ACTEWAGL ELECTRICITY DISTRIBUTION NETWORK

EXPENDITURE FORECASTING METHODOLOGY 2019-2024

June 2017

ActewAGL for you

Table of 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 Australian Energy Regulator (AER) by 30 January 2018 for the 2019/20 – 2023/24 regulatory control period

1.2 Background

The AER is required to determine the revenue allowance for ActewAGL Distribution under the National Electricity Rules (NER) for the 2019-24 regulatory control period (2019–24). As part of this review process, this methodology informs the AER of ActewAGL Distribution's expenditure forecasting methodology, as required by the NER, which states:

> A Distribution Network Service Provider (DNSP) 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 DNSP.[2] For the 2019-24 regulatory control period, this corresponds to a submission deadline of 30 June 2017.

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

2 Consumer engagement

2.1 Overview of engagement activities

Customer and stakeholder input is integral to ActewAGL Distribution's expenditure planning in ensuring alignment of products and services to customer needs and satisfying compliance with the AER's requirements. ActewAGL's Consumer Engagement Strategy provides a roadmap outlining its initiatives to effectively engage consumers and enhance its ability to respond to consumer needs and expectations going forward, as well as principles for engaging with consumers.

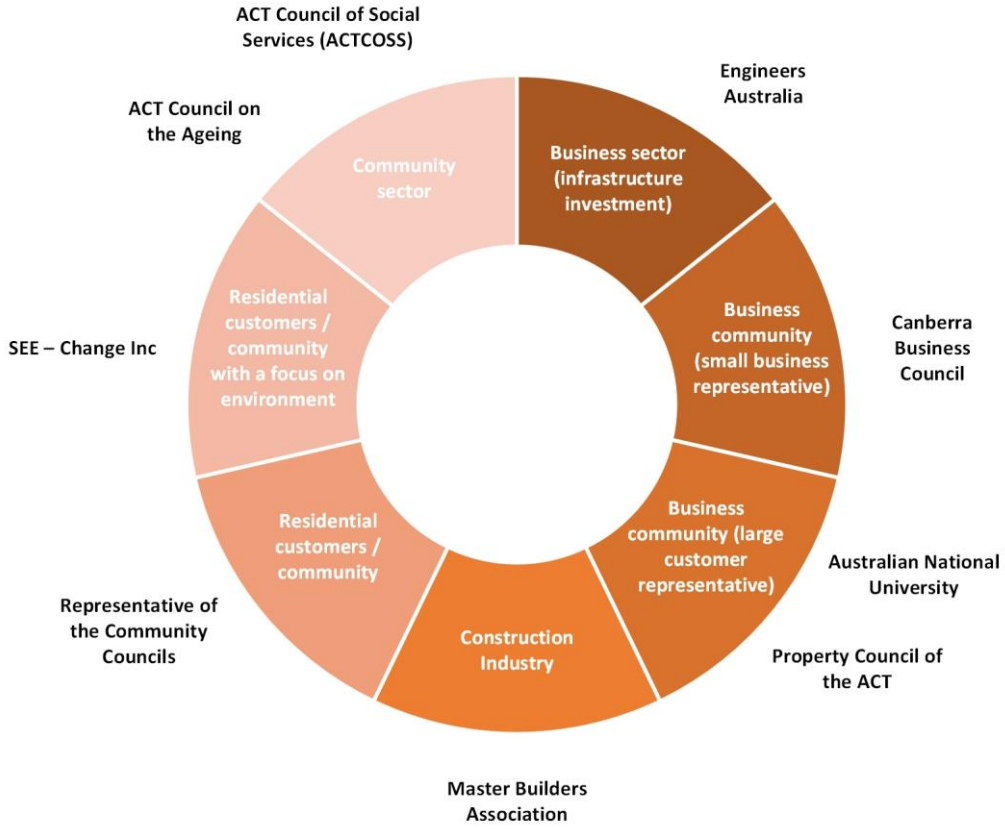
The ActewAGL Energy Consumer Reference Council (ECRC) provides a direct two-way communication channel between consumers and ActewAGL Distribution and ensures that consumer input plays a vital role in ActewAGL Distribution's long term planning, operations and service delivery. The ECRC establishes a feedback loop between ActewAGL Distribution and consumer representatives on key issues in the sector, with the following objectives:

- Provide information and support to foster deeper understanding of the issues and challenges
- Arrange facilitation of discussions on these issues, and
- Obtain feedback from ActewAGL Distribution on the outcomes of the engagement subject areas.

The ECRC and Consumer Engagement Strategy conjointly provide a robust consumer engagement approach that ensures forecasts sufficiently reflect the concerns of electricity consumers, in accordance with the NER.[3] The ECRC is comprised of members from seven different sectors, ensuring a more complete representation of views in the ACT community. These are illustrated in the diagram below.

