

Appendix 1.4: Asset management strategy

**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.

ASSET MANAGEMENT STRATEGY

Version Number: v8.0

Effective Date: 31 January 2018

ActewA/AGL

for you

Table of Contents

1	Purpose.....	1
2	Good Practice Alignment.....	2
3	Corporate Alignment	3
4	Document Alignment and Review.....	5
4.1	Alignment.....	5
4.2	Review.....	5
5	Key Roles and Responsibilities	6
6	Scope of the Asset Management System.....	7
6.1	Scope of Assets Covered.....	7
6.2	Life Cycle Scope.....	9
6.3	Geographical Scope	9
7	Asset Management Objectives and Principles.....	10
7.1	Corporate Objectives	10
7.2	Core Asset Management Principles	10
7.3	Asset Management Objectives.....	11
7.4	Risk Management Objectives	11
7.5	Key Performance Indicators.....	12
7.5.1	Leadership and Commitment: ISO 55001 Clause 5.1	12
7.5.2	Organisation Roles, Responsibilities and Authorities: ISO 55001 Clause 5.3.....	12
7.5.3	Awareness: ISO 55001 Clause 7.3.....	12
7.5.4	Creating and Updating, and Control of Documented Information: ISO 55001 Clauses 7.6.2 & 7.6.3	13
7.5.5	Internal Audit: ISO 55001 Clause 9.2	13
7.5.6	Management Review: ISO 55001 Clause 9.3	13
8	Implementation of Asset Management System.....	14
9	Current Asset Status	16
9.1	Current Requirements.....	16
9.1.1	Legislative, Regulatory and Statutory Compliance.....	16
9.1.2	Asset Capacity	18
9.1.3	Capability.....	18
9.1.4	Availability and Reliability.....	18
9.1.5	Definition of Maintenance Categories.....	19
9.2	Performance Monitoring.....	20
10	Future Asset Status.....	21

10.1	Stakeholder Engagement	21
10.2	Future Requirements – Reporting, Compliance and Capability.....	21
10.2.1	Annual Planning Report	21
10.2.2	Ten Year Augmentation Plan.....	22
10.2.3	Zone Substation Reports	22
10.2.4	Legislative, Regulatory, and Statutory Compliance.....	22
10.2.5	Capacity	23
10.2.6	Capability.....	23
10.2.7	Availability and Reliability.....	23
10.2.8	Condition or Remaining Life of Assets.....	23
10.2.9	Guidelines for Greenfield and Augmentation Planning	23
10.3	Forecasting	24
10.3.1	Methodology.....	24
10.3.2	Demographic and Economic Factors.....	25
10.3.3	Rooftop PV Generation.....	25
10.3.4	Batteries	25
10.3.5	Improved Energy Efficiency of Buildings	25
10.3.6	Forecasting Model Verification.....	26
11	Asset Management Capabilities	27
12	Asset Maintenance and Renewal Planning	30
13	Aspirational Strategies	31
13.1	Evolution of the Regulated Business to a Distributed Systems Operator/Manager 31	
13.2	Exploring the Contestable Space through our Metering Company ‘Metco’	32
13.3	The Symbiotic Relationship	32
13.4	Test and Learn	32
13.5	Exploration and Design of Smart City and Innovation Incubator	33
13.6	Designing New Culture and Capabilities.....	33
13.7	Managing Disruptive Technologies.....	33
14	Asset Specific Strategies.....	35
14.1	Asset Specific Plans	35
14.2	Criteria for the Prioritisation or Optimisation of Plans.....	35
14.3	Consideration of Asset Criticality	35
14.4	Consideration of Stakeholder Requirements	35
15	Publication and Communication	36
16	Continuous Review and Improvement.....	37

Glossary

Term	Definition
ACT	Australian Capital Territory
AAD	ActewAGL Distribution
AER	Australian Energy Regulator
AEMC	Australian Energy Market Commission
AEMO	Australian Energy Market Operator
AIMS	ActewAGL's Information Management System
AMIP	Asset Management Improvement Plan
ASP	Asset Specific Plan
B2B	Business-to-business information exchange
BSP	Bulk Supply Point
CAIDI	Customer Average Interruption Duration Index
DER	Distributed Energy Resources
DMD	Diversified Maximum Demand
DNSP	Distribution Network Service Provider
DSM	Distribution System Manager
DSO	Distribution System Operator
DT	Disruptive Technology
GMEN	General Manager – Energy Networks
HV	High Voltage electricity circuit – generally 132kV in ActewAGL network
KPI	Key Performance Indicator
kV	Kilovolt
MDP	Metering Data Provider
MEFM	Monash Electricity Forecasting Model
MSE	Mean Squared Error
MSP	Metering Service Provider
MW	Megawatts
N-1	Security Standard where supply is maintained following a single credible contingency event
NEL	National Electricity Law
NEM	National Electricity Market
NER	National Electricity Rules
NPV	Net Present Value
NSP	Network Service Provider

Term	Definition
NSW	New South Wales
PV	Photo-Voltaic panels (solar panel generators)
RCM	Reliability Centred Maintenance
RIT-D	Regulatory Investment Test for Distribution
RIT-T	Regulatory Investment Test for Transmission
RIVA DS	Riva Decision Support (proprietary software system that supports analytical modelling to aid asset management decision making)
SAIDI	System Average Interruption Duration Index
SAIFI	System Average Interruption Frequency Index
SCADA	Supervisory Control and Data Acquisition system
SFD	State Final Demand
STPIS	Service Target Performance Incentive Scheme
TNSP	Transmission Network Service Provider
Utilities Act	ACT Utilities (Technical Regulations) Act 2014
UTR	Utilities Technical Regulations
VoLL	Value of Lost Load

1 Purpose

This document forms the Asset Management Strategy for ActewAGL Distribution. It is intended to define the strategic objectives and approach to the management of the relevant physical assets within the organisation, in a manner which:

- Is optimised and sustainable in terms of whole-life, whole-system cost over the long term;
- Facilitates the delivery of the company's Asset Management Policy;
- Considers how the organisation will achieve current and future demand, reliability, and security via the management of the condition and performance of the asset base;
- Considers the necessary current and future Asset Management capabilities of the organisation, in terms of people, processes, systems, equipment, and data to achieve the identified outputs and objectives.

This document and the Asset Management approach captured within it are derived from and consistent with the overall ActewAGL *Electricity Distribution Asset Management Policy* (Doc. Ref. PO1101), which in turn is consistent with the overall ActewAGL Distribution Organisation Strategic Plan.

This is a live document, meaning it is periodically updated to reflect changes in the strategy. This document defines how the ActewAGL Asset Management Policy is to be implemented and achieved and provides the necessary framework and guidance to all relevant stakeholders.

It is intended to define what ActewAGL intends to achieve from its Asset Management activities and by when, including both:

- The current and future demand on, and condition and performance requirements of, the Electricity Distribution Network assets and ActewAGL's approach to ensuring the delivery of these future requirements
- The current and future Asset Management capabilities of ActewAGL, i.e. its processes, information, systems, people, tools, resources, etc. and how we intend to develop our future capabilities to a level of maturity necessary to deliver our organisational goals.

2 Good Practice Alignment

This document has been developed based on good practice guidance from internationally recognised sources, including the Global Forum on Maintenance and Asset Management (GFMAM), the Asset Management Council (AMC) and the Institute of Asset Management (IAM). It has been developed to comply with the relevant clauses of ISO 55001.

3 Corporate Alignment

This *Asset Management Strategy* document plays a key role within the overall ActewAGL Asset Management Framework and in ensuring alignment between the company's activities on the ground, including asset interventions, and the overall Energy Networks Organisation Strategic Plan. The generic steps in this alignment, as defined by ISO 55001, are shown in Figure 1. Mapping to ISO 55001 clauses is given in Table 1.

