ActewAGL Electricity Distribution Network

Expenditure Forecasting Methodology

May 2014

ActewAGL for you

Contents

1 Introduction

1.1 Document purpose

The purpose of this document is to outline the methodology that ActewAGL Distribution intends to use to forecast capital expenditure (capex) and operating expenditure (opex) for its regulatory proposal to be submitted to the AER by 30 May 2014 for the 2014/15 – 2018/19 regulatory control period.

1.2 Background

ActewAGL Distribution is preparing a regulatory proposal to the Australian Energy Regulator (AER) for ACT electricity distribution network for the regulatory control period 2014/15 to 2018/19. The National Electricity Rules (NER) require:

> *A Distribution Network Service Provider must inform the* AER *of the methodology it proposes to use to prepare the forecasts of operating expenditure and capital expenditure that form part of its regulatory proposal.*[1]

The NER further stipulates that this should occur 24 months before the expiry of a distribution determination that applies to the Distribution Network Service Provider (DNSP).[2] However the Savings and Transitional Measures under the NER applying to ActewAGL Distribution in relation to the Transitional Regulatory Proposal for the transitional regulatory control period 2014/15,[3] reduces the relevant period before the expiry of the transitional distribution determination (30 June 2015) to 19 months[4] (that is, 30 November 2013).

This date is proximate to the scheduled date of publication by the AER of important guidelines, most notably the *Expenditure Forecast Assessment Guidelines for electricity transmission and distribution.* In preparing this document, ActewAGL Distribution has where relevant, referred to the draft guidelines.

1.3 Document development process

This document was prepared by management consulting firm Analytics Group, under the guidance of ActewAGL Distribution. The methodologies and procedures described are based on engagement with relevant ActewAGL Distribution stakeholders and review of existing business documentation.

Analytics Group has prepared this document with the express purpose of documenting the capex and opex forecasting methodologies of ActewAGL Distribution. Analytics Group was reliant on the information provided by ActewAGL Distribution in preparing this document.

---

[1] NER clause 6.8.1A(a)

[2] NER clause 6.8.1A(b)(1)

[3] NER clause 11.55.2(a)

[4] NER clause 11.56.4(o)

2 High-level overview

2.1 Zero-based versus Base Year

There are two forecasting approaches used in the utilities sector: *zero-based* and *base year* methods. The zero-based method assumes a nil budget as the start point, adding the projects or activities required that year in a *bottom-up* construction of the cost. The base year method uses a comparable financial year as the starting point, removing projects or activities no longer relevant and adding projects or activities required during the forecast period that were not in the base year. These are referred to as *step changes*.

2.2 Forecasting approaches used

ActewAGL Distribution uses a combination of zero-based and base year approaches when forecasting for its electricity distribution business as summarised in the diagram below. Corporate overheads are the exception, being attributed between ActewAGL group businesses based on a cost allocation model as approved by the AER in 2012. The following sections of the report analyse these approaches in more detail.

Figure 1

Type	*Cost category*	*System source*	*Forecasting/costing approach*
Capex	Asset renewal/replacement	Riva asset management software	Zero based
	Customer initiated		
	Augmentation		
	Reliability and quality improvements	Riva asset management software	Zero based
	Network OT	Financial Management Information System	Zero based
	Non-network assets		Base year[5] and zero based
Opex	Network operating	Financial Management Information System	Base year
	Network maintenance	Riva asset management software	Zero based
	Vegetation management	Financial Management Information System	
	Other operating expenditure		Base year
	Corporate overheads	Fixed Price Service Charge model	Attribution

[5] Expenditure forecasts for plant and equipment and some non-system capital are typically based on historical levels and reflect a provisional estimate.

3 Asset Management System

3.1 Overview

The Asset Management System is a collection of functionally related elements working together towards the purpose of effectively and efficiently managing ActewAGL Distribution core assets. The asset management strategy is the central document, identifying activities to be performed, implemented by the asset management plan, which for ActewAGL Distribution is composed of a number of Asset Specific Plans (ASPs). These ASPs are very detailed in their description of the assets they cover, as well as their attributes, planned activities and the costs associated with those assets.