[3] Clauses 6.5.6(e)(5A) and 6.5.7(e)(5A) of the NER.

Figure 1: ECRC members



2.2 Engagement on 2019-2024 regulatory proposal

Consumers are engaged at each stage of the process leading up to the submission of the regulatory proposal and AER's final decision to provide the opportunity for consumers to participate and impact forward planning, ensuring that future demands of customers are accurately and sufficiently reflected in ActewAGL Distribution's expenditure plans.

Throughout the preparation of the regulatory proposal, ActewAGL Distribution has engaged and sought input from a diverse range of representatives from all consumer segments as well as targeted engagement with retailers. These consumer segments are illustrated in the diagram below.

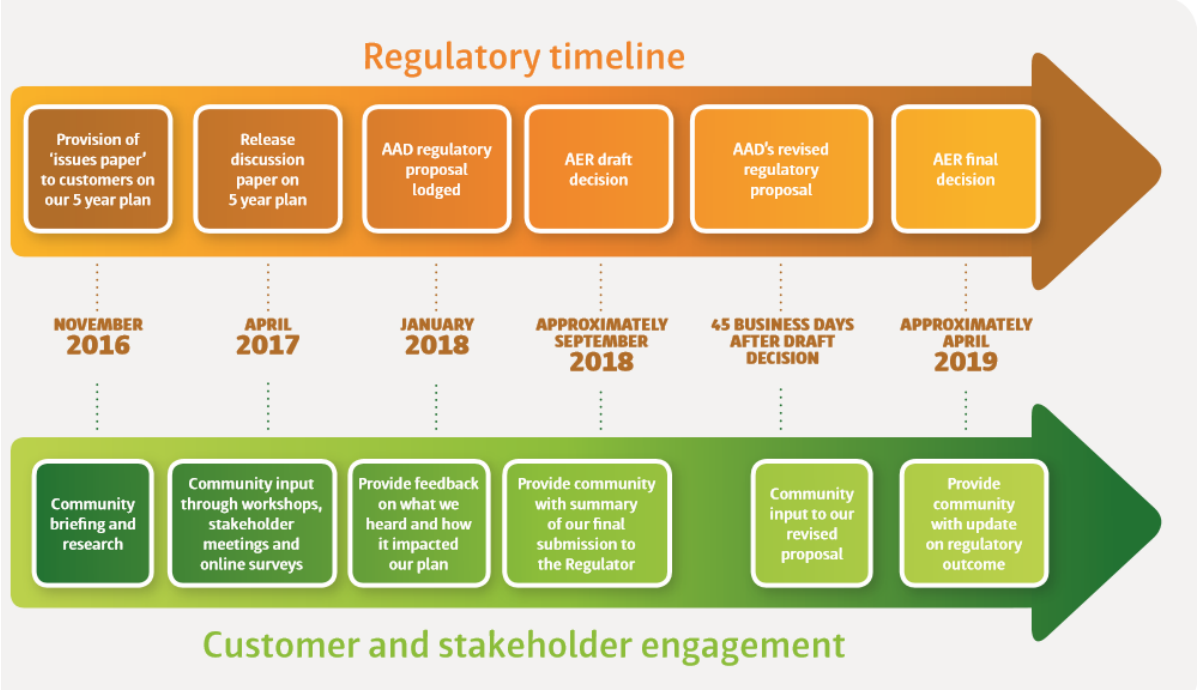
Figure 2: ActewAGL Distribution customers

The regulatory proposal consumer engagement program is made up of four key phases:

- Community briefing and scoping of issues
- Gathering community feedback
- Responding to the community feedback, demonstrating the influence the consumer feedback has had on regulatory proposal, and
- Post AER draft determination consultation.

An overview of the consumer engagement implementation timeline is illustrated in the figure below.

Figure 3: Consumer engagement on 2019-2024 regulatory proposal



A number of different engagement tools have been used to involve and collaborate with consumers, including –

- ECRC meetings
- Consumer publications
- Consumer forums
- Stakeholder meetings
- Focus groups
- Online surveys
- Consumer feedback updates, and
- Media and public relations campaigns.

A special project in co-ordination with ACT Council of Social Service (ACTCOSS) has been initiated, sourcing community feedback on what aspects of the Determination consumers would like particular input and explanation.

The following steps have been taken to ensure consumer feedback is addressed in the preparation of the regulatory proposal:

- **Careful and accurate collection of data** – this includes minutes, reports and data analysis of feedback from all interactions with consumers and stakeholder groups.

- **Public release of feedback** – through the web-based release of regular reports on consultation activities and a final consultation report consumers are able to challenge if stakeholder feedback has not been accurately recorded or adequately considered in the regulatory proposal.

- **Consumer feedback register** – a register of themes and feedback from consumers maintained and used as a checklist to record responses to that feedback as the regulatory proposal is developed.

- **Direct input to management structure** – feedback from consumers regularly reported to the project board and team responsible for preparing the regulatory proposal.