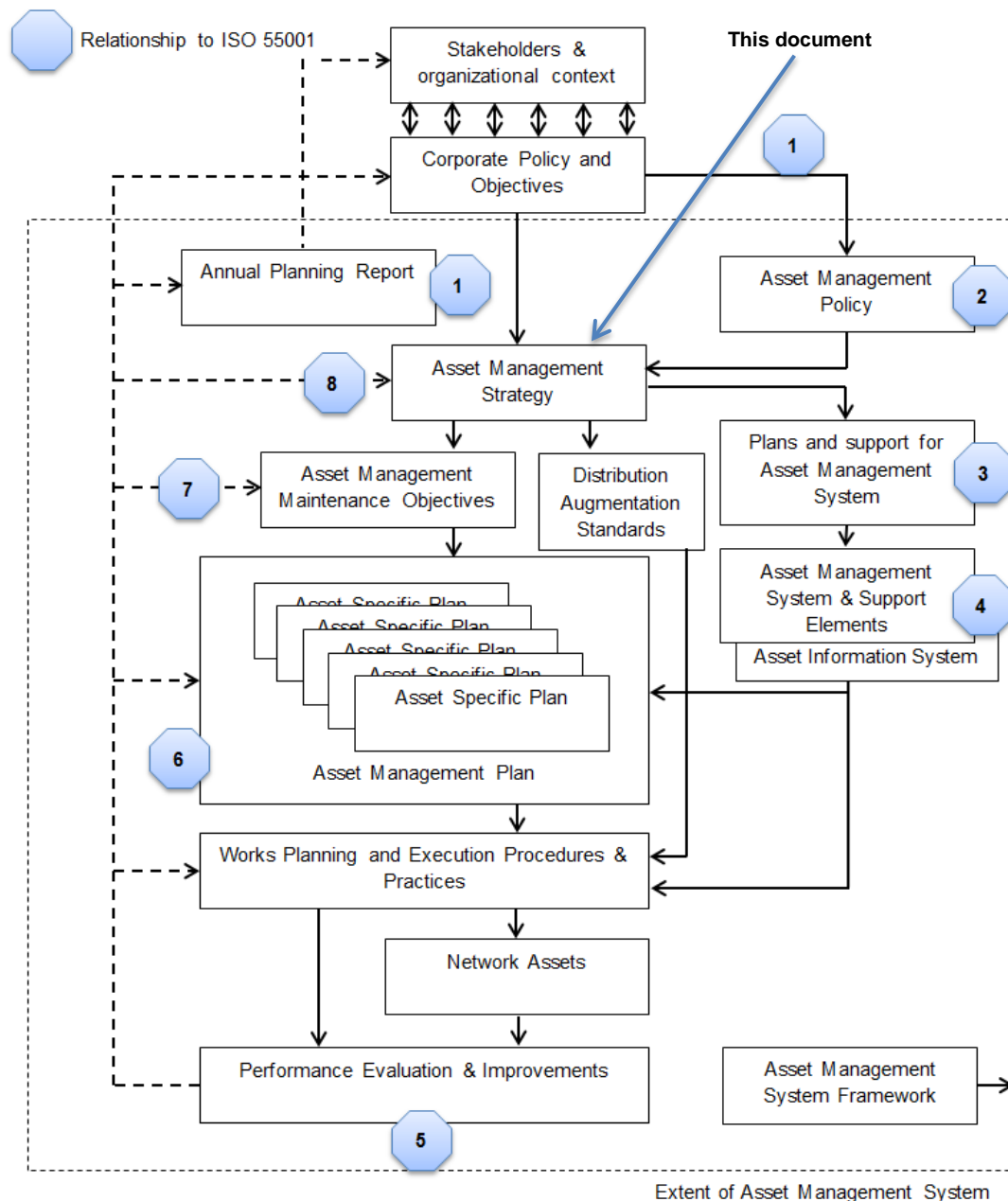


Figure 1: Asset Management Strategy Corporate Alignment

	ISO 55001 Reference
1	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
2	5.2 Policy
3	4.4 Asset management system 6.1 Actions to address risks and opportunities for the asset management system
4	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
5	8.2 Management of change 9.1 Monitoring, measurement, analysis and evaluation 9.2 Internal audit 9.3 Management review 10 Improvement
6	8.1 Operational planning and control 8.2 Management of change 8.3 Outsourcing (control)
7	6.2.2 Planning to achieve asset management objectives 8.3 Outsourcing (scope)
8	4.3 Determining the scope of the asset management system 6.2.1 Asset management objectives

Table 1: Asset Management Strategy Relationship to ISO 55001

4 Document Alignment and Review

4.1 Alignment

This document is informed by the Asset Management Policy, which in turn is informed by corporate level policy objectives. The purpose of this document is to provide high level strategic direction on how the Asset Management Policy will be implemented. This direction will include the scope of assets covered by the Asset Management System; the standards that will determine the structure, implementation and operation of the Asset Management System; and the geographical boundary of assets covered.

This document in turn informs each of the Asset Specific Plans and strategies and augmentation plans within the system-wide Asset Management Plan. At the Asset Management Plan level, the strategies contained in each of the asset- or issue-based strategy documents will be an extension of, and provide additional details to, this document. The Asset Management Strategy will also provide the framework for asset-specific and augmentation plans generated within the Asset Management Plan.

The Asset Management Plan includes all asset-specific, augmentation, customer initiated, and demand response plans.

4.2 Review

This document shall be reviewed every 2 years, and approved by the Branch Manager, Asset Strategy. The date of the previous review and next review is shown in the Approval table, after the Version Control table.

5 Key Roles and Responsibilities

This document has been authorised by the ActewAGL General Manager – Energy Networks.

The Branch Manager – Asset Strategy, is fully accountable for this Asset Management Strategy, its communication, implementation, continual development and its on-going authorisation by the ActewAGL General Manager – Energy Networks.

Key positions and responsibilities in asset management are as follows:

- General Manager Energy Networks (GMEN): Overall responsibility for Energy Networks to the executive and board
- Responsible to the GMEN:
 - Branch Manager Asset Strategy: Responsible for Strategic Network Planning, Forecasting and Network Capability Analysis, Regulatory Compliance, Asset Information Systems, Assets Standards and Acceptance, Asset Management Systems development, Asset Management Strategy and Planning, Implementation and Audit
 - Branch Manager Asset and Network Performance: Responsible for Network Control, Management of Primary and Secondary Systems Assets, Delivery of Program of Works
 - Branch Manager Works Delivery: Responsible for Works Packaging and Scheduling, Construction and Maintenance Management, Management of Works Crews, Logistics, Contracts and Fleet Management
 - Branch Manager Customer Connections: Responsible for Energy Markets, Metering and Metering Reform, Contact Centre, Network Connection Services
 - Branch Manager Gas Networks
 - Branch Manager Business Transformation: Responsible for Change Management and Business Improvement
 - Branch Manager Strategic Project Services: Responsible for managing the introduction of new strategic business niches.

6 Scope of the Asset Management System

6.1 Scope of Assets Covered

The scope of the Asset Management Strategy is consistent with the Asset Management Policy and applies to the provision, operation, and maintenance of all networks, equipment and facilities relating to the following asset groups:

- Zone Substations
- Transmission System
- Distribution System
- Secondary Systems (SCADA/Protection)
- Operational Technology Systems
- Asset Information Systems

Asset Management Information assets are covered in a separate document "[Asset Information System Description](#)".

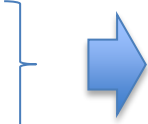
Key elements of the asset base are included in the table on the next page:

Asset Type	Nominal Voltage	Quantity
Bulk Supply Points	330/132 kV	2
	132/66 kV	1
Transmission Lines	132 kV	189 km Overhead
	132 kV	6 km Underground
Sub-transmission Lines	66 kV	7 km overhead
Switching Stations	132 kV	2
Zone Substations	132/11 kV	12 (+ 1 mobile substation)
	66/11kV	1
Power transformers	132/11 kV	28
	66/11 kV	3
Feeders	22 kV	2
	11 kV	248
22/0.415 kV Substations	22 kV & 400 V	18
11/0.415 kV Substations	11 kV & 400 V	5,079
Number of transmission towers and pole structures	132 kV	917
	66 kV	52
Number of poles	22 kV, 11 kV and 400 V	50,685
Circuit km of distribution overhead lines	22 kV, 11 kV and 400 V	2,365 km
Circuit km of distribution underground cables	11 kV and 400 V	2,946 km
Number of customer connections	22 kV	2
	11 kV	25
	400 V / 230 V	191,454
Coverage area		2,358 km ²
System maximum demand		633 MW
Telecommunications network		Fibre optic and radio

Further details of the assets within each asset group can be found in the *Asset Specific Plans*.

