

Metering is a critical function for any transmission or distribution system. Metering assets measure consumption and can also capture power quality information from across the network. This information is then used by Essential Energy and other external entities in many ways including to provide efficient metering services to customers and other market participants.

Scope

This Asset Class Strategy (ACS) addresses metering assets. These assets support several critical functions across the electrical network. These functions include but are not limited to; Customer consumption metering, market metering and power quality metering. The assets addressed in this strategy include the assets shown to the right. It must be noted that due to changes to market rules Essential Energy no longer installs customer meters however we continue to support existing EE owned Type 5 and 6 customer meters including any supporting Low Voltage Current Transformers (LVCT). This strategy is for the meter assets only and does not cover market related functions such as reading and other market related functions.

Purpose

The ACS provides strategic direction on the asset management decisions required to ensure metering assets meet the asset management objectives. Specifically, the ACS:

- Sets direction for asset lifecycle decisions
- Articulates the required actions to improve asset lifecycle decisions

Our value-based approach to asset management, provides visibility across the asset lifecycle and enables a better understanding of the risk and considerations for operating the asset.

Meters

Type 5 – 6

Whole current meters

CT meters

High Voltage Metering

Wholesale metering

HV metered LV tariff

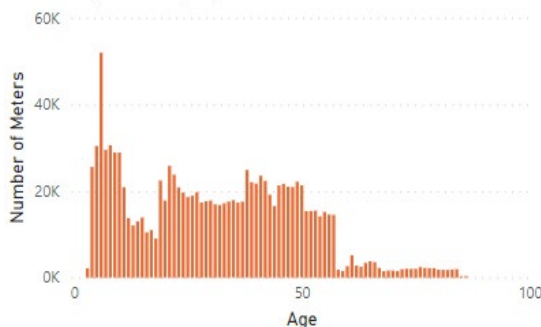
LV CT's on crossarms

Power Quality + Statistical Meters

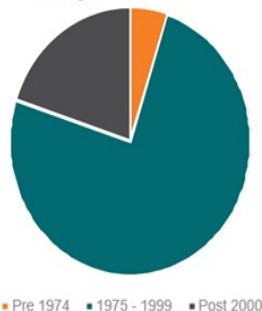
Asset Profile

Essential Energy has approximately 1,056,859 metering assets of which 1,045,719 are Type 5 and 6 meters, 10,183 are Low Voltage Current Transformers and 902 are Power Quality meters.

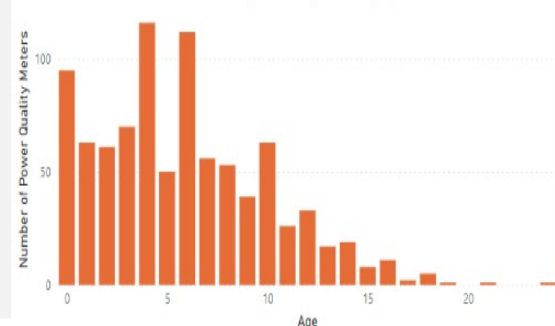
Meter Population by Age



CT Age Distribution



Power Quality Meter Population by Age



SWOT

The SWOT analysis is based on a review of external and internal drivers that will impact Metering asset management

Context

Strengths:

- All Meters have proven to be extremely reliable across a significant operating period.
- The Regulatory requirement to have an AEMO approved Metering Asset Maintenance strategy has been met for the current regulatory period.
- The Type 5 and Type 6 metering fleet is decreasing and expected to be at negligible levels by 2034

Weaknesses

- Significant regulatory overheads for auditing and testing
- Lack of high voltage metering transformer testing resources
- Lack of resourcing to support regulated testing requirements.
- Survey Metering of Load Control difficult due to smart meter rollout impacting sites being monitored by AEMO

Opportunities:

- Essential Energy could provide meter testing and maintenance services for 3rd party's using HV metering.
- Increased network visibility capability through growing Power Quality Metering capability.
- Better consumption and network performance data available through smart meters