- **Demonstrate resulting changes to strategies** – changes resulting from consumer feedback clearly identified in the regulatory proposal. Where consumer feedback differed to the final position in the proposal, the reasons for this difference will be clearly explained.

3 Overview of expenditure forecast method

3.1 Zero-based versus base-step-trend

There are two forecasting approaches typically used in the utilities sector: *zero-based and base year* (or base-step-trend) methods. The zero-based method assumes a nil budget as the starting point, adding the projects or activities required that year in a bottom-up construction of the costs.

The base year method uses a comparable financial year as the starting point, making adjustments as required to bring the base year opex to an efficient level for the purposes of forecasting. Trending is then applied to account for changes in real prices growth, output growth and productivity growth in the forecast regulatory control period. Step changes are then added for efficient project or activity costs required during the forecast period that were not in the base year or accounted for in trending.

3.2 Forecasting approaches used

Capex

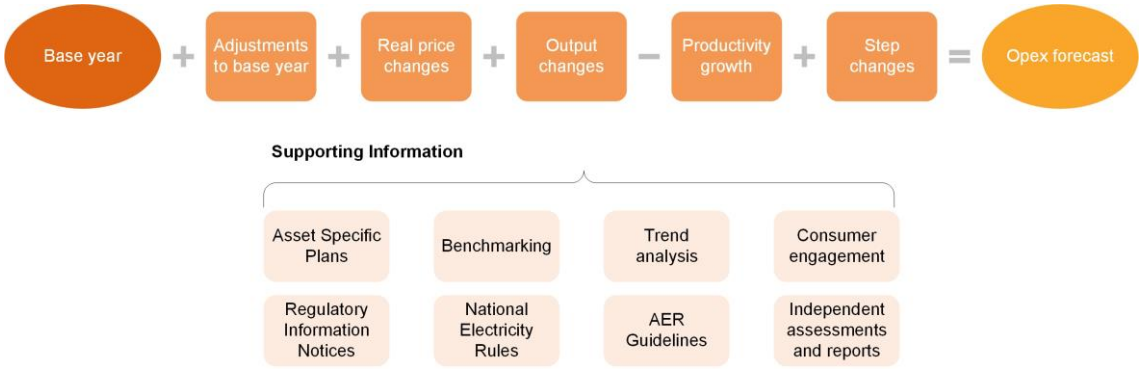
ActewAGL Distribution uses a zero-based approach for capex forecasting for its electricity distribution business, with the exception of some non-network capex such as plant and equipment, where the recurrent nature of the expenditure lends itself to a base-step-trend approach. Consistent with the AER's guidance on assessing capex,[4] past actual expenditure may not be an appropriate starting point for capex given it is largely non-recurrent or 'lumpy', therefore a zero-based approach has been adopted.

Opex

Consistent with the AER's preferred approach to assessing most opex categories,[5] ActewAGL Distribution uses a base-step-trend approach for opex forecasting for its electricity distribution business. The diagram below summarises ActewAGL Distribution's approach to forecasting opex.

[4] Section 2.2 of the AER Expenditure Forecast Assessment Guideline for Electricity Distribution.
[5] Section 4 of the AER Expenditure Forecast Assessment Guideline for Electricity Distribution.

Figure 4: Opex forecasting approach



Corporate overheads are attributed between ActewAGL Distribution – Electricity and Gas, ActewAGL Retail and Icon Water based on a cost allocation method as approved by the AER in 2012.

The diagram below summarises ActewAGL Distribution's forecasting methodology. The following sections of the report analyse these approaches in more detail.

Figure 5: Expenditure forecasting methodology

Type	*Cost category*	*Information system*	*Forecasting/costing approach*
Capex	Asset renewal/replacement	Decision Support System asset management software	Zero-based
	Augmentation		
	Demand management		
	Reliability and quality improvements		
	Customer initiated		
	Non-system assets	Financial Management Information System	
	Network OT		Base-step-trend / zero-based*
Opex	Network operating	Financial Management Information System	Base-step-trend
	Network maintenance	Decision Support System asset management software	
	Vegetation management	Financial Management Information System	
	Metering		
	Other operating expenditure		
	Corporate overheads	Fixed Price Service Charge model	

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

3.3 Base year

ActewAGL Distribution will determine opex for a base year to inform forecast opex for the 2019-24 regulatory period. Once determined, the base year opex will be adjusted to ensure that forecast opex reflects efficient, sustainable costs going forward.

ActewAGL Distribution notes that actual opex in the current regulatory period is significantly lower than ActewAGL Distribution's proposed opex for the period, and has been driven by the uncertainty as to the outcome of the prolonged appeal process in respect of the AER's opex decision in its *Final Decision, ActewAGL distribution determination 2015-16 to 2018-19* (2015 determination), rather than an efficient and prudent program for maintenance of its distribution network. ActewAGL Distribution considers that the AER's opex allowance is not consistent with the level of opex required for the sustainable maintenance of a safe and reliable supply of electricity in the ACT.