6.2 Life Cycle Scope

The asset management system manages the entire asset life cycle, which for ActewAGL is segmented into the following areas:

- Technical Standards and Legislation
 - Planning
 - Design
 - Construction
 - Systems Engineering
 - Configuration Management
 - Maintenance Delivery
 - Reliability Engineering
 - Asset Operations
 - Resource Management
 - Shutdown and Outage Management
 - Fault and Incident Response
 - Asset Decommissioning and Disposal.
- 
- Asset Creation and Acquisition

6.3 Geographical Scope

ActewAGL owns and operates the electricity network in the ACT that provides supply to high voltage and low voltage customers in the region, and a small number of customers in the neighbouring region of New South Wales. It serves over 191,000 customers (ActewAGL Annual Planning Report 2017). ActewAGL's electricity transmission and distribution network takes supply from three TransGrid bulk supply points (Canberra, Williamsdale, and Queanbeyan substations), and transmits and distributes it throughout the ACT.

The geographical area of the asset base considered in this Asset Management Strategy is shown in the [Annual Planning Report](#) 2017

7 Asset Management Objectives and Principles

Alignment is the transparent linkage of the intended and actual operations throughout different levels of the organisation. This aligns the top management aspirations of the organisation with the “nuts and bolts” realities and opportunities of the assets.

The alignment between organisational strategic direction and the day-to-day activities of managing assets is a vital component of the Asset Management System.

To assure alignment between the Organisation Strategic Plan and the Asset Management Objectives incorporated within this *Asset Management Strategy*, the following sections provide a summary of the key objectives identified at each level of the Asset Management System. Each section is aligned with the previous section and ultimately the Organisation Specific Asset Plans.

7.1 Corporate Objectives

The key organisational objectives defined by the Organisation Strategic Plan are to:

- Embed an effective safety culture throughout the Energy Networks business
- Implement an effective workforce strategy to develop employee skills, leadership, and accountability; and to increase the readiness and ability of staff to adapt to change throughout the Energy Networks business
- Replace legacy network operational systems.

The prime objective of the Asset Management element of the ActewAGL Energy Network Business and Transformation Plan is:

“...Achieving excellence in the management of ActewAGL’s strategic asset portfolio and continuously striving to safely and effectively deliver programs within stakeholder requirements and regulatory constraints...”

7.2 Core Asset Management Principles

ActewAGL Distribution shall apply an Asset Management approach that encompasses the following principles:

- The appropriate balance between stakeholder expectations regarding system reliability, risk, and cost.
- All Asset Management interventions will be justified by robust engineering analysis underpinned by available and appropriate asset information
- Future projects will be prioritised based on the lifecycle costs and impact on customers in accordance with Board directives
- The development of asset management plan(s) and life cycle activities will include consideration of the impact of actions in one life cycle phase upon the activities necessary in other life cycle phases
- *Asset Specific Plans* will be jointly optimised and prioritised, taking into account overall value, resource requirements, interdependencies, risks, and performance impact
- Modern equivalent technology will be adopted, but only where that technology has already been proven in a similar utility business environment

- The preventative maintenance program will be improved through implementation of a risk-based approach to determining maintenance requirements that deliver required levels of reliability
- The utilisation of internal and contracted labour resources will be improved
- The Asset Management capabilities of the organisation will be developed to an appropriate level to deliver efficient outcomes for customers and stakeholders
- Asset management activities will take into account the output and recommendations from consumer engagement initiatives to emphasise the partnership between ActewAGL and its customers.
- Budget for expenditure across asset management activities to achieve a level of quantified residual risk that is acceptable to its customers and the community as well as to meet relevant regulatory and license based requirements. This is achieved via a top-down and bottom up approach to risk assessment as detailed in

[Consideration of Risk for Evoenergy Regulatory Proposal 2019 -2024](#)

7.3 Asset Management Objectives

In alignment with the Asset Management Strategy, the Asset Management Objectives are directed at maintaining assets according to the principles of Reliability Centred Maintenance (RCM). The governing factor in RCM analysis is the impact of a functional failure at the equipment level, and tasks are directed at a limited number of significant items – those whose failure might have safety, environmental, or economic consequences. These items are subjected to intensive study, first to classify them according to their failure consequences, and then to determine whether there is some method of mitigation in the form of an optimised maintenance program against these consequences. The specific and integrated Asset Management Objectives are detailed in the following linked document:

[Asset Management Objectives](#)

7.4 Risk Management Objectives

The objective of risk management is to identify and to manage the uncertainties that affect a business enterprise. This is accomplished within the framework of asset management by taking the following steps:

- Actively find and manage risks, and develop comprehensive controls and treatment strategies
- Implement continuous improvement in risk management. Set asset performance targets and measures. Review and modify processes as required. Review and modify systems, resources, and capability/skills to ensure continuous improvement.
- Individuals responsible for asset management should be appropriately skilled, have adequate resources to check and improve controls, monitor risks, and the ability to communicate effectively with all stakeholders
- Decision making should include consideration of risks and the application of the risk management process as appropriate
- Risk management performance should be transparent and reported. This reporting is inherent in the “line of sight” principle.

7.5 Key Performance Indicators

The following Key Performance Indicators (KPIs) have been set as a result of the gap analysis arising from the self-assessment conducted on ActewAGL's asset management system. The intention of setting these KPIs is to ensure:

- Corporate objectives are met, and
- Continued certification ISO 55001 and continuous improvement to the standard.

7.5.1 Leadership and Commitment: ISO 55001 Clause 5.1

	Key Performance Indicator
Specific Task	Signoff and commitment by top management to asset management head documents, Asset Management Policy, Asset Management Strategy, Asset Management Committee Charter
Metric	Approved Asset Management Policy, Asset Management Strategy, and Asset Management Committee Charter
Attainable through:	Asset Management Committee meetings and processes
Relevant	Required to meet requirements of Clause 5.1 of ISO 55001
Timing	Complete by January 2017

7.5.2 Organisation Roles, Responsibilities and Authorities: ISO 55001 Clause 5.3

	Key Performance Indicator
Specific Task	Complete and attain approval of section 5 "Key Roles and Responsibilities" of this document
Metric	Section 5 completed, and this document approved
Attainable through:	Overall approval of the revision of this document
Relevant	Required to meet requirements of Clause 5.3 of ISO 55001
Timing	Complete by June 2017

7.5.3 Awareness: ISO 55001 Clause 7.3

	Key Performance Indicator
Specific Task	Create awareness in Energy Networks staff of Asset Management, the Asset Management Policy, benefits of improved asset management, risks and opportunities of work activities, and implications of not conforming to the Asset Management System Requirements
Metric	All Energy Networks staff exposed to principles and purpose of Asset Management, and its relevance to ActewAGL and their responsibility
Attainable through:	ActewAGL's communication framework
Relevant	Required to meet requirements of Clause 7.3 of ISO 55001
Timing	Complete by June 2017

7.5.4 Creating and Updating, and Control of Documented Information: ISO 55001 Clauses 7.6.2 & 7.6.3

	Key Performance Indicator
Specific Task	Ensure asset management documents are adequately identified, described formatted, reviewed, approved, and controlled
Metric	Outstanding Asset Management documents processed and approved: <ul style="list-style-type: none"> • Asset Management System Framework • Asset Management Policy • Asset Management Strategy • Asset Management Objectives • Asset Management Communications Plan • Asset Management Stakeholder Engagement
Attainable through:	ActewAGL's Information Management System
Relevant	Required to meet requirements of Clauses 7.6.2 & 7.6.3 of ISO 55001
Timing	Complete by June 2017

7.5.5 Internal Audit: ISO 55001 Clause 9.2

	Key Performance Indicator
Specific Task	Ensure internal and external certification audits are planned, and provide information to determine whether the Asset Management System conforms to ActewAGL's requirements, and ISO 55001, and is effectively implemented and maintained
Metric	The annual audits are conducted and effective reports produced
Attainable through:	ActewAGL's internal audit resources
Relevant	Required to meet requirements of Clause 9.2 of ISO 55001
Timing	Complete annually

7.5.6 Management Review: ISO 55001 Clause 9.3

	Key Performance Indicator
Specific Task	Ensure planned periodic review by senior management of the Asset Management System on its continuing suitability, adequacy, and effectiveness
Metric	Asset Management Committee meetings held and minutes taken every two months
Attainable through:	ActewAGL's standing Asset Management Committee
Relevant	Required to meet requirements of Clause 9.3 of ISO 55001
Timing	Ongoing meetings held every two months

8 Implementation of Asset Management System

An Asset Specific Plan has been developed for each class of asset. These Asset Specific Plans are managed using Riva DS software and are built up from the actions that need to be carried out on each individual asset. The Asset Specific Plans also describe the databases that are used to store data about each type of asset.