Asset Management System

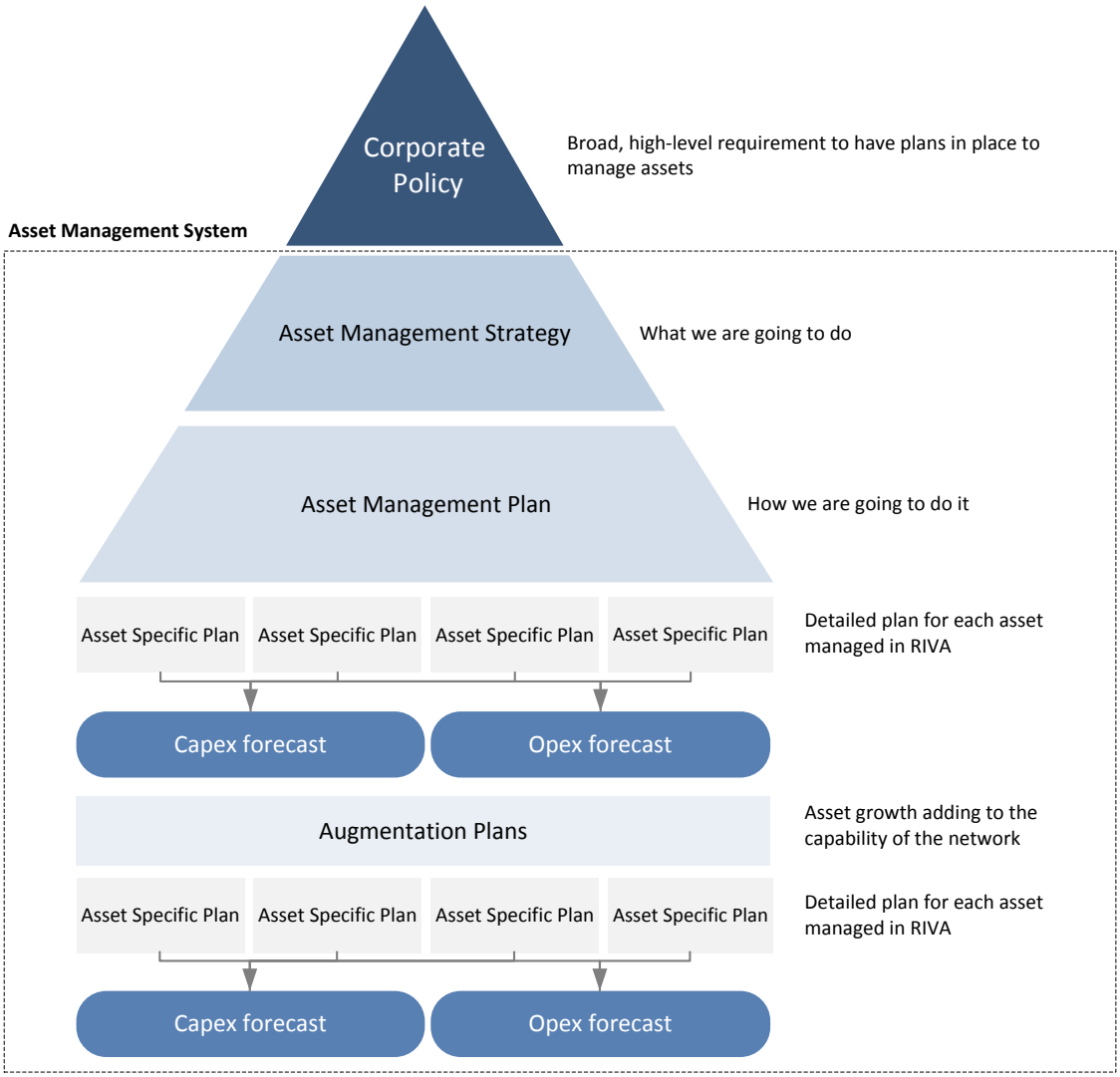


Figure 2

3.2 Delivering the Asset Specific Plan

The key to successfully building asset specific plans is underpinned by preparation and consistency. Considerable effort was invested in designing an ASP template with the following attributes:

1. Detailed description of the asset and its functions
2. Reliability and availability targets
3. Quantitative information on asset population
4. Current and future health and risk reporting
5. Asset criticality
6. Deterioration drivers and failure modes
7. Source and quality of information on asset
8. Planned activities and alternative strategies
9. Disposal strategies
10. Program of planned works and budget

The template is a combination of descriptive text fields, tables, graphs, and an appendix of planned program of works, with an associated budget for that asset. In practice, the components of the template are stored in ActewAGL Distribution's asset management system, "RIVA", and these fields are assembled on command to produce the final ASP. Considerable effort was undertaken to generate and populate the data fields for each asset to ensure accuracy of the final ASP.

The structure of an ASP is depicted in the following diagram.