ActewAGL Distribution was successful in appealing the AER's opex allowance to the Australian Competition Tribunal in 2016. The AER subsequently sought judicial review of the Tribunal's decision in the Federal Court, which on 24 May 2017 upheld the Tribunal's decision on forecast opex. The time that has elapsed since the making of the Federal Court decision has provided little opportunity to consider the implications of that decision for the forecasting of opex for the 2019-24 regulatory period. ActewAGL Distribution is, as yet, unaware of the AER's proposed approach to remedying the limitations and deficiencies of its approach to determining base opex in the 2015 determination and is still considering the implications of the Tribunal's decision on opex forecasts, including in particular the determination of base year opex.

Future opex will be forecast by escalating (or de-escalating) this base opex on the basis of expected changes in real costs (eg, labour), output and productivity. ActewAGL Distribution will add cost estimates for any other one-off requirements or step change cost items that are not captured in the base year opex or rate of change that are required for the forecast in order to meet the operating expenditure objectives.

4 Asset Management System

4.1 Overview

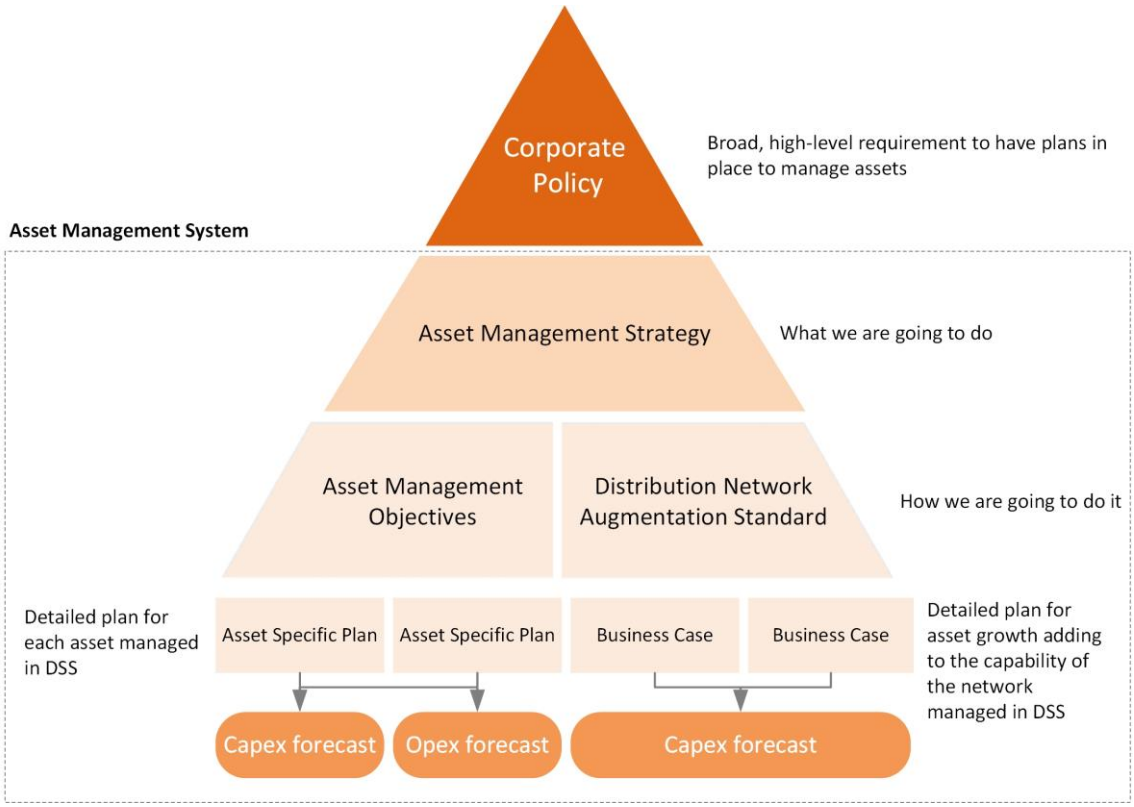
The Asset Management System is a collection of functionally related elements working together towards the purpose of effectively and efficiently managing ActewAGL Distribution core assets (see Figure 6 below). The ultimate aim of the asset management system is to implement the corporate mission, which is to offer customers the safe, reliable and sustainable energy solutions they want.

The asset management strategy is the central document, identifying activities to be performed. The asset management strategy is implemented by both the Asset Management Objectives, which for ActewAGL Distribution is composed of a number of Asset Specific Plans (ASPs), which analyse assets and recommend an asset class strategy and plan which meets the Objectives, and the Distribution Augmentation Standards, which pertain to augmentation business cases.