In order to determine if new or augmented assets are required, it is necessary to carry out a demand forecast to test if the existing assets will have the capacity to provide the service required for the duration of the forecast period. Demand forecasts and a comparison of the forecast to the asset capability of zone substations and HV feeders are documented in Zone Development Reports. These reports are saved in ActewAGL's Information Management System (AIMS).

A gap analysis will determine if the existing assets have the capability to meet forecast demands. The asset capability assessments (or ratings) are recorded in the Electrical Data Manual and stored in the AIMS.

The following steps have been taken to ensure the implementation of an ISO 55001 compliant Asset Management System which is in alignment with Corporate Vision, Policies and Strategies:

- Undertake Asset Management Training for key staff
- Conduct an extensive ISO 55001 gap analysis
- Undertake a Standards Alignment workshop
- Identify staff resource gaps and recruitment of key staff
- Develop Asset Management Policy in line with Corporate Policies
- Develop Asset Management Objectives/Strategy based on the Asset Management Policy
- Develop Asset Management framework and Document Hierarchy
- Develop Template for Asset Specific Plans
- Establish and embed communications plan and capabilities audit to ensure team approach within the Asset Management System
- Identify and record network constraints and capture performance monitoring information streams
- Develop Asset Specific Plans for all asset classes
- Compile and prepare the final plan.

To ensure delivery of the Asset Management activities defined above, ActewAGL has implemented an organisational structure with clear definition and accountability for Asset Management activities. Refer to Figure 3 for details.

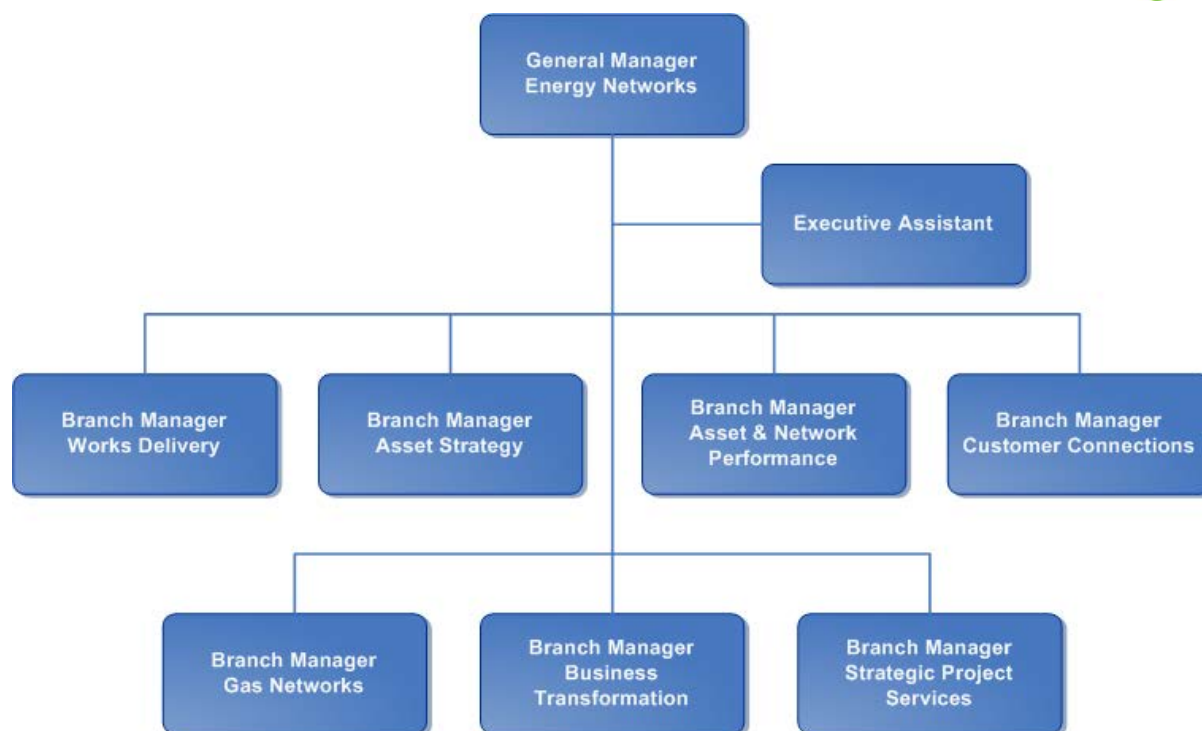


Figure 2: Asset Management Organisational Structure

9 Current Asset Status

9.1 Current Requirements

ActewAGL's current requirements are based on meeting corporate objectives, the Asset Management Policy, and specific Asset Management Plans of each asset group. Requirements of the specific asset groups are listed in the Asset Specific Plans, and the overall strategic objectives are presented in section 9.1.1 to 9.1.4.

9.1.1 Legislative, Regulatory and Statutory Compliance

ActewAGL Distribution owns, operates and maintains the electricity transmission and distribution network supplying customers in the ACT and approximately 100 customers located in NSW. This section provides an overview of its main obligations.

ActewAGL Distribution is subject to a broad range of Commonwealth and territory-specific laws, as well as a number of codes and procedures established by the relevant regulators. These obligations fall under the following broad categories:

- *Industry obligations* – These are mainly associated with the characteristics of ActewAGL Distribution as a Network Service Provider and Metering Service Provider. These include many of the obligations under the *Utilities Act 2000 (ACT)*, *Utilities (Network Facilities) Tax Act 2006 (ACT)*, *Electricity Feed-in (renewable Energy Premium) Act 2008*, *Territory-owned Corporations Act 1990 (ACT)*, *Utility Services Licence*, *Consumer Protection Code*, and *Ring-fencing guidelines*.
- *Technical obligations* – These are associated with the technical requirements involved in owning, managing, and operating electricity network assets. These obligations include aspects of the *Utilities Act 2000 (ACT)* and codes established under that Act such as the *Management of Electricity Network Assets Code*, and a variety of relevant Australian Standards. The *Utilities Act 2000 (ACT)* specifically requires compliance with ISO 55001. Compliance with industry procedures developed in accordance with these Acts also creates regulatory obligations. Technical and operational obligations are also covered by the National Electricity Rules, Australian Standards, and electricity industry codes and guidelines.
- *Safety obligations* – These are associated with the safety risks involved in owning an electricity network; and the procedures and processes required to operate, maintain, and build network assets while ensuring employee and public safety. Relevant obligations include the *Occupational Health and Safety Act 2011 (ACT)*, the *Electrical Safety Act 1971 (ACT)*, *Utility Network (Public Safety) Regulation 2001*, the *Building Act 2004 (ACT)*, the *Construction (Occupation) Licensing Act 2004 (ACT)*, the *Scaffolding and Lifts Act 1912 (ACT)*, the *Dangerous Substances Act 2004 (ACT)*, the *Crimes Act 2000 (ACT)*, the *Utilities Act 2000 (ACT)*, and regulations, codes and procedures under these Acts.
- *Environment, emergency, and heritage obligations* – These relate to the operation of ActewAGL Distribution in the ACT environment, its responsibilities to protect the environment and heritage property, and prepare for and act appropriately in the event of an emergency. Obligations arise from the *Environment Protection Act 1997 (ACT)*, the *Litter Act 2004 (ACT)*, the *Planning and Development Act 2007 (ACT)*, the *Tree Protection Act 2005 (ACT)*, the *Nature Conservation Act 1980 (ACT)*, the *Emergencies Act 2004 (ACT)*, *Heritage Act 2004 (ACT)*, and the *Native Title Act 1993 (Cwth)*.
- *Market obligations* – These relate to the roles of ActewAGL Distribution as a Distribution Network Service Provider (DNSP) and Transmission Network Service Provider (TNSP) in the National Electricity Market (NEM). These obligations include compliance with the *National Electricity Law*, *National Electricity Retail Law*, *National Electricity Rules*, and policies and

procedures developed by the Australian Energy Market Operator (AEMO) such as the *National Metrology Procedure*, including business-to-business (B2B) obligations and procedures, and other rules and directions. National Electricity Rules cover also a range of technical and operational obligations.

