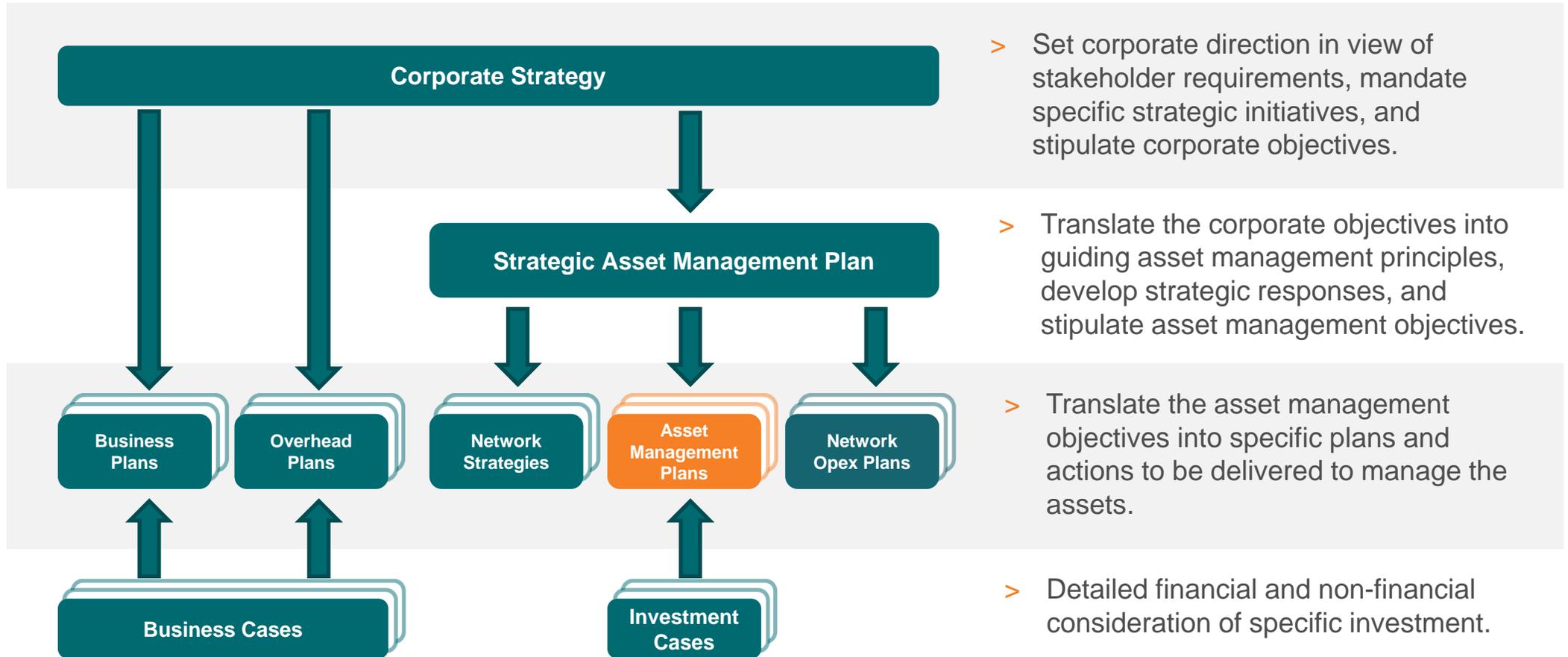
- > From 1 December 2017, new and replacement meters are to be provided by competitive Metering Coordinators chosen by customers electricity Retailer
- > Essential Energy retains the Metering Coordinator (MC) role for existing type 5 and 6 meters
- > Faulty meters will be referred to Retailers for replacement
- > We forecast that approximately 20% of Type 5 and 6 meters will be replaced by smart meters during the 2019-24 period