To ensure continual improvement of its Asset Management, in 2016 ActewAGL Distribution participated in an international benchmarking program against other utilities against ISO 55001, an international standard specifying requirements for an efficient and effective asset management system. The results of the assessment indicated above-average performance on all ISO 55001 measures.

In 2017, engineering consulting firm GHD was engaged to conduct an internal audit of ActewAGL Distribution's asset management system. The results of that audit were that ActewAGL Distribution is well above the minimum requirements for ISO 55001 accreditation.

Figure 6: Asset Management System



4.2 Asset Specific Plans

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. The ASPs individually, and in concert with each other, provide the plans which will inform:

1. A detailed program of works for all ActewAGL Distribution assets
2. A forecast of capital and operating expenditures
3. A budget for planned and unplanned maintenance, condition monitoring and refurbishment
4. Health of assets and risk of asset failure
5. Assurance of transparency and alignment from boardroom to workshop. Senior managers can be confident that corporate policy is being implemented and frontline workers can be confident that they are empowered with the resources and information to meet corporate requirements.
6. Assurance that alternatives and priorities on asset management have been set to best meet corporate goals

7. Feedback on the effectiveness of the asset management plan on achieving targets

8. Asset class strategy options analysis

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

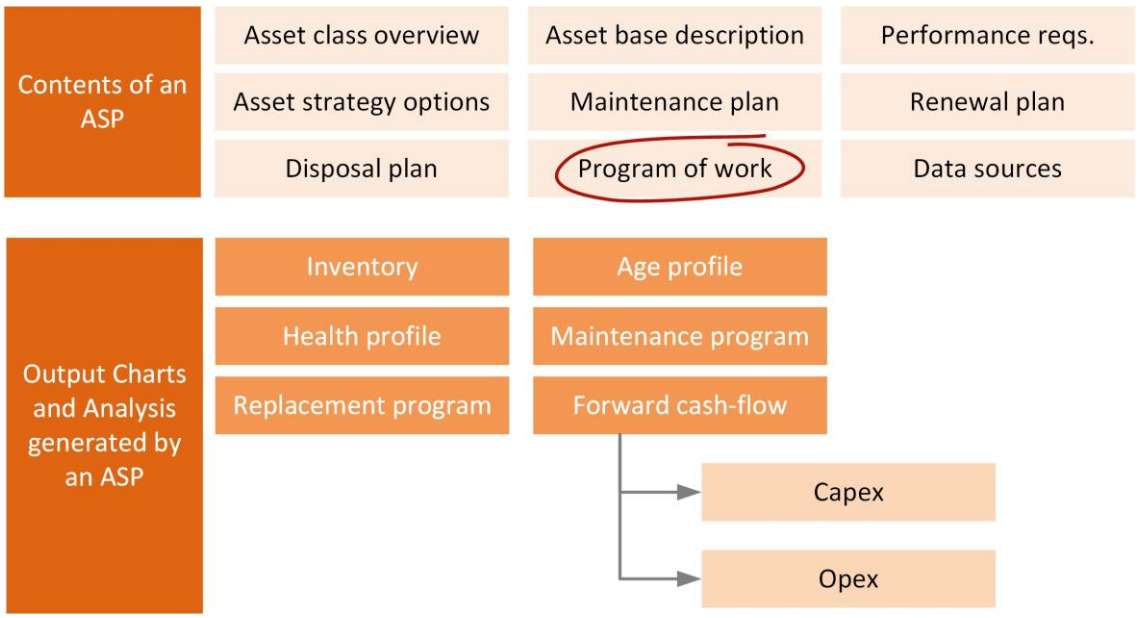
8. Planned activities and alternative strategies including analysis of alternative strategies

9. Disposal strategies

10. Program of planned works and budget

The template is a combination of descriptive text fields, tables and graphs. In practice, assets are modelled and budgets are forecasted in the asset management application, DSS. Results from this analysis is used in the 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 below.

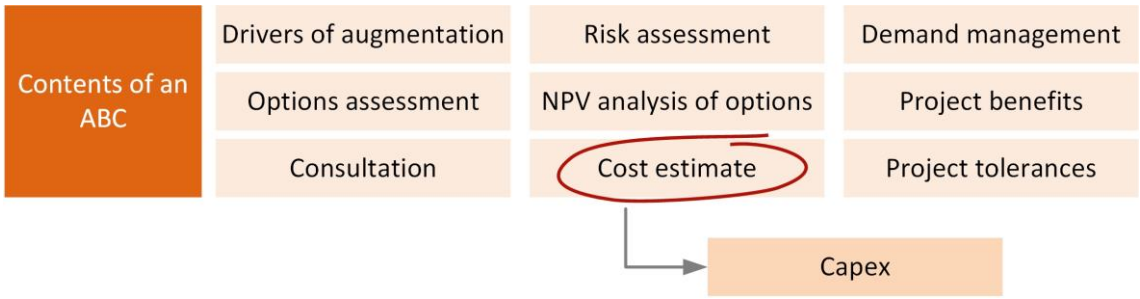
Figure 7: Asset Specific Plan (ASP) document structure



4.3 Augmentation business cases

Business cases for augmentation capital expenditure are prepared to request approval to fund customer-driven demand to grow or add density capacity or security to the network or to address constraints on the network by installing new assets or upgrading existing assets that will result in an improvement in service capacity, security or reliability. Business cases go through a rigorous internal approvals process, with significant business cases going to the ActewAGL CEO or Board for approval. The structure of an ABC is depicted below.