Asset Specific Plan (ASP) document structure

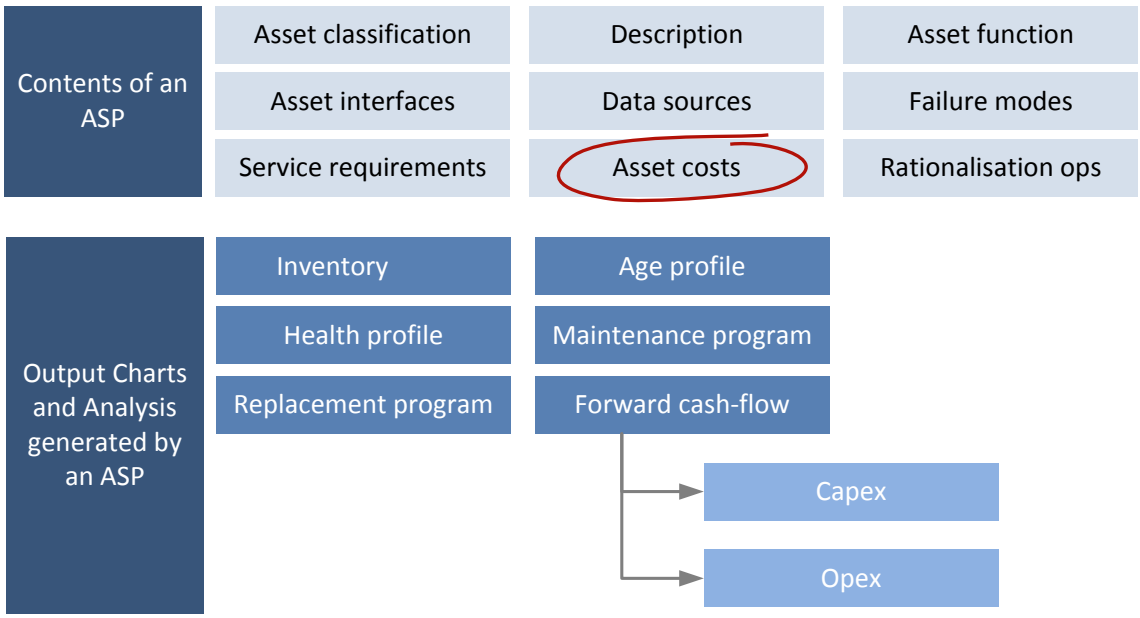


Figure 3

4 RIVA

4.1 What is RIVA?

ActewAGL Distribution uses RIVA asset management software to perform a range of functions, including the forecast of significant capex and opex projections made by ActewAGL Distribution. The 2014-15 financial year will be the first year that ActewAGL Distribution will rely on RIVA forecasts, following extensive testing and refining of the asset data.

RIVA is a single source inventory listing for all core assets managed by ActewAGL, providing for an Asset Specific Plan (ASP) for each and every asset. The following data is collected for each asset maintained in RIVA:

- Asset condition
- Forecast useful life
- Value to the organisation
- Discoverability
- Probability of failure
- Consequence of failure
- Replacement cost
- Cost of asset

RIVA also pulls information from WASP for up to date maintenance data, ensuring work schedule projections are based on relevant data and trends.

At its core, RIVA uses this data to inform a series of algorithms that provide an optimal capex replacement/augmentation program and maintenance work schedule. This is a fundamental function of risk and cost.

The two risk considerations include probability of failure (POF) and consequence of failure (COF). The two combine to determine a risk priority. Each asset is subsequently ranked according to the exposure that the distribution network and customer would experience if the asset failed.