Threats

- Changes to rules and regulations dictating how the asset must be managed by Essential Energy.
- Metering equipment currently installed on Essential Energy's equipment.
- Possible Use of 3rd party metering information to make real time decisions on the operations of the electrical network
- Sample testing rates change due to increased out of tolerance testing results

Type 5 and 6 Meter Churn

Due to changes in the Electricity Market Essential Energy is no longer licensed to install customer meters. These changes have seen Essential Energy's metering assets decline as customers have transitioned across to Type 4 smart meters installed by other providers due to the following factors:

- Meter failures.
- Failed meter families identified through testing.
- Retailer initiated moves to smart meters
- Tariff change requests
- Meter upgrades due to solar installations
- Switchboard upgrades

This transition away from Essential Energy owned Type 5 and 6 meters to Type 4 meters owned by other providers is known as meter churn and based on current churn rates there is expected to be a reduction in Essential Energy's revenue metering assets to almost 0.

Low Voltage Current Transformer sites Churn

In the same way as our Type 5 and 6 meters are impacted by the churn detailed above our Low Voltage Current Transformer (LVCT) population will be similarly affected. The impacts of this will result in the fleet reducing in size and analysis has been done to determine proportions of churn based on rates experienced by Essential Energy already.

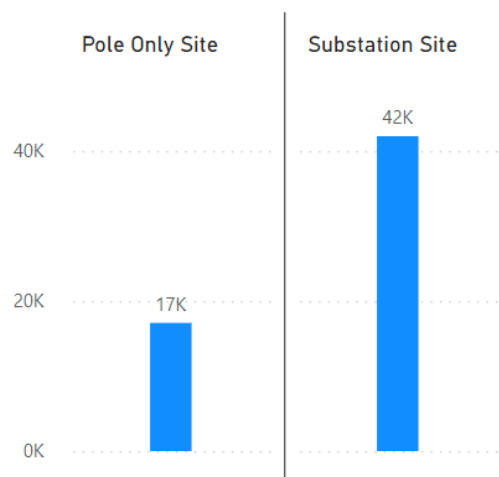
This analysis shows that the LVCT population is expected to reach 0 before the Type 5 and 6 meters as these types of installations are typically at larger customer sites who historically have been transitioning to smart meters faster than the average customer.

Customer Meters on Essential Energy Assets

Essential Energy has a large number of metering sites installed on Essential Energy owned poles, strategically these sites represent an issue as this practice does not align with a number of regulatory frameworks. As a practice for new metering installation this has ceased however there are a large number of legacy sites that present a challenge to Essential Energy, its customers and other stakeholders.

Below are the details of where and how many meter boxes are installed on Essential Energy assets, these do not represent exact numbers of metering installations on our assets but will correlate within a scaling factor as a general rule.