Figure 8: Augmentation Business Case (ABC) document structure



5 Asset Management Decision Support System

5.1 Summary of the Decision Support System

ActewAGL Distribution uses asset management software, the Decision Support System (DSS), to perform a range of functions, including the forecast of significant capex and opex projections made by ActewAGL Distribution. ActewAGL Distribution has been relying on DSS forecasts since the 2014-15 financial year, following extensive testing and refining of the asset data.

DSS is connected to a single source inventory listing for all core assets managed by ActewAGL, providing for an ASP for each and every asset. Connection of a geospatial database for all assets managed by ActewAGL Distribution is key to enabling the capability to construct for an ASP for each and every asset type. ActewAGL Distribution conducts assessments of assets when they are first acquired and during their inspection or maintenance cycle. Asset managers collect the following data for each asset maintained in DSS:

1. Asset condition
2. Forecast useful life
3. Probability of failure
4. Consequence of failure
5. Replacement cost
6. Refurbishment cost
7. Inspection cost
8. Maintenance cost

DSS also pulls information from the Works Management System (WMS) for up to date maintenance data, ensuring work schedule projections are based on relevant data and trends.

DSS facilitates -

- Accurate and convenient update of asset specific plans
- Detailed and consistent bottom up maintenance planning
- Detailed forecast of activities and expenditure
- Risk prioritised maintenance planning, and

- Ease of generating reports.

Historical records of the performance of assets are used for Failure Mode and Effects Analysis. This assists ActewAGL Distribution to identify common or recurring faults with specific types of assets and assists with the development of preventive maintenance and replacement programs to prevent similar faults or failures occurring in the future, improving reliability and reducing maintenance costs.

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

The three risk considerations include probability of failure (POF), consequence of failure (COF) and detectability index (DTI). The three combine to determine a risk priority. Each asset is subsequently ranked according to the exposure that the organisation would experience if the asset failed.

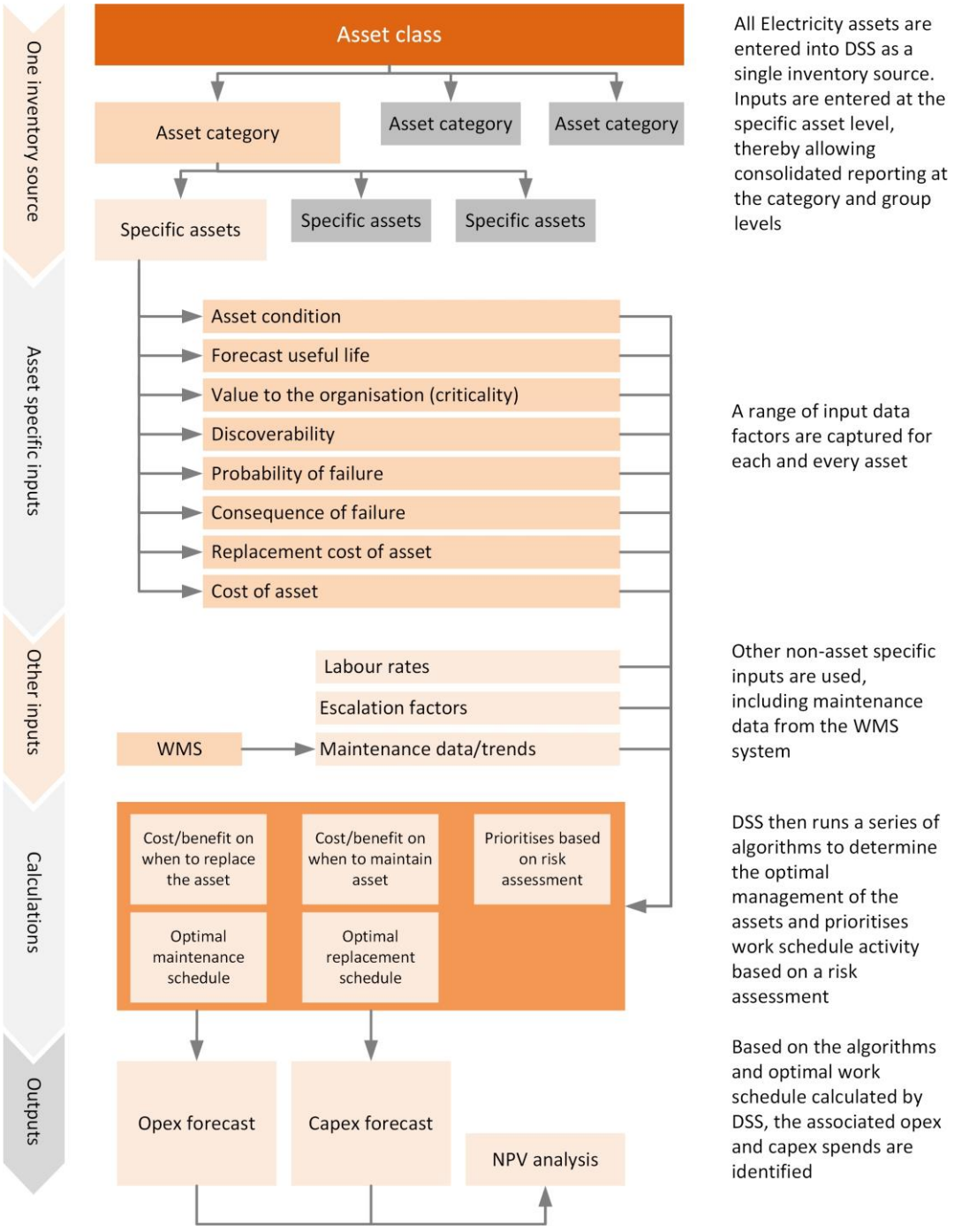
DSS then produces a risk priority number (RPN) value for each asset in the inventory. This value can be used to drive inspection frequency, insurance valuations, environmental mitigation strategies, and also rank competing events and activities. Ultimately, DSS also determines a replacement/augmentation program and maintenance work schedule which includes the period covering the upcoming regulatory period. With this information an associated capex and opex forecast is identified over 20 years for each specific asset. This is then consolidated at the category and group level for summary level reporting.