Proposed Opex Expenditure \$95.3M

Nil Proposed Capex Expenditure

Document hierarchy and purpose



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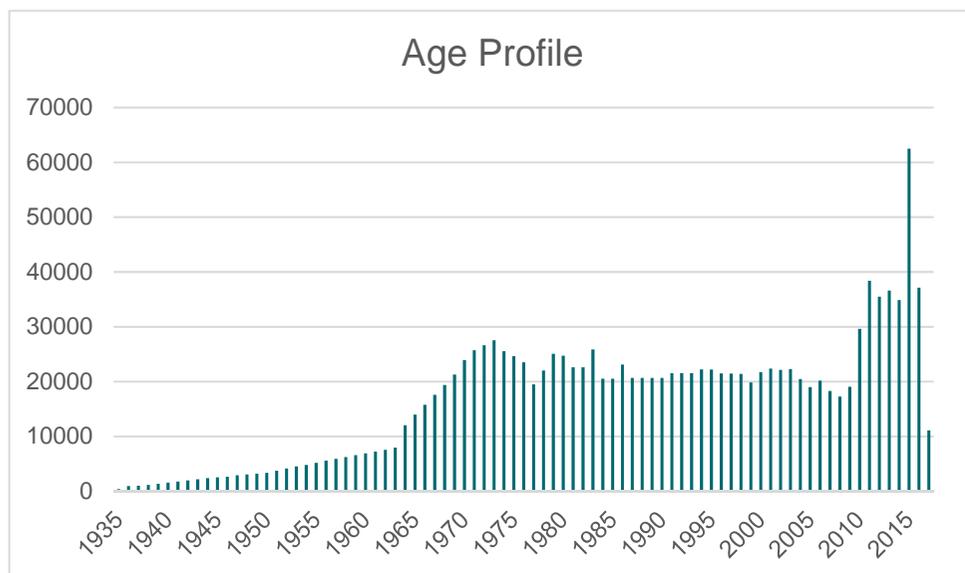
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Asset Overview - Meters

- > Essential Energy's metering assets consist of ~1.4 Million meters
- > The vast majority of these meters are Type 6, with only 0.04% Type 5 meters
- > While the age profile shown does not represent the condition of the metering assets, it does provide useful information in determining potential replacement requirements when considering the equipment age, design and manufacturers estimated component life
- > Meter assets are tested in accordance with the NER, with sample testing completed by meter population



Population	Description	Models	Size
0	Non-Magnetic, jewel / ball bearing design	HM, AZ, HMT, WF2, SD, BAZ 10-40	112,829
BAZ 10-60	BAZ 10-60 Coastal	BAZ 10-60	13,677
1	Email / AMPY electronic	A1, E1, P1, A11, EM1xxx,	187,152
2	Nilsen electronic	EMS2xxx	3,377
3	Email magnetic	M1, M2, M3, SDM	477,670
3/SDM	Email SDM	Email SDM	41,984
4	L&G magnetic	MLxxx, CLxxx, CMxxx	297,011
5	WF magnetic	WF3xx	20,699
6	L&G electronic class 0.5	Q3, Q4, EM53xx	5,974
7	Secure electronic	I-Credit 400, I-Credit500, Sprint	60,693
8	L&G electronic new batch	EM3030, EM500, U13xx, U33xx	77,230
	Unknown meter details		94,998
			1,393,294

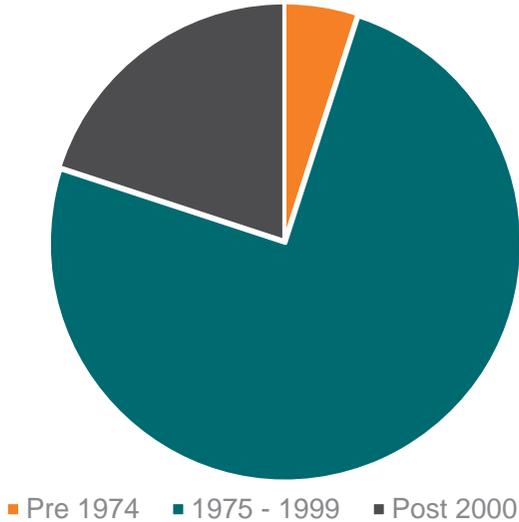
Unknown Meters - Essential Energy still has ~95,000 unknown metering devices installed in the field. The number of unknown meter types reduced by over 40,000 during the past 5 years. Essential Energy proposes to re-establish a program with its contract meter readers to identify these meters as part of routine meter reading programs.