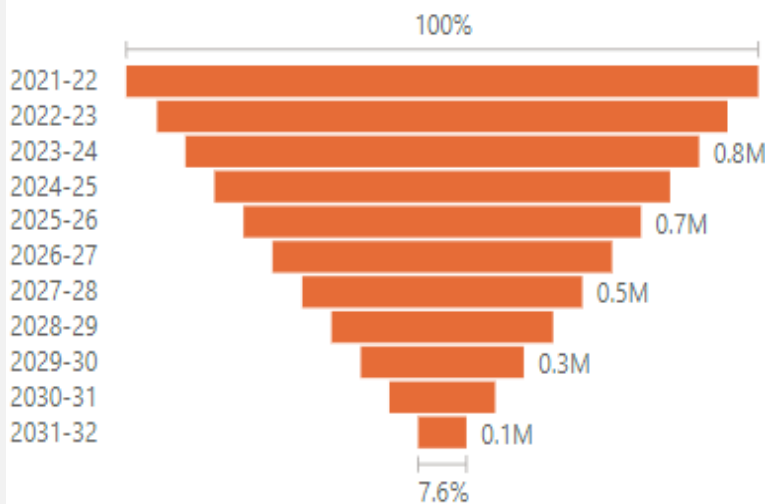
Poles with MeterBoxes installed



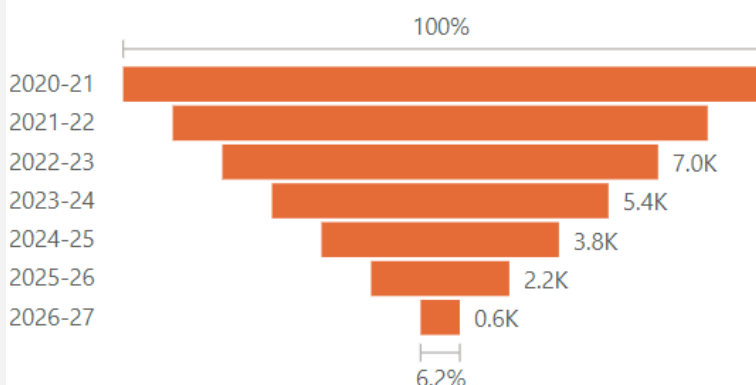
High Voltage Customers

Essential Energy has over 70 customers who are high voltage metered sites where Essential Energy own the Metering Transformers. These Metering Transformers require regulatory injection testing on a ten year cycle at a significant cost. The number of sites may be able to be decreased by transferring the HV Metering assets to the customer or changing the sites to low voltage current transformer metering where the load permits.

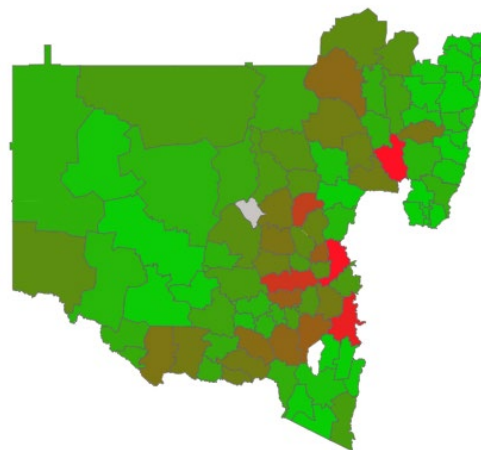
Predicted Meter Population Reduction per Financial Year



Predicted Low Voltage CT Population per Financial Year



Depot Heatmap of Poles with Meter Boxes installed



Market Meters

Essential Energy has 46 wholesale market meters located at our bulk supply points which also have a significant testing regime. These sites are critical to the energy market and the data collected is reported to the Australian Energy Market Operator and is used to allow the energy market to function with visibility of the demand that is happening across Essential Energy's footprint.