Using the information outputs of DSS, net present value (NPV) values are projected for each specific asset class, providing for cost, benefit and other analysis. This allows a 20 year life-cycle cost estimate for replacing the asset to be compared against the alternative option of maintaining the asset over this period. The ultimate intention is for all forecasts to be adjusted for the time value of money, ensuring the impact of cash flow timing is correctly accounted for.

5.2 How does DSS work?

The structure of DSS is summarised in the following diagram.

Figure 9: DSS structure



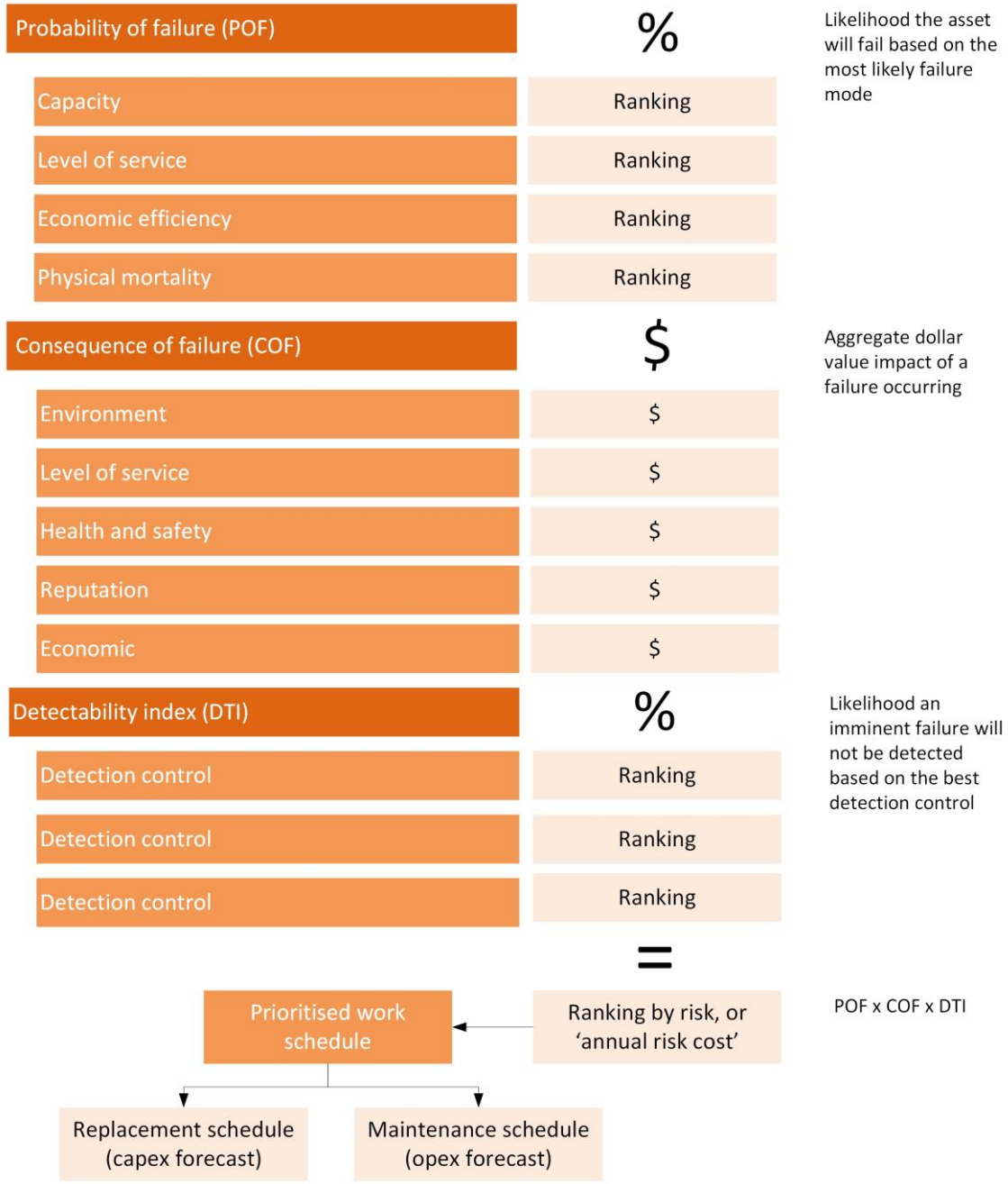
5.3 Prioritisation process

The method by which ActewAGL Distribution asset renewal/replacement and maintenance activities are prioritised is a critical function of DSS. A series of factors contributing to occurrence, severity and detection of failure are identified, analysed and rated by a team of cross-functional subject matter experts. These factors include –

- Probability of Failure (POF)
- Consequence of Failure (COF), and
- Detectability Index (DTI).