Asset Overview - Transformers

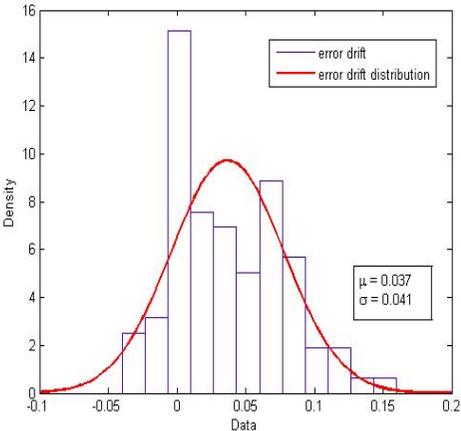
- > Essential Energy has ~6,600 low voltage current transformer connected meters, to support larger basic connections.
- > Essential Energy is responsible for verifying the overall accuracy of current transformers for Type 5 and 6 metering installations
- > The customer owns the current transformer and is responsible for any remediation works that may be required
- > Essential Energy will continue to sample test LV CT's in accordance with the AER's guideline "Alternative Testing Minimum Requirements: Low Voltage Current Transformer Metering Installations – v1.1"

Low Voltage Current Transformers		
Type	Description	Count
A	150 / 300 / 600 : 5	1,529
B	400 / 800 / 1200 : 5	17
C	1000 / 2000 / 3000 : 5	16
S	200 : 5	14261
T	800 : 5	1302
Non standard	100/5, 250/5 , 750/5	190
TOTAL		17,315

CT Age Distribution



Test results to date confirm that there is very little drift in the accuracy of transformers and an expected life exceeding 40 years is deemed reasonable for the CT's within Essential Energy's distribution area



Strategic Objectives, Targets and Performance

Purpose:	Strategies & Objectives	Targets	Performance
<ul style="list-style-type: none"> > Asset Management Plans enable Essential Energy to achieve the objectives and targets in the overarching strategy documents > Maintain regulatory compliance with existing Type 5 and 6 metering equipment installed > Align with Power of Choice framework with meters progressively replaced with newer technologies as they fail, either functionally or from an accuracy failure across a statistical class of meter types 	1. Regulatory Compliance Obligations		
	National Electricity Rules Schedule 7.6 Existing metering equipment shall be tested to comply with class accuracy requirements.	Compliance with inspection and testing requirements for equipment classes	Testing and inspections completed as per program schedule.
		Compliance with population replacement when required under the NER.	From 1 December 2017, meter faults (including family failure) are referred to Retailers for rectification.
	NER 7.2.1 Every connection point shall have a metering installation.	100% of all new connection points have compliant metering equipment commissioned prior to connection.	From 1 December 2017, Retailers are responsible for new meter installations.
NER 7.8.10 Metering installation malfunction rectification.	Meter installation malfunctions Type 5-6 rectified within 10 business days.	From 1 December 2017, meter faults are referred to Retailers for rectification.	

In Service Meter Compliance Testing

- > Essential Energy undertakes meter accuracy testing in accordance with Schedule 7.6 of the Rules
- > Australian Standard AS1284.13 (Electricity Metering: In-service Compliance Testing) defines criterion accuracy limits, as well as the compliance period for populations
- > The accuracy of electro-mechanical meters tend to drift as they approach the end of service life. The results from regulatory testing can be used to estimate the likelihood that a given group of meters may fail testing and need replacing in the future.

Non Compliant

- > Population 0 meters are currently non-compliant, and require replacement

Forecast Non Compliance

- > Group 3 / SDM meters are expected to become non-compliant following analysis of the 2017/18 test results
- > Group 0 / BAZ10-60 Coastal following analysis of the 2023/24 tests

Population	Size*	Last compliance Test (year)	Low Load Failures		High Load Failures		Criterion	Compliance	Next Test (year)
			Max Allowed	Actual	Max Allowed	Actual			
0	126554	2009/10	21	23	21	36	3	Fail	Replace Required
0/BAZ 10-60 coastal	15,341	2014/15	21	19	21	9	2	Yes – expected to fail in 2023/24	19/20, 23/24
1	187152	2009/10	21	6	21	5	1	Yes	18/19, 22/23
2	3,377	2009/10	21	3	14	4	1	Yes	18/19, 23/24
3	535,776	2009/10	21	17	21	7	2	Yes	17/18, 24/25
3/SDM	47,091	2009/10	Was part of Sample 3				2	Yes - expected fail in 2017/18	17/18
4	311451	2010/11	21	4	21	6	1	Yes	20/21, 25/26
5	22,655	2010/11	21	20	21	16	1	Yes – expected to pass criterion 2	19/20, 24/25
6	5,974	2009/10	Initial Test				1	Yes	18/19, 21/22
7	60,693	2014/15	Initial Test				1	Yes	24/25
8	77,230		Due for Initial Testing				1	Yes	17/18, 26/27
Total	1,393,294								

*unknown meters distributed across meter populations for sample modelling purposes

Forecast Meter Replacements

Retailer / Customer Initiated

- > Customers, through their Retailer, request meter changes for a number of reasons:
 - Upgrade metering eg when photovoltaic generation systems are installed.
 - Upgrade switchboards for safety or capacity reasons, or to relocate for renovations.
 - Demolition / rebuilding of properties.
 - Tariff change requests such as moving to a Time of Use Tariff.
 - Retailer initiated changes to move to smart meter functionality.