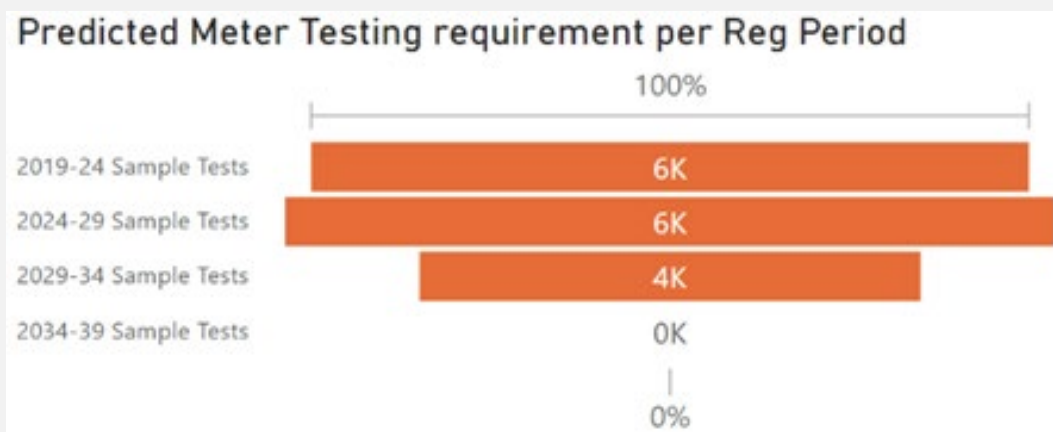
Line of Sight	Linkages to Network Strategies <ul style="list-style-type: none"> Network Safety Future Networks (DSO) Asset Intervention and Retirement STPIS Network Visibility <p>Note that the Metering ACS is part of the Secondary System, and its recommendations are aggregated with other Secondary System assets in the Secondary System Strategy.</p>				
	AMO	Objective	Historical Performance	Performance Targets	
Performance	AMO-03	Meet corporate targets for network value and expenditure	<ul style="list-style-type: none"> TOTEX 2020- \$17.56M TOTEX 2021 - \$18.54M TOTEX 2022 - \$18.09M 	<ul style="list-style-type: none"> TOTEX 2023 - \$20.03M TOTEX 2024 - \$19.39M 	
	AMO-04	Demonstrate network safety risk is managed SFAIRP, and achieve corporate network safety targets.	<ul style="list-style-type: none"> No Cat 1 or 2 Incidents recorded for last 13 years. 	<ul style="list-style-type: none"> Short/Medium/Long: Maintain safety incidents at or below current levels. 	
	AMO-08	Maintain compliance with our network related obligations (both internal and external)	<ul style="list-style-type: none"> Current LV testing practices are expected to meet our regulatory obligations 	<ul style="list-style-type: none"> 2019 – 2024 Reg Period: 5730 Type 5 Meter Sample Tests 4838 LV CT Inspections 682 LV CT Tests 4838 LV Meter Tests: LV CT sites 2025 – 2029 Reg Period: 6143 Type 5 Meter Sample Tests 1963 LV CT Inspections 386 LV CT Tests 1963 LV Meter Tests: LV CT sites 2030 – 2034 Reg Period: 3999 Type 5 Meter Sample Tests 0 LV CT related tests or inspections 	
			<ul style="list-style-type: none"> Current HV Testing does not meet our regulatory obligations 	<ul style="list-style-type: none"> 2019 – 2024 Reg Period: 46 Wholesale sites require tests 6 HV Customer Tests 2025 – 2029 Reg Period: 46 Wholesale sites require tests 6 HV Customer Tests 2030 – 2034 Reg Period: 46 Wholesale sites require tests 6 HV Customer Tests 	
	AMO-10	Realise opportunities and alleviate constraints through enhanced network visibility and analytics including modelling	<ul style="list-style-type: none"> Excluding Customer meters there are currently approximately 1086 meters providing data back into Essential Energy systems 	<ul style="list-style-type: none"> Medium/Long: Utilise existing programs to grow this visibility capability to approximately 4000 sites. 	
	AMO-14	Build a systems and infrastructure platform capable of supporting value from DER penetration			