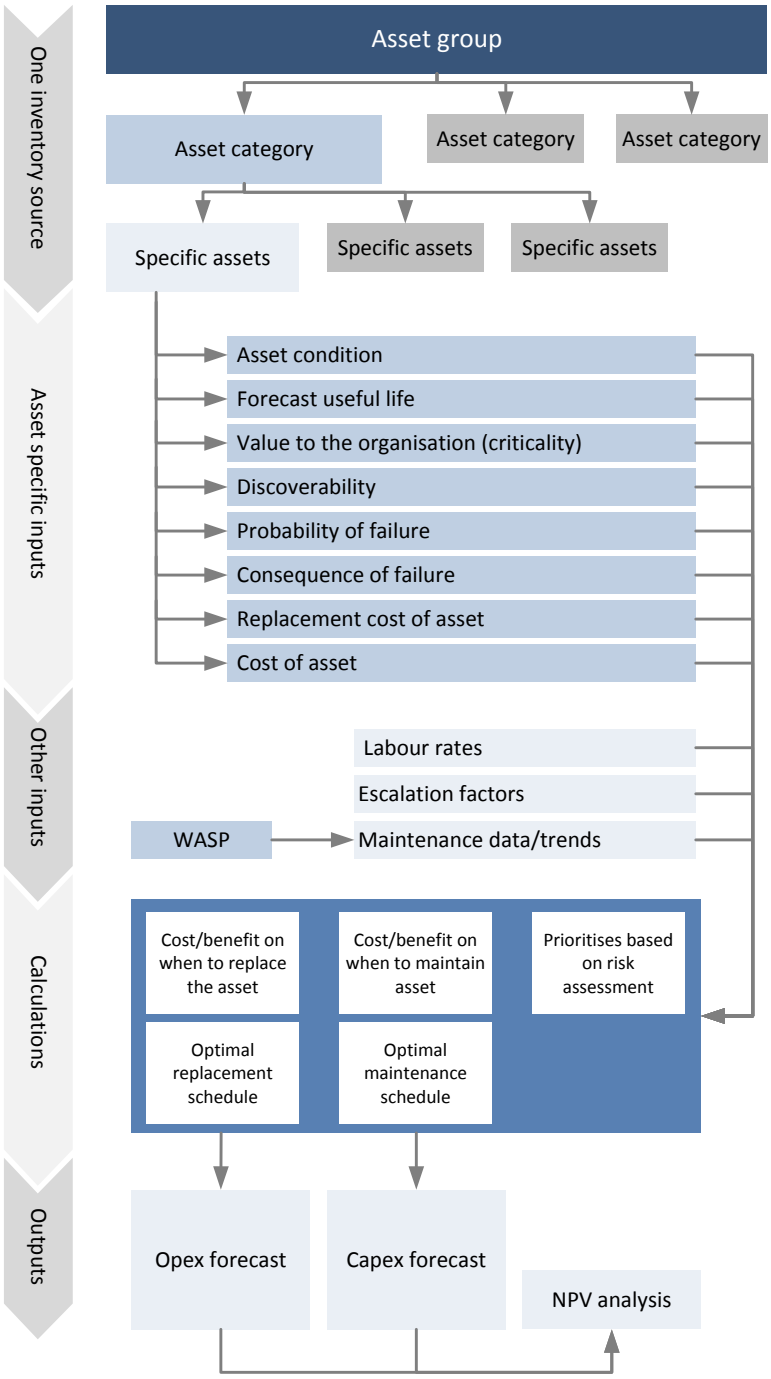
RIVA then produces a risk priority number (RPN) value for each asset in the inventory. This value can be used to prioritise inspection frequency, insurance valuations, and environmental mitigation strategies; and also rank competing events and activities. Ultimately, RIVA also determines a replacement/augmentation program and maintenance work schedule which includes the period covering the upcoming regulatory period. Using this information, RIVA generates ten year capex and key opex forecasts for each specific asset. These forecasts are then consolidated at the category and group level for summary level reporting.

Using the information outputs of RIVA, discretionary projects over $100,000 in value are subject to net present value (NPV) assessments, providing for cost-benefit and analysis. This is done in the ASP and allows a 10 year life-cycle cost estimate comparing asset replacement with alternate options of maintaining the asset over the same period.

4.2 How does RIVA work?

The structure of RIVA is summarised in the following diagram.

RIVA structure



All Electricity assets are entered into RIVA as a single inventory source. Inputs are entered at the specific asset level, thereby allowing consolidated reporting at the category and group levels

A range of input data factors are captured for each and every asset

Other non-asset specific inputs are used, including maintenance data from the WASP system

RIVA then runs a series of algorithms to determine the optimal management of the assets and prioritises work schedule activity based on a risk assessment

Based on the algorithms and optimal work schedule calculated by RIVA, the associated opex and capex spends are identified

Figure 4

4.3 Prioritisation process

The method by which ActewAGL Distribution asset renewal/replacement and maintenance activities are prioritised is a critical function of RIVA. Essentially, a series of factors contributing to probability and consequence of failure are each rated by maintenance personnel and engineers on a 1 to 10 scale, with 10 being the most severe rating. When combined, these factors determine the asset's risk priority number (risk score). This forms the basis for work schedules on which the opex and capex forecasts are based.