	18/19	19/20	20/21	21/22	22/23	23/24
Solar Install	4,100	3,500	2,600	1,300	1,400	2,100
Retailer / Customer Initiated	5,000	10,000	15,000	15,000	15,000	15,000
Total Installations	9,100	13,500	17,600	16,300	16,400	17,100

Unplanned failure

- > From time to time meters fail in service. Essential Energy will notify the relevant Retailer of the need to change these meters in accordance with the NER.
- > Historical data has been used to forecast future failure rates

Metering Equipment Type	14/15	15/16	16/17	3 year average	Annual Forecast
Single phase accumulation meters	199	72	68	113	120
Single phase one element meters	261	239	197	232	250
Single-phase two element meter	995	562	513	690	700
Three phase accumulation meters	11	10	10	10	10
Three phase whole-current meters	475	350	361	395	400
Three phase CT meters	114	87	116	106	120
TOTAL Malfunction	2,055	1,320	1,265	1,547	1,600

Accuracy failure

- > The primary driver of the need to replace Type 5 and 6 metering assets will be non-compliance with accuracy requirements of Schedule 7.6 of the NER
 - 126,554 population 0 meters already deemed non-compliant
 - 47,091 SDM meters are forecast to become non-compliant in 18/19, with 15,341 BAZ 10-60 meters expected to become non-compliant in 23/24

	July 2017	17/18	18/19	19/20	20/21	21/22	22/23	23/24
Type 5 / 6 meters requiring replacement	126,554	0	47,091	0	0	0	0	15,341

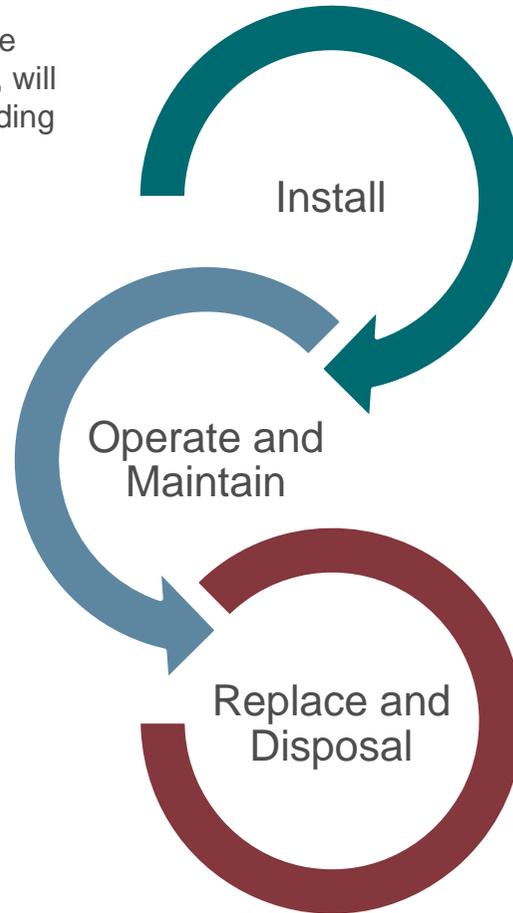
Lifecycle Management Strategy: Public Lighting Equipment

Install

- > Under Power of Choice arrangements contestable Metering Coordinators, appointed by the Retailer, will arrange installation all metering equipment. Including new installations, upgrades and replacement.

Replace and Disposal

- > Responsibility for meter replacements transferred to Retailers on 1 December 2017, Essential Energy has a responsibility to notify Retailers of Metering Equipment assets that malfunction or reach the end of their service life, with a Meter Fault Notification issued.
- > Essential Energy disposes of metering equipment assets removed by Essential Energy employees or returned to Essential Energy depots in accordance Operational Procedure: Corporate Disposal CEOP8074, SSHE Manual: Waste CECM1000.75, and SSHE Manual: Hazardous Materials CECM1000.10
- > Meter Providers may dispose of Essential Energy's metering assets in accordance with relevant legislation, safety and environmental regulations and other obligations that would otherwise apply to Essential energy if it were disposing of meters directly.