Acquisition	Selection Criteria <ul style="list-style-type: none">- Type 5 and 6 meters are no longer required to be purchased- Low Voltage Current Transformers are no longer required to be sourced.- Wholesale meters continue to source under existing selection criteria.	Procurement <ul style="list-style-type: none">- Continue to procure Wholesale meters through existing contracts
		Supply Chain <ul style="list-style-type: none">- Maintain existing supply chain.
		Stock Holdings: <ul style="list-style-type: none">- Conduct a review of current spares holding practices to determine stock holding requirements.
Ops & Maintenance	Preventative Maintenance (Inspections): <ul style="list-style-type: none">- Type 5 and 6 current meters are to be sample tested in line with CEOM8014.170 Metering Asset Maintenance and sample sizes determined as per AS/NZS 1284.13:2002- Wholesale Zone Substation Market metering installations are to be tested in accordance with NER Section 7.6- Medium: Power Quality Meters are to be tested in accordance with AS/NZS 1284.13:2002- Low Voltage Current Transformers and associate meters are to be inspected and sample tested in accordance with CEOM8014.170 Metering Asset Maintenance and AEMO document Alternative Testing and Inspection Guidelines For Metering Installations in the NEM	Corrective Maintenance Repairs : <ul style="list-style-type: none">- Type 5 and Type 6 metering installations: Continue to repair defective where defect is not with the Meter.- For all other metering installations continue with current defect practices.
		Breakdown Maintenance: <ul style="list-style-type: none">- Type 5 and Type 6 metering installations: If meter has failed then raise an Meter Fault Notification (MFN) as per current practice.- For Type 5 or 6 Metering CT failures develop a process for informing customer of their responsibilities with regards to repairing the CT- For all other metering installations replace metering assets as per existing practices.
Interventions	High Voltage Metering Customers <ul style="list-style-type: none">- Short: Negotiate with Customers to encourage either converting to Low Voltage Metering or Transfer of ownership of Current Transformers and Voltage transformer used for high voltage metering purposes to the customers ownership.- Short: Conduct Testing for High Voltage Customers for Essential Energy Owned Assets.	Customer Metering Equipment on Essential Energy Assets <ul style="list-style-type: none">- Develop a policy for managing customer metering equipment installed on Essential Energy's assets with a view to simplifying the transition to type 4 meters for customers without excessive costs, reducing complexity of working on poles with customer meters and current transformers on them and complying with regulatory requirements.
	Controlled Load Sample Meters <ul style="list-style-type: none">- Short: Trial a Load Control relay with metering capability to be used for sample load reporting purposes as required by AEMO	Network Visibility <ul style="list-style-type: none">- Work to deploy communications to 3000 pad mount subs that have meters installed to increase network visibility
Disposals	Individual Assets or Entire Asset Variants <ul style="list-style-type: none">- Disposal as per Section 5.4 of CECM1000.10a Asbestos Management	Hazardous Materials Continue to manage interactions with: <ul style="list-style-type: none">• Asbestos as per <i>CECM1000.10a</i> and <i>CECM1000.10e</i>
Asset Support	Process & Information <ul style="list-style-type: none">- Short : Establish a planning capability for metering within the planning team to align with existing planning processes- Short : Establish an engineering capability within engineering teams to provide engineering support for the meter assets- Short : Work with stakeholders to determine the appropriate data repository for meter data collected by Essential Energy owned and maintained metering assets.- Short: Continue to maintain our Meter Asset Information in EDDiS.	
	People & Training <ul style="list-style-type: none">- Continue with current regulatory and periodic training.- Resourcing level analysis to achieve required regulatory testing needs to be conducted to determine appropriate resource levels	

Testing of metering assets is critical to ensuring they are functioning accurately, as accurate metering is essential to the running of the energy market there is a very significant regulatory framework that Essential Energy must follow to ensure the integrity of the metering function is maintained. This section details the forecasts related to the testing requirements for our metering assets over the next 5 years and beyond.

Type 5 and 6 Meter Testing

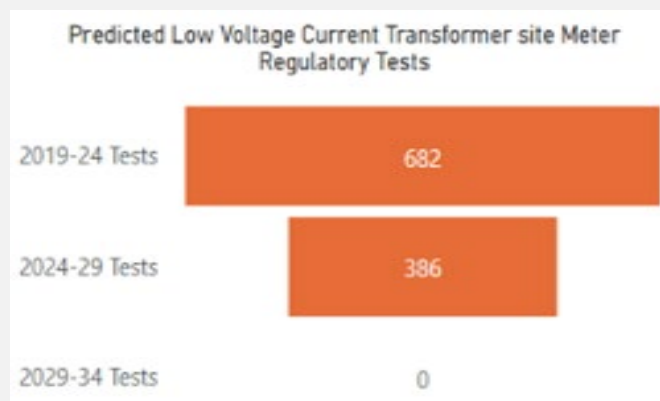
Although Essential Energy is predicted to have almost no Type 5 and 6 meters by Mid 2032 there is still a significant testing regulatory requirement that will need to be resourced through these regulatory periods. The table below is a high level summary of the number of tests that will need to be conducted each regulatory period in order to meet our licence conditions.



Low Voltage Current Transformer testing requirements

The Electricity market changes described previously are also impacting our Low Voltage Current Transformer (LVCT) sites in the same way as it is impacting our Type 5 and 6 meters. The predicted asset testing requirements are shown in the adjacent chart.

Note: The LVCT is expected to reach 0 before the type 5 and 6 meters as these types of installations are typically at larger customer sites who historically have been transitioning to Smart Meters faster than the average customer.