Prioritisation of capital and maintenance expenditure

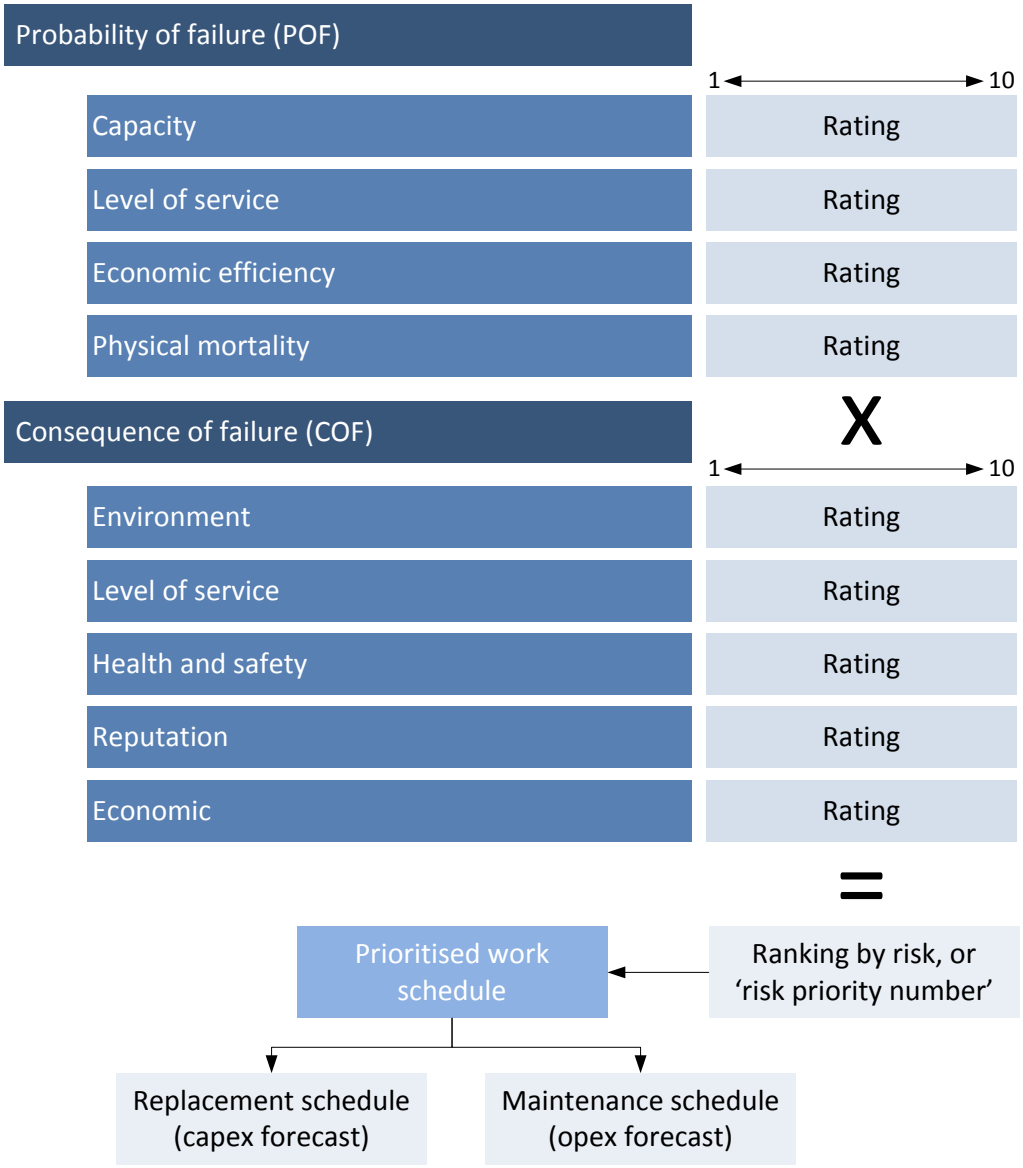


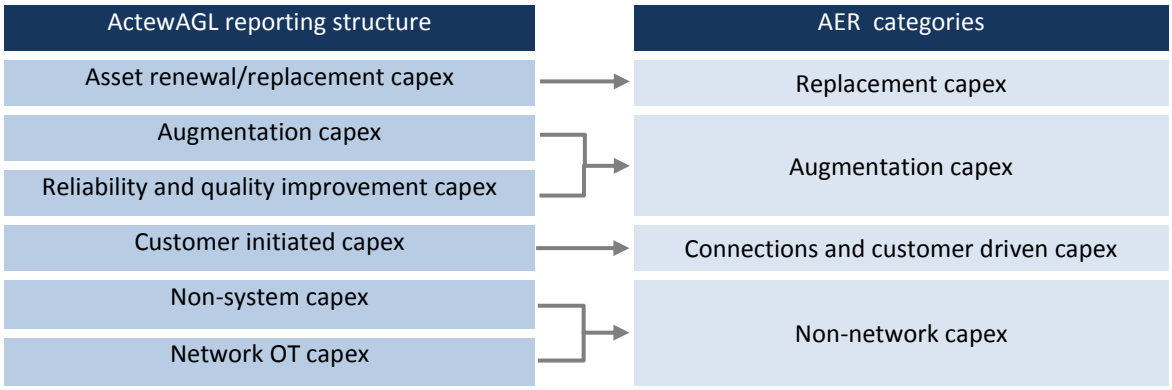
Figure 5

5 Capex forecasting

5.1 Categories mapping

The capex reporting categories used by ActewAGL Distribution are consistent with the categories used in the Draft AER Guideline, supporting the methodology documentation process. The forecasting method for each reporting category is unique and is described as follows.