- *Corporate obligations* – These are associated with running a large and complex business in Australia which has significant economic, environmental, employment, and safety impacts in the community. These obligations relate to finance and taxation; intellectual property; human resources; terrorism and criminal matters; and ensuring appropriate compliance systems, internal auditing, and due diligence procedures are in place. Relevant acts include the *Annual Reports (Government Agencies) Act 2004 (ACT)*, *Taxation (Government Business Enterprises) Act 2003 (ACT)*, *Corporations Act 2001 (Cwth)*, and the *Privacy Act 1988 (Cwth)*.

ActewAGL Distribution supplies electricity to a small number of customers located in NSW that are connected to ActewAGL's network. ActewAGL Distribution is exempt from a requirement to hold a Network Service Provider licence in NSW. Nevertheless, ActewAGL Distribution has obligations to comply with a number of NSW legal and technical requirements relating to asset management which are specific to NSW. In particular, most of the network-related construction work is contestable in NSW. In addition, specific NSW requirements relating to safety, technical standards, and environmental management may apply.

9.1.1.1 *Network Asset Management and Operations*

ActewAGL Distribution holds a licence under the *Utilities Act 2000 (ACT)* to provide electricity distribution and connection services. ActewAGL Distribution is also registered with AEMO as:

- Distribution Network Service Provider (DNSP)
- Transmission Network Service Provider (TNSP)
- Metering Service Provider (MSP)
- Metering Data Provider (MDP).

As summarised above, there is a broad range of legislative, statutory, and technical requirements that are relevant to the operation and maintenance of the electricity network. The requirements that are key to asset management are:

- Utilities Act 2000 (ACT)
- Utility Network (Public Safety) Regulation 2001
- National Electricity Rules
- Occupational Health and Safety Act 2011 (ACT)
- Management of Electricity Network Assets Code
- Electricity Distribution Supply Standards Code
- Selected technical standards
- Selected industry guidelines.

9.1.2 Asset Capacity

The strategic intent for asset management is to ensure that all assets must be of sufficient capacity to meet expected peak demands. For the electricity network, this means the zone substations, transmission networks, and distribution networks must at all times be adequately rated to ensure supply to customers is not interrupted because of peak demand requirements.

This strategy also requires that Secondary Systems, such as communications, protection and SCADA, will have the capacity to function to requirements during periods when those systems are under stress, and will have adequate physical security to ensure against intrusion and mal-operation.

Similarly, the Operational Technology and Metering systems shall have sufficient capacity and security to meet expected demands, and meet privacy requirements.

Buildings and structures containing distribution assets shall be adequately sized, secure, and designed to contain and protect assets.

All fleet plant shall have the capacity to carry out intended duties, and the fleet size shall be sufficient to meet reasonable foreseeable demands.

9.1.3 Capability

The transmission network and zone substations shall have the capability to continue to operate and serve customers in the event of a single contingency failure for at least 99% of the time.

Distribution systems must be capable of being restored within an acceptable time period, depending on the nature of the interruption, and of being supplied from an alternative source where reasonable.

Secondary systems, metering and operational technology shall be robust, modern, and have the capacity to meet normal operating requirements and reasonable levels of stress and overload.

Buildings and fleet shall be capable of supporting network requirements under normal operating requirements and during reasonable levels of stress and overload.

9.1.4 Availability and Reliability

The Australian Energy Market Commission (AEMC) has reviewed the national framework for distribution reliability. The intention is to introduce Australia-wide standards for distribution network reliability, and ActewAGL needs to align its reliability strategy with those emerging standards. Further information on these standards may be found in the following document:

<https://scer.govspace.gov.au/files/2014/12/ToR-National-reliability-standard.pdf>

9.1.4.1 SAIDI, SAIFI and CAIDI

The following indices are used to measure distribution network reliability:

- **SAIDI:** System Average Interruption Duration Index. The ratio of total customer hours interrupted to total customers served. This is a performance measure of network reliability, indicating the total minutes, on average, that customers are without electricity during the relevant period.
- **SAIFI:** System Average Interruption Frequency Index. The ratio of total customer interruptions to total customers served. This is a performance measure of network reliability, indicating the average number of occasions each customer is interrupted during the relevant period.

- **CAIDI:** Customer Average Interruption Duration Index. The ratio of total customer time interrupted to total customer interruptions. Measured in minutes and indicates the average duration an affected customer is without power. $CAIDI = SAIDI/SAIFI$.

The reliability targets specified in the Supply Technical Standards Code are shown in Table 2.

Parameter	Target	Units
Outage duration (SAIDI)	91.0	Minutes
Outage frequency (SAIFI)	1.2	Number
Outage time (CAIDI)	74.6	Minutes

Table 2: Supply Technical Standards Code Reliability Targets for 2016-17

9.1.5 Definition of Maintenance Categories

AAD's maintenance activities include condition monitoring, preventative maintenance, and corrective maintenance. These are explained in more detail below.

- *Condition Monitoring* – Planned inspections, tests, measurements, surveys
Examples: Pole inspections, transformer oil analysis, monthly zone substation inspections
- *Preventative Maintenance* – Maintenance required to prevent an asset failure and to preserve its normal function
Examples: Planned replacement of silica gel breathers, planned maintenance of circuit breaker after a specified number of operations
- *Corrective Maintenance* – Emergency repairs, response to failures, works that were not previously identified as a planned activity
Examples: Repair oil leak on transformer, repair cable fault.

The type of maintenance activity undertaken will often depend on the outcome of condition monitoring, as depicted in Figure 4.



Figure 3: Maintenance Activities

9.2 Performance Monitoring

Asset performance is measured against Key Performance Indicators (KPIs) and relevant targets. Areas of continual improvement, alignment with stakeholder requirements, and defined responsibility and processes for measurement, recording and reporting are also included where relevant.

KPIs for each asset class are identified in the Asset Specific Plans.

The Asset Management System improvement is guided by the results of annual ISO 55001 certification audits. These audits provide reports of observations and non-compliances which form the basis of the improvement plans determined by the Asset Management Committee.

[Bureau Veritas – ISO 55001 Certification Report – Nov 2017](#)

10 Future Asset Status

10.1 Stakeholder Engagement

In order to assure appropriate understanding of needs and demand on the Electricity Distribution Network, ActewAGL routinely engages and communicates with stakeholders via the following key channels:

- National or state policy and legislation
- AER
- TransGrid
- Customer surveys
- Employee surveys
- Publication and consultation of proposals and plans
- ACT Government
- Publication of comparator and benchmarking analysis
- Triple bottom-line accounting.

The list of stakeholders includes, but is not necessarily restricted to:

- Customers
- Legislators and regulators
- Planning Authorities
- Commercial Developers
- Suppliers, including energy suppliers (e.g. renewable energy suppliers)
- Owners and the board
- Employees and management
- The public.

10.2 Future Requirements – Reporting, Compliance and Capability

ActewAGL aims to provide efficient, cost-effective transmission and distribution services to our customers, whilst meeting their current and future reliability and power quality expectations, ensuring public safety and minimising environmental impact.

10.2.1 Annual Planning Report

The purpose of the Annual Planning Report is to inform Customers, Generators, Investors, and Government about the ActewAGL electricity transmission and distribution network's current capability, anticipated investments to maintain that capability, drivers of future development needs and options to meet them.

In doing so we aim to provide information in a clear, concise and accurate way that:

- Enables us to have informed dialog with Generators and Customers to contribute to our understanding of their development plans;

- Clearly identifies and promotes opportunities for Generators and Customers to participate in the development of our plans for the network; and
- Informs investment and connection decisions.

It is our priority to have a transparent and accessible approach to the way we plan our network. This will encourage meaningful stakeholder participation in the planning process and improve the planning of the investments necessary to deliver transmission and distribution services to the people of the ACT.

Achieving the above will also meet the obligations in the National Electricity Rules (NER) and the ACT Energy Utilities Technical Regulations (UTR).

ActewAGL welcomes feedback on this Annual Planning Report, especially from external stakeholders considering investments that could either defer or accelerate network development

10.2.2 Ten Year Augmentation Plan

The stakeholder engagement is combined with our internal demand analysis processes, including 'Forecasting and Asset Capability Assessment' and the current 'Network Ten Year Augmentation Plan' to identify the following key network demand targets.