Wholesale Metering requirements

Essential Energy has a number of sites that are wholesale metered, these sites will remain Essential Energy's responsibility in the long term. The following table describes the required testing/inspections for these sites.

CT/VT Testing	Meter Testing	Site Inspections
Every 10 Years	Every 5 Years	Every 2.5 Years
4.6 Tests p.a.	9.2 Tests p.a.	18.4 Inspections p.a.

HV Metering Customer requirements

Currently approximately 70 customers are HV metered and LV Tariffed. A program to remediate this has been budgeted for in the current regulatory period. At the end of this program it is estimated that around 12 customers will remain as HV metered and LV Tariffed. As the sites are HV Metered sites this will result in a testing overhead as detailed in the table below.

Number of VTs/CT's	25
Testing Frequency	Every 10 Years
Annual Tests	2.5

Lifecycle Forecasts	<p>The following programs are significant deliverables that need to be visible across the strategic lifecycle:</p> <p>Master Subtractive metering program Due to changes to the Australian Energy Market Operator rules, Master subtractive metering configurations are no longer allowed. As such Essential Energy is running a program to remediate these sites to meter these locations in accordance with new rules. As there is a very large number of affected customers with a diverse range of metering configurations this program is being managed by a dedicated team with only a small impact to existing business as usual functions across the organisation. Essential Energy is funding the changes required to meet compliance and appropriate funding is being sourced through appropriate regulatory frameworks.</p> <p>End of life 3G program for metering assets Telstra has announced that their 3G cellular network will be switched off on June 30 2024, Essential Energy currently uses this network as the backhaul for reading 1496 meters across its network. As such Essential Energy is currently developing a solution to migrate all of the affected meters to an appropriate solution prior to the switch off date. This work is likely to present a significant resourcing requirement however until the final solution is developed this effort cannot be accurately estimated.</p>		
	<ul style="list-style-type: none"> • Meter Population Reduction predictions Meter populations reduction predictions were modelled using historical data around the loss of meters since the start of Power of Choice (POC). • Meter testing predictions Meter testing predictions were modelled using historical data around the loss of specific meter models since the start of Power of Choice (POC). • Low Voltage Current Transformer Population Reduction predictions Low voltage current transformer populations reduction predictions were modelled using historical data around the loss of Current Transformers since the start of Power of Choice (POC). • Low Voltage Current Transformer testing predictions Low voltage current transformer testing predictions were modelled using historical data around the loss of specific Current Transformer types since the start of Power of Choice (POC). • Metering Installations on Essential Energy assets The visualisations of number and locations of metering installations on Essential Energy assets was sourced through WASP using the assumption that meter boxes installed on EE assets in fact house customer meter installations. 		
Assumptions			
Enablers	<p>Enabling tools include</p> <ul style="list-style-type: none"> • Existing Policies, Procedures and Standards • Power BI Models • National Electricity Rules • Service Installation rules • Meter Installation Rules 		
Governance	Roles & Responsibilities	Information & Interfaces	Governance
	<p>This strategy is owned by:</p> <p>Metering Strategy Lead</p>	<p>Information</p> <p>Reliability DB, Fire Starts Register, WASP, PEACE, Smallworld, Totalsafe, MVRs, MV90, EDDiS</p> <p>Interfaces</p> <ul style="list-style-type: none"> • Internal: Network Strategy Leads, ETECH, Asset Engineering, Investment Delivery, Asset Performance, Planning, C&NS. • External: Customers, Retailers, IPART, External auditor, AEMO and the AER. 	<p>This strategy has the following review cycle:</p> <p>Minor – Annually</p> <p>Major – 5 years (or when triggered)</p> <p>All updates are to be approved by the Head of Asset Management.</p>
Summary of Changes	<p>This document includes the following key changes since the previous version of this asset class strategy:</p> <ul style="list-style-type: none"> • Line of Sight and performance targets developed against the Asset Management Objectives. • Developed new Power BI visualisation for the included assets, allowing a high level of understanding of Existing and predicted metering asset populations as well as predicted Testing and Inspection requirements. 		