Figure 2 Capex reporting categories linked to AER categories



5.2 Asset renewal, including pole replacement

Asset renewal/replacement includes the following costs:

- Zone substations
- Secondary systems
- Distribution
- Transmission
- Metering
- Property

Asset renewal, including pole replacement expenditure, is forecast using a zero-based approach utilising the asset management software RIVA (as described in Section 4). Each asset is analysed and prioritised for replacement based on the input of a series of condition reports and risk ratings, generating a work schedule for the replacement of assets by financial year and the associated capex cash-flow.

5.3 Metering

There are two types of metering capital expenditure: replacement and new meter installations. Both types follow a zero-based forecast method and feature in the Meter Asset Management Plan (MAMP). The MAMP documents the current state of the meters, their replacement, maintenance and testing schedules. Information contained in the MAMP is then included in RIVA to arrive at a replacement and new meter installation schedule, along with associated costs.

5.3.1 Meter replacements

The metering replacement schedule is identified in the MAMP and RIVA, which contains the build date, date installed and other details relating to each meter in the ACT. Using this information, a forecast is developed for the number of replacements expected during the regulatory period in conjunction with an estimate of labour rates and parts.

5.3.2 New meters

For customer initiated metering installs, estimates are also zero-based. These are based on broader projections for other customer initiated capex incorporating BIS Shrapnel projections on employment, home borrowing and other land release data.

5.4 Augmentation

Augmentation capital expenditure includes the addition of assets that grow the network, the result of adding density to service areas, and general improvements in service or reliability. Augmentation assets are built into RIVA and forecast using density and other growth projections. It is zero-based and therefore changes year-to-year, based on the number of large projects.

5.5 Customer initiated

Customer initiated capital expenditure relates to new housing and similar developments, where the customer (being the developer) contributes to the cost of a network to service the area. This also follows a zero-based approach, with forecast developments based on the following:

- Direct customer / developer enquiries,
- Major public and private development initiatives identified through public / media announcements,
- Future development activity identified through the ACT Government planning, preliminary assessment and agency liaison/consultation processes,
- Future development activity identified through ACT Government land release programs.
- Economic forecasting of underlying demand and of dwellings commenced, identified by BIS Shrapnel Pty Ltd, and
- Historical expenditure in the various customer initiated work categories adjusted to reflect the anticipated short-term broader economic environment.

5.6 Non-network capex

Expenditure in this category includes OT systems, buildings, land, property, plant and equipment and non-system capex. Non-network capex forecasts are primarily derived using a zero base approach. This is the case for Network OT, building, land and property and motor vehicles.

Expenditure forecasts for plant and equipment and some non-system capital are typically based on historical levels and reflect a provisional estimate.

6 Opex forecasting

6.1 Opex categories

ActewAGL Distribution's financial management structure adopts the following opex categories in both its management reports and forecasting approach.

Category	Description
Network operating expenditure	• IT Planning and Operations • Quality, Environmental and Safety Systems • Network control • Customer Support • Other Network Operating Costs
Network maintenance expenditure	• Zone Substations • Secondary Systems • Distribution • Transmission • Property
Vegetation management	• All expenditure relating to normal tree cutting, undergrowth control and waste disposal connected to line clearing, including coordination and supervision of vegetation control work.
Metering	• All operating expenditure incurred in the carrying out of meter reading, testing and maintenance activities.

Other operating expenditure	• Network specific marketing
	• Apprentice Training Program
	• Business Overheads
	  ○ Includes Insurance, Audit Fess, Bad & Doubtful Debts, Performance Share and other Miscellaneous Corporate Business expenditure
	• Fee Based Services
	  ○ Expenditure relating to re-energise or de-energise a site, Temporary Connections and other services in connection with use of the electricity system.
	• Quoted Services
	  ○ Involves work on assets owned by the network business like damage to its assets, relocations and removals which are not capital in nature.

Figure 7

The following sections describe the forecasting approach used for each opex category.

6.2 Network operating expenditure

A mixture of zero-based and base year approaches is used to forecast network operating expenditure, dependent on the nature of each sub-category.