10.2.3 Zone Substation Reports

Future electricity demand requirements are detailed in the Zone Substation Reports. Augmentations for future requirements will also need to incorporate AER consumer engagement guidelines.

10.2.4 Legislative, Regulatory, and Statutory Compliance

The existing legislative, regulatory, and statutory requirements relate to the way ActewAGL Distribution designs, constructs, operates, and maintains the electricity transmission and distribution network.

The key technical requirements relate to the quality (e.g. voltage levels, frequency variation, harmonics, voltage dips and fluctuations) and reliability (customer minutes of interrupted supply and number of interruptions of electricity supply) as specified in the *Management of Electricity Network Assets Code*.

ActewAGL Distribution's general obligations in relation to reliability of electricity supply are also covered in the National Electricity Rules, and are based on management of the network asset in a way consistent with "good industry practice".

From this regulatory period onward, network reliability performance will be subject to financial penalties and incentives under the Service Target Performance Incentive Scheme (STPIS) which is administered by the Australian Energy Regulator (AER). STPIS guidelines were published by the AER in 2009.

The AEMC announced the commencement of new requirements under an umbrella of Network Planning and Expansion Framework which imposes on ActewAGL new obligations in relation to:

- Consistent application of regulatory investment test for transmission and distribution (the AER's RIT-T and RIT-D Guidelines were published in August 2013)
- Annual Planning Report (publication date by 31 December each year)
- Coordination of planning process with other networks

- Development and implementation of Demand Side Management Strategy.

Detailed requirements are covered in the National Electricity Rules Chapter 5.

10.2.5 Capacity

Asset capacity requirements will be impacted by load growth, which in turn will be driven by population growth and changes in technology, customer requirements, and economics.

Technical capacity will be defined and updated in the Electrical Data Manual, (Network Asset Strategy and Planning SharePoint site).

Network assets shall be utilised at an efficient level, taking into account detailed forecasts of power and energy demand.

Demand management incentives shall be included in the management of network capacity.

Our tariff strategy is currently being reviewed, and tariffs amended to better reflect the cost of supplying network capacity to each customer. Tariffs shall be based on a bottom-up approach, according to the costs to supply each class of customer. This may include identifying customers where we can maximise the value of smart meters.

10.2.6 Capability

Asset capability shall be managed to provide services required by customers, at a least cost, whole of life, whole of system approach. The extent of services required will be updated to meet stakeholder expectations.

10.2.7 Availability and Reliability

The following strategic issues shall be taken into account when managing network assets with regard to availability and reliability:

- Regulatory requirements
- Stakeholder expectations
- The N-1 principle
- The value that customers assign to lost load (Value of Lost Load, VoLL) when setting future reliability targets.

10.2.8 Condition or Remaining Life of Assets

The condition and remaining life of all network assets shall be monitored. Decisions to maintain, refurbish, or replace assets shall be based on a risk management process. The overall risk shall be determined by the condition of the asset, the consequences of failure, and the likelihood of detection and intervention prior to failure.

10.2.9 Guidelines for Greenfield and Augmentation Planning

Greenfield development and augmentation of the Distribution Network is essential to keep up with forecast growth, customer requirements, legislative and regulatory requirements, and technological requirements. The process is initiated by a perceived future need, either from stakeholder requirements or a forecast derived from historical trends. This future requirement is matched against

the capabilities of the existing assets to derive a quantitative, time-based measure of the anticipated capacity shortfall.

Solutions are proposed to meet the shortfall, and they may range from a single proposal where the solution is obvious with no practical alternatives, to a range of alternatives, including non-network solutions. The Net Present Value of each of the proposed solutions should be calculated, and the most suitable option recommended based on maximising the NPV and other relevant factors.

This entire process shall be documented as a project, before entering into the Asset Management Plan, and augmentation project documents will be audited against a checklist. Details entered into the document may vary with the nature, size and complexity of the project, but the checklist shall be annotated to reflect the contents of the project document, and reasons for not including items.

10.3 Forecasting

10.3.1 Methodology

ActewAGL has adopted and implemented AEMO's maximum demand forecast methodology which uses the Monash Electricity Forecasting Model (MEFM), based on the paper by Hyndman and Fan (2010). For more technical details about this methodology, the Monash Electricity Forecasting Model Technical Report is available at AEMO's website.

Key features of the MEFM load forecasting methodology are:

- MEFM has three sub-models:
 - Half-hourly model (HH Model)
 - Annual model
 - PV generation model (PV Model)
- Adjusted half-hourly demand, where each year of demand is normalised by seasonal average demand, are inputs to the HH model
- Annual model considers seasonal average demand against all possible economic and demographic drivers
- Forecast generated from HH and PV generation models are based on temperature and daily solar exposure simulations
- For the HH model, temperature and calendar variables are selected through a cross-validation procedure based on mean squared error (MSE)
- The coincident maximum demand contributions of block loads to the total maximum demand of BSPs and zone substations are calculated using diversity factors
- The final demand forecast simulation = Forecast from HH Model × Forecast from Annual Model – Forecast from PV model.

The main purpose of migrating to the MEFM methodology is to improve forecast accuracy, minimise estimation bias, and enhance ActewAGL's network planning.

10.3.2 Demographic and Economic Factors

Long-term electricity demand growth is largely dependent on demographic and economic variables. The following three demographic and economic variables impact on ActewAGL's maximum demand and energy consumption forecasts:

1. Population – Actual population growth rate in the ACT over the last five years has varied from 1.2% pa to 2.0% pa. The forecast average population growth rate for the ACT over the next ten years is 1.3% pa.
2. State Final Demand – State Final Demand (SFD) measures the total value of goods and services that are sold in a state. SFD growth rate in the ACT over the last five years has varied from 1.0% pa to 6.0% pa. The forecast average SFD growth rate for the ACT over the next ten years is 3.4% pa.
3. Electricity Price – Electricity price growth rate in the ACT over the last five years has varied from 0.6% pa to 1.4% pa. The forecast average electricity price growth rate for the ACT over the next ten years is 1.2% pa.

10.3.3 Rooftop PV Generation

Domestic rooftop photovoltaic (PV) generation systems are currently installed on approximately 9.4% of homes in the ACT. These vary in size from 1 kW – 10 kW capacity. The level of penetration is increasing steadily due to a number of reasons that include:

- Cost of PV systems is decreasing as more units are produced (i.e. reduced manufacturing costs) and more suppliers are competing for this market.
- Some developments (notably Denman Prospect Estate and Ginninderry Estate) have mandated that PV systems must be installed on all new detached dwellings to be constructed.
- Modern homes are being built with a PV system incorporated into the original design which avoids the costs associated with retrofitting later.
- The climate in the ACT is conducive to PV with long sunshine hours annually.
- The ACT Government is promoting its 100% renewable energy target and encouraging the installation of PV systems.
- Increased awareness of the public to climate change issues and the benefits of renewable energy.
- There has also been an increase in small scale rooftop PV systems being installed on commercial and community buildings over the last year. These systems range in size from 30 kW – 200 kW.

10.3.4 Batteries

The uptake of batteries for the purpose of supplementing energy supplied from the grid will have an impact on expected maximum demand. AEMO has provided initial modelling on the effect of batteries on system demand, which is currently being investigated by ActewAGL. It is intended to integrate modelling into the forecasting methodology, however there is currently no formal recording of battery capacity within the system, or an effective methodology on determining the future rate of battery capacity growth.

10.3.5 Improved Energy Efficiency of Buildings

The ACT Government has legislated that the energy performance of a new building must be demonstrated when applying for building approval. The building certifier will require proof that a

building will meet the mandatory minimum energy efficiency standards as part of determining whether to give building approval. This implies a revision of the Diversified Maximum Demand (DMD) of residential and commercial buildings. Since new DMD standards have not yet been developed for these new designs, ActewAGL will undertake measurements to determine the new (hopefully lower) DMDs for typical residential and commercial buildings.

10.3.6 Forecasting Model Verification

The accuracy of the forecasting model has been verified by comparing calculated back cast (a backward looking forecast) values with actual values. There should be close correlation (< 5% error) between calculated back cast annual median demand figures with the actual figures, otherwise the forecasting methodology should be reviewed.