Operate and Maintain

> Operate

- Quarterly reading of meters; and
- Data is to be validated and substituted and provided to National Electricity Market within 2 business days.

> Test

- Sample testing is completed in accordance with AS1284.13 Electricity Metering In-Service Compliance Testing.
- Testing is required for new meter populations within one to three years of being placed in service to determine the initial in-service compliance period.
- “In field” meter testing will be conducted, with samples are selected using an approved and auditable methodology.
- Sample testing LVCTs in accordance with Alternative Testing Minimum Requirements: Low Voltage Current Transformer Metering Installations – v1.1.

> Inspect

- Meter Readers will conduct a visual inspection of the metering equipment at the time of meter reading. If the equipment is damaged or appears to have malfunctioned this will be reported for follow up and action
- LVCTs are inspected at a rate of 20% per annum.

Investment Program Summary

OPEX (\$ millions 2018/19)

	17/18	18/19	19/20	20/21	21/22	22/23	23/24
Total Opex	\$18.85	\$18.86	\$20.02	\$19.19	\$18.62	\$18.72	\$18.80

- > No new capital expenditure forecast for metering services over the 2019 – 24 period.
- > Whilst it is expected the costs associated with the ongoing management of type 5 and 6 metering services will reduce as the volume meters reduces, we acknowledged that some variable costs, such as meter reading, are likely to increase on a unit basis. This is due to the time to read individual installations increasing over time as type 5 and 6 meter density reduces, with the biggest impact being on travel time in between individual meter readings.
- > Other costs will remain relatively fixed in real terms, e.g. compliance testing costs as the required sample sizes only vary slightly with population declines.



Performance Monitoring, Continual Improvement and Supporting Initiatives

Continual Improvement & Support Initiatives:

- > Initiatives aim to leverage new technologies, increase investment program efficiency and effectively manage risk profiles. Measures include:

Unknown Meter Type

- > Essential Energy has approximately 95,000 unknown meters across the network. Whilst this number has reduced by approximately 40,000 over the last few years, it is desirable that it be eliminated.
- > Essential Energy will continue to work with its meter reading service providers to accelerate the rate of reduction over the period of this plan

Meter Fault identification, reporting and replacement

- > Unplanned failures are predominantly reported by Meter Readers, however in some cases these may be reported due to an interruption to supply at the customer's premises, not a fault in the meter.
- > All reported faults are investigated to confirm if a meter replacement is required due to fault in the meter.
- > This process requires refining to simply require replacement upon initiation, removing the need for field investigation.

Performance reporting

- > There is a need to introduce additional and revised performance reporting to assist with the monitoring performance and replacement of Type 5 and 6 metering equipment.
- > Additional reports are currently being specified to be included within routine monthly and quarterly reports to ensure that data is available to support the management of the metering equipment

Relevant Legislation , Policies, and Supporting Documents

Legislation

Document	Relevance to the AMP
National Electricity Rules	Used to set Asset Management Objective Targets
Electricity Supply Act 1995 and supporting Licence Conditions	
Electricity Supply (Safety and Network Management) Regulation 2014 (NSW)	
Australian Standard AS1284.13 (Electricity Metering: In-service Compliance Testing)	
National Electricity Law	

Policies

Document	Relevance to the AMP
Supply Standards: Electricity Supply Standard (CEOP8026)	This document is intended to provide details of the objectives which Essential Energy has adopted in relation to the various system characteristics that influence the quality, reliability and security of electricity supply to its valued customers
Metering Services: Network standard Metering (CEOP8027)	This document sets out minimum metering requirements, as determined by Network Division, for category Type 5, 6, and 7 Customers connected to Essential Energy's electricity network.
Corporate Disposal (CEOP8074)	This policy sets out the core principles that are to be applied when Essential Energy's transformer assets are disposed of
ISO 55000:2014 - Asset Management	Used to develop Asset Management System

Support Documents

Document	Relevance to the AMP
National Electricity Market Procedures, Guidelines And Documents	Used to set Asset Management Objective Targets

Essential Energy

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