IT Planning and Operations are zero-based. Where new systems are introduced, there is a known cost impact based on the cost of software and resourcing required to support the new systems.

Quality, Executive, Financial Management and Other Network Operating Costs are generally recurrent and therefore forecast on a base year approach.

6.3 Network maintenance expenditure

Network maintenance is forecast using RIVA and is the result of the inputs and parameters of each asset combined with algorithms that prioritise the maintenance schedule. This process is discussed in more detail in Section 4. Being fully zero-based, maintenance costs can be difficult to predict. In such cases, additional system algorithms help smooth and remove any volatility by bringing forward and pushing back maintenance needs as appropriate – with the objective being to minimise the cost over time.

Each asset's maintenance forecast is based on the following key activities:

- Condition monitoring
- Planned maintenance
- Unplanned maintenance
- Strategy & Planning

6.4 Vegetation management

Vegetation costs are forecast using a zero-based approach, however these costs are largely recurrent in nature and are adjusted for changes in contractual arrangements. ActewAGL inspects all vegetation rural and urban areas on a three year cycle. Responsibility for vegetation clearance rests with either the property occupant, ActewAGL or the ACT Government depending on the location and attributes of the vegetation. ActewAGL incurs the costs of clearing vegetation from network assets where there is pre-existing vegetation, in natural areas and when urgent clearing is required. These responsibilities are detailed below in Figure 8.

	Private land	Public land	
		Unleased land	National land
Vegetation clearance responsibility	Land holder for non pre-existing vegetation. Otherwise ActewAGL	ActewAGL is responsible for vegetation in natural areas, specifically national parks, nature reserves, special purpose reserves and Namadgi National Park Vegetation in urban areas is maintained by ACT Government Territory and Municipal Services	Vegetation is dealt with on a case by case basis through direct contact with the National Capital Authority

Figure 8

6.5 Metering

Metering includes both meter reading and testing services, both of which are forecast using a base year approach. Meter testing is largely consistent year to year, with actual metering costs determined through the use of a statistical sampling requirement mandated by Australian Standard AS1284, Part 13. This standard determines the number of meters that require testing. Meter reading is also recurrent in nature, following adjustment for growth in the number of meters operating in the ACT.

6.6 Other operating expenditure

Other operating expenditure contains a number of different expenditure types, predominantly recurrent in nature and therefore forecast using a base year approach. These include marketing costs, audit fees, insurance and bad debts. The exception is apprentice training, which is zero-based because the number of apprentices and their annual costs are known and are therefore modelled accordingly. Similarly, advertising costs are based on a Service Level Agreement (SLA) and can be forecast accurately using a zero-base approach.

7 Fixed Price Service Charge (FPSC)

7.1 What is the FPSC?

The FPSC is an annual charge issued by ActewAGL Corporate for the shared corporate services being provided to Electricity, Gas, Retail and ACTEW Corporation. It covers the following services:

- CEO
- Human Resources
- Facilities Management
- Environment, Health, Safety and Quality (EHSQ) Division
- Contracts and Procurement
- Legal & Secretariat
- Corporate Finance
- A/c Payable
- Corporate
- Business Systems Division Exec
- Service Delivery
- Information and Communications
- PMO
- IT Applications
- Corporate System Replacement Program

7.2 How is the FPSC calculated?

All corporate costs are recovered via the FPSC and are allocated to each of the businesses based on a series of cost attributions using relevant activity drivers. The allocation process is performed in a model, with the activity for each of the above cost categories being used to attribute expenditure across the four businesses. For example, all Accounts Payable costs are attributed based on the number of invoices processed for each division during the previous year.

This same process is applied for the other cost categories where a relevant activity driver is available. Where activity data is not relevant, as is the case for the cost of a CEO for example, costs are attributed based on a hybrid driver of opex and FTE data to reflect the differences in the scale of each of the businesses.

FPSC attribution

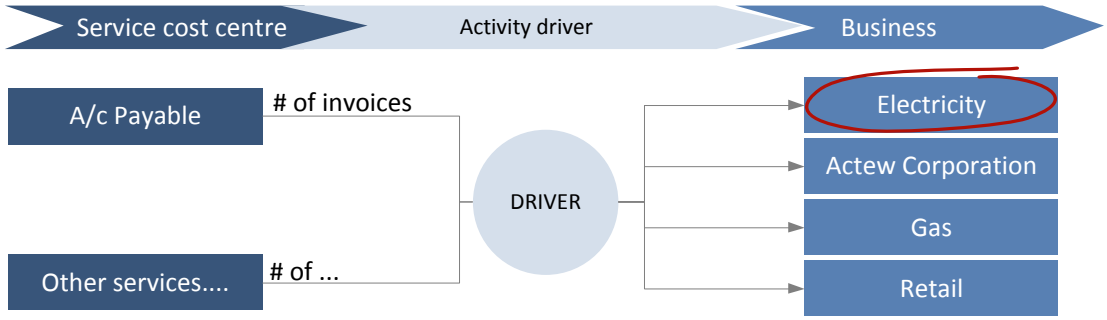


Figure 9

7.3 How does ActewAGL Distribution forecast the FPSC for the regulatory period?

The FPSC is fixed for a defined period and is reflected in the forecast where known. For the outer years, a base year (2012-13) forecasting approach is used.