11 Asset Management Capabilities

In order to implement an asset management system, AAD has put in place:

- Technical, financial, enterprise, and agreement processes
- Organisational roles, structures, and competencies
- Technical, financial, and operating plans
- Project Management competencies, including “PRINCE2” as the project management methodology
- Risk-based decision-making plans.

The Capability Delivery Model schematically represents the processes used to deliver the stated outputs of ActewAGL. Refer to Figure 5.

The processes are shown in six main disciplines:

1. Demand Management
2. Systems Engineering
3. Configuration Management
4. Acquisitions
5. Operations and Maintenance
6. Continuous Improvement.

The scope of the asset management system includes all of the processes required for capability delivery.

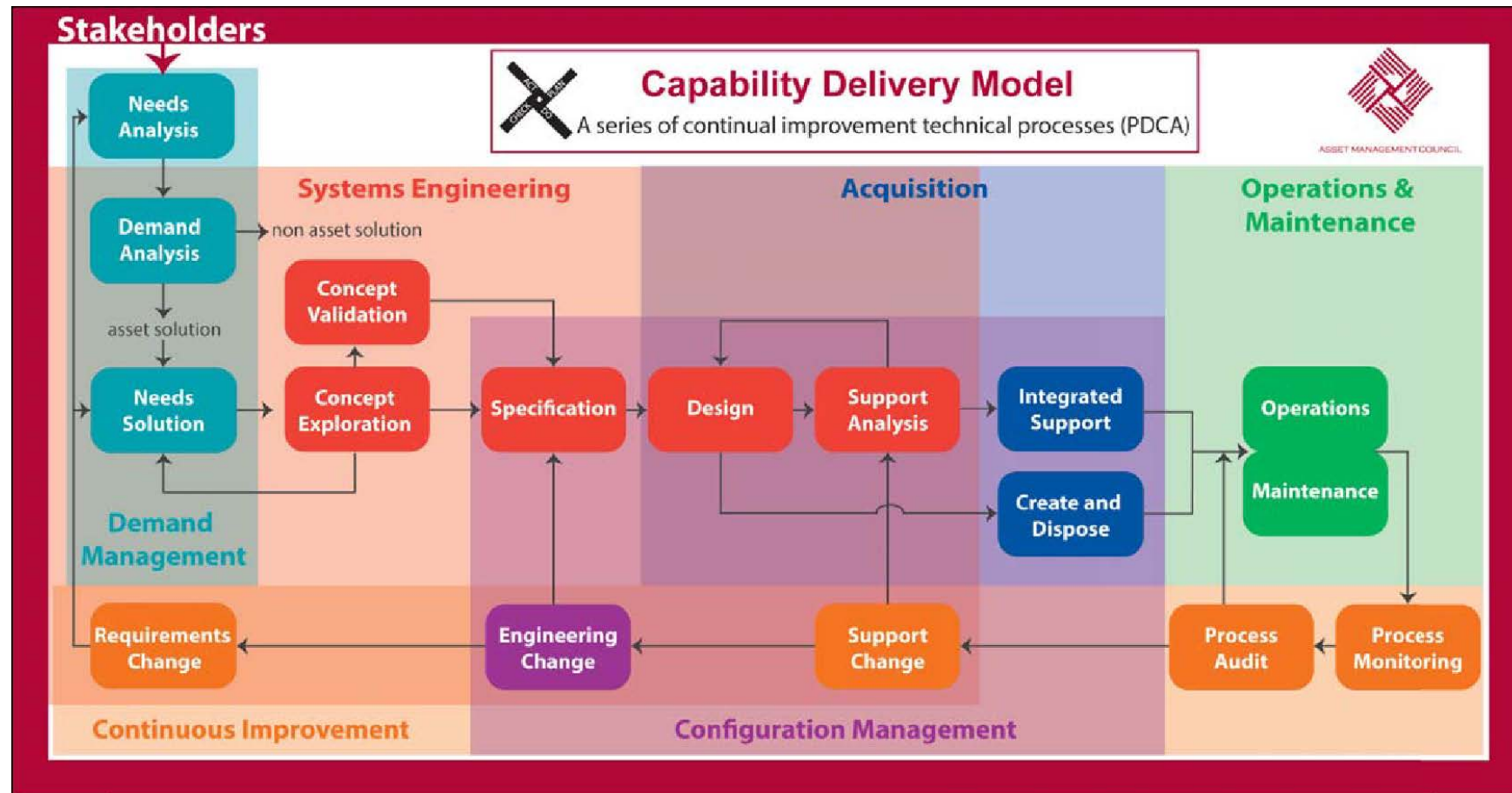


Figure 4: Capability Delivery Model

A Gap Analysis of ActewAGL's capabilities against the requirements of ISO 55001 has been undertaken which has resulted in the development of an Asset Management Improvement Plan. This plan summarises the improvement activities that ActewAGL intends to undertake in order to become compliant with the requirements of ISO 55001.

ActewAGL also intends to acquire and operate modern and cost effective facilities which enable surveillance and condition monitoring of high value or critical assets. This capability will assist in minimising whole of life, whole of system costs by facilitating timely and effective interventions.

12 Asset Maintenance and Renewal Planning

Asset maintenance and renewal planning is an activity that is centrally embedded in the Asset Management System Framework; and has feedback links from the asset information system; network performance and costs; and performance, capability and reliability requirements. The purpose of this activity is to take into account the information from the different feedback links, and synthesise it into actions required in the Asset Management Plan. This planning activity is conducted by asset managers, expert in the field of assets under their management.

In order to ensure the accuracy of the cost estimate of planned activities, asset managers shall ensure that unit costs, which are used in the estimate of overall activity cost estimates, are updated annually.

13 Aspirational Strategies

13.1 Evolution of the Regulated Business to a Distributed Systems Operator/Manager

Energy Networks must conceptually transition from a Distribution Network Service Provider (DNSP) to a Distributed System Operator (DSO). That is, rather than simply receiving power from the transmission NSP and distributing it to customers; Energy Networks will oversee a system of intelligent networks with controllable Distributed Energy Resources (DERs) and loads. As a DSO, Energy Networks would still undertake the conventional role of a distribution network owner, but would also make full use of smart techniques to create value for the wider electricity system. Energy Networks would be required to manage a complex and interactive energy system, driven by rapid technology development and changing consumer behaviour. There will be an increasing number of distributed points of variable production and consumption of electricity connected to the distribution network, unlike the traditional network that consisted of a linear, one-way flow of energy from large-scale producers to consumers. The system is increasingly becoming a two-way network, enabling the exchange of energy and information, and increasing consumer choice.

The network function is transitioning from the traditional model to an interactive system, within which consumers are becoming “prosumers” and DNSPs must adapt to become “DSOs”

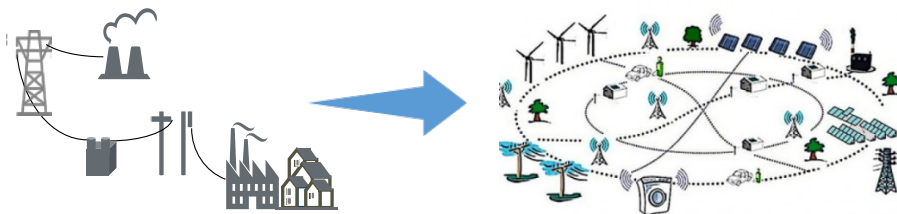


Figure 5: Electricity Network Transition

The transition to a DSO (Figure 6) is required due to:

- The grid becoming increasingly complex to operate due to large penetrations of customer owned distributed generation
- The need to leverage two-way power flows across the system, and greater visibility and predictability needed down to end devices
- Greater interaction between the distribution and transmission systems
- The need for integration and synchronisation of distributed generation and microgrids, to become key components of distribution system operations
- Operations becoming more predictive rather than reactive
- A shift away from traditional inertial energy storage and toward new battery/energy storage technologies
- The grid transitioning to operate as a centralised-decentralised hybrid, and the distribution system may be the heart of the future grid
- DSOs playing the coordination role in the decentralised grid.

13.2 Exploring the Contestable Space through our Metering Company 'Metco'

In parallel to the regulated business' evolution to a DSO, the new contestable business will open up the ability (in the post ring-fencing world), to explore contestable spaces and identify opportunities that will position both businesses (contestable and regulated) well in the future.