8 Escalation factors

In developing its expenditure forecasts ActewAGL Distribution applies price escalation factors based on the external advice of a consultancy firm. Partnering with a number of other NSPs, a consultancy firm was commissioned to estimate cost escalation factors in order to assist in forecasting future operating and capital expenditure based on changes in unit costs.

Escalation factors were developed for the following categories for the upcoming regulatory period:

- aluminium;
- copper;
- steel;
- crude oil;
- labour (including utilities industry , professional services and general labour); and
- construction – both engineering and non-residential.

8.1 Price escalation process

Applying the escalation factors differs in complexity between cost categories. For labour costs, direct and relevant escalation data has been made available, providing for a clear and simple escalation of the costs by the labour index identified for each financial year.

The process is complicated when forecasting capex, particularly the construction and replacement of assets. To escalate forecasts, the asset base must be broken down into its material categories, for example aluminium, copper, steel, crude oil etc. Weightings for each category are then determined by an external consultancy to ensure the most appropriate escalation factor is being used. These weightings are arrived at based on ActewAGL Distribution's recent experience of asset construction and management, and are then reviewed by another independent third-party consultancy. Due to the escalation factors often being based in foreign currency (that is, USD), foreign exchange movements are also taken into account. Finally, the relevant escalation factors are applied and an escalated asset forecast is determined. This process is depicted in Figure 10.

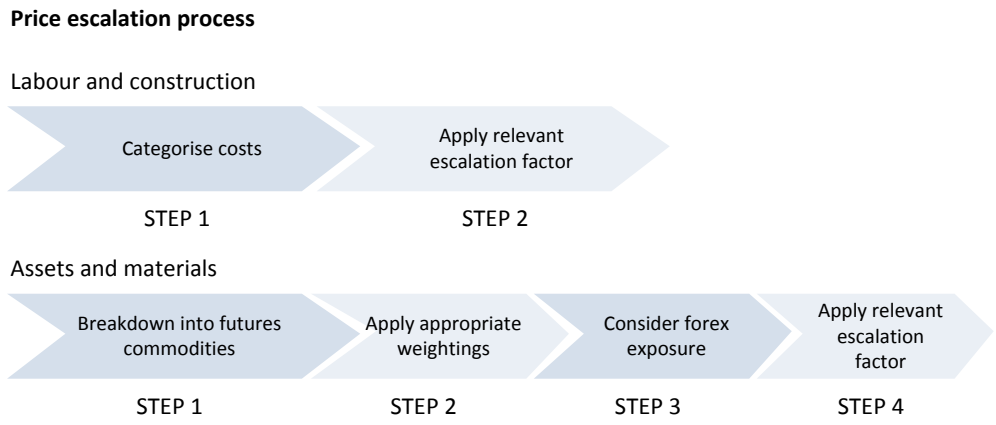


Figure 10

Consultation

The following ActewAGL stakeholders have been consulted in the development of this document.

Name	Position
Christopher Walker	Senior Commercial Analyst
Martin Priest	Commercial Manager Networks
Mike Schultzer	Principal Asset Strategy Engineer
Santanu Chaudhuri	Network Performance Manager
Chris Bell	Manager Regulatory Affairs
Claire Reid	Commercial Manager Corporate Services
Bjorn Tibell	Senior Financial Advisor

Glossary

AMS	Asset management strategy
AMP	Asset management plan
ASP	Asset specific plan
Base year	Using an efficient previous year's expenditure as the starting point for forecasting future years.
COF	Consequence of failure
FIT	Feed in tariff
FMIS	Financial Management Information System
FPSC	Fixed price service charge
MAMP	Metering asset management plan
NSP	Network service provider
NPV	Net present value
POF	Probability of failure
PP&E	Property, plant and equipment
SLA	Service level agreement
The Territory	Australian Capital Territory
UNFT	Utilities Network Facilities Tax
WASP	A commercial off-the-shelf maintenance software product
Zero-based	A bottom-up construction of the forecast assuming a nil budget starting point