The contestable business will operate through two functions (Explore and Pilot, and Commercialise and Scale) across three strategic focus areas (Intelligent Grid, Services and Infrastructure, and Sustainable Living). In doing this, the contestable business will explore new concepts and test commercial viability with a 'succeed fast, adjust or move on' approach. Meanwhile, commercially proven opportunities will be operationalised and scaled by the Commercialise and Scale function. We will learn how to win in this space.

The first initiatives identified for the new 'Metco' contestable business are:

- Services and Infrastructure:
 - Contestable works project management such as construction and relocation works
 - Electric vehicle charging
 - Streetlights and smart city implementations
- Intelligent Grid:
 - Accredited Smart Metering services
 - Embedded network management
 - Microgrids
- Sustainable Living:
 - Biomethane (renewable gas to grid)
 - Renewable energy to grid (hydrogen to grid storage)
 - Optimisation of Distributed Energy Resources (DERs).

13.3 The Symbiotic Relationship

By exploring new spaces and scaling economically viable concepts, the contestable business will not only drive new sources of revenue but also share learnings, pilots and value propositions while laying down key foundations for the regulated business to operate more effectively over the long-term.

In doing this, the two businesses can work in a symbiotic relationship that complements not contains, and together unlocks new value that no one thought possible (e.g. $1+1=3$).

An example of such a 'symbiotic approach' would involve exploring a new microgrid/embedded network through the contestable business, as a pre-cursor to DSO capability that the regulated business can leverage.

13.4 Test and Learn

The test and learn strategy will focus on leveraging small-scale, localised 'innovation pilots' (e.g. West Belconnen and new Greenway depot micro-grids) to develop new commercial models on a larger scale.

13.5 Exploration and Design of Smart City and Innovation Incubator

This strategy will establish relationships and align Smart City aspirations with willing partners – ACT government, ANU, industry, utility operators, and others.

13.6 Designing New Culture and Capabilities

ActewAGL will explore and design opportunities to pilot and embed the 'desired' culture and capabilities across AAD (regulated and contestable spaces).

13.7 Managing Disruptive Technologies

All network businesses in Australia are at a turning point, with the rapid changes in the composition of the energy system driven by changing customer behaviour, energy efficiency, shifts from centralised to decentralised generation/storage, a more austere regulatory environment, and a move to decarbonise the energy chain. To date, customers (and the market more broadly) have transitioned with disruptive technologies (DT) at a fast pace, with ActewAGL Distribution (AAD) responding reactively.

AAD's challenge is to refocus its capability and thinking to proactively navigate and drive the DT landscape, and ensure optimal outcomes for AAD and its customers are achieved.

AAD must conceptually transition from a Distribution Network Service Provider (DNSP) to a Distribution System Operator (DSO). That is, rather than simply receiving power from the transmission NSP and distributing it to customers, AAD will oversee a system of intelligent networks with controllable DERs and loads. As a DSO, AAD would still undertake the conventional role of a distribution network owner, but would also make full use of smart techniques to create value for the wider electricity system.

Historically, the distribution network has been constructed for energy flows from the generators to transmission systems, and through distribution systems to customers. Distributed energy resources (DER) such as PV arrays, batteries, and embedded generators within the distribution system will cause more complex two way energy flows that will have serious long-term technical implications for the traditional electrical distribution business and its operating model.

DTs will also have substantial financial impacts where they will have the potential to significantly reduce forward revenue and affect future investor opportunities. This will require a focus on maintaining the value of the core distribution business by continuing efficiency improvements, refining our asset management practices, and optimising operational and capital expenditure to suit the new business environment. Creating additional revenue streams to maintain or increase shareholder value by offering commercial responses into the transforming energy market will be very important.

The DERs will provide both benefits and incur operational and capital costs on AAD that will need to be assessed in order to transition to this new paradigm in the operation of the distribution network. It means that AAD will need to be more aware of the energy flows within its systems, and transform from a passive to an active network operator.

There is an imperative to enhance the understanding of customers and their requirements from the ground up, and how this affects AAD and its network assets; essentially, to engage more with customers, understand their evolving expectations, and become a truly customer-centric organisation that will deliver industry best practice customer service.

AAD will need to develop a future business model within the next 10 year period that encompasses the adaptation of our core business and establishes commercial businesses that respond into the new

energy market. AAD has a vision of creating a Smart City Grid for Canberra that is at the forefront of world best practice.

The strategic objective is to provide network services that anticipate and meet customers' evolving requirements at the lowest cost, and to ensure long-term business viability through the forthcoming uncertain energy consumption (and revenue) trends.

The implementation and impacts of these strategic objectives will guide the preparation of the AAD 2019/20-2023/24 electricity pricing proposal which is to be submitted by AAD to the Australian Energy Regulator (AER) in January 2018 for Final AER approval by April 2019. It is critically important that the necessary transformation adjustments and action programs are incorporated into this Electricity Determination.

14 Asset Specific Strategies

14.1 Asset Specific Plans

At an asset-specific group level, ActewAGL Distribution's approach to Asset Management Optimisation varies, due to either differences in the asset types included within the group, or because of the relative criticality or maturity of that asset group when compared with others within the same organisation.

Full details of the specific Asset Management approach for each asset group are included in the relevant Asset Specific Plan (ASP). These Asset Specific Plans contain complete asset logistic and health details and will also determine all future activities (maintenance, refurbishment, replacement, or disposal) of the assets within the plan. It is essential to populate and maintain very high quality data within the ASPs, to maintain a high level of confidence and quality performance from the Asset Management System.

The quality of narratives and primary quantitative data, as well as derived programs and cash flow is the responsibility of asset managers by checking the quality of data in ASPs referring to assets under their control.

14.2 Criteria for the Prioritisation or Optimisation of Plans

Prioritisation and optimisation of Asset Specific Plans will be based on the following criteria:

- Risk of injury to public or employees
- Risk to environment
- Risk of damage to assets, particularly critical assets
- Risk of service interruption, particularly critical customers, numerous customers, or of long duration
- Cost/benefit evaluation of the project
- Reputational risk.

14.3 Consideration of Asset Criticality

The criticality of an asset will be a determining factor in formulating strategies and plans. The asset strategy consists of the life cycle activities planned for that asset, and the nature, frequency, and priority of these activities will depend on the extent to which the assets are exposed to the risks listed in section 14.2.

14.4 Consideration of Stakeholder Requirements

Stakeholder requirements, including safety, environmental issues, continuity of supply, reputation and cost/benefit considerations will be taken into account when determining the asset criticality in section 14.3.

Ensuring that assets will meet the forward view of demand requirements is a key issue in managing the risk of loss of continuity of supply. This risk must be managed in the asset specific strategies and plans. Section 7 provides an explanation of how this requirement will be met.

15 Publication and Communication

An original approved copy of the current version of this Asset Management Strategy is retained in formal company records at all times. Communication to relevant internal and external stakeholders, service providers, and other relevant parties who require knowledge of the Asset Management Strategy is via the following mechanisms:

- Intranet publication
- Internet publication
- Standard company briefing processes
- Training courses
- Contractual requirements.

Details on communications senders, recipients, content, and media are presented in the Asset Management Communications Plan.

16 Continuous Review and Improvement

ActewAGL's Branch Manager – Asset Strategy has accountability for the continuous review and improvement of this Asset Management Strategy. It should be reviewed at least every 2 years.

Each review shall include:

- That the document remains relevant, suitable, consistent, and appropriate for the implementation of the Asset Management Policy
- Opportunities for continual improvement in terms of Asset Management activities
- Opportunities for improvements in the format, communication, and implementation of the Asset Management Strategy itself.

Appendix A 10 Year Capital and Maintenance Programs

Table 3 provides a summary of expected maintenance and capital expenditure for the next 10 years.

Total Budget	2016/17	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Maintenance Expenditure (\$'000)	15,348	15,589	15,607	15,282	15,653	15,569	15,199	15,172	15,092	15,065
Capital Expenditure (\$'000)	75,709	71,797	55,817	66,328	63,989	60,823	67,069	84,223	79,863	63,941

Table 3: Capital and Maintenance 10 Year Budget Forecast

Comprehensive details of the 10 year expenditure forecast are available through the following link.

[10 Year Program of Work](#)