When combined, these factors determine the asset's RPN and each asset in the inventory is subsequently ranked according to the exposure that the organisation would experience if the asset failed. This forms the basis for work schedules on which capex forecasts are based and opex base year forecasts are checked against. Assets with a higher RPN have a higher priority under the asset renewal/replacement and maintenance program.

Figure 10: Prioritisation of capital and maintenance expenditure

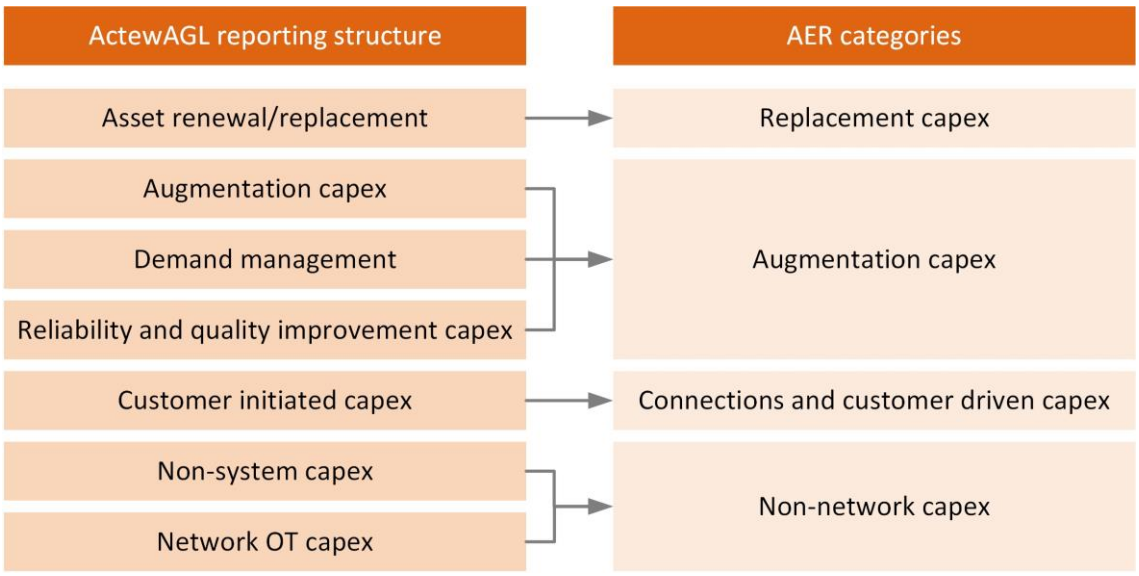


6 Capex forecasting

6.1 Categories mapping

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

Figure 11: Capex reporting categories mapped to AER categories



6.2 Asset renewal, including pole replacement

Asset renewal/replacement includes the following costs:

- Zone substations
- Secondary systems
    - Communications
    - Protection
    - SCADA
- Distribution
- Transmission

Asset renewal, including pole replacement expenditure, is forecast using a zero-based approach utilising the asset management software DSS (as described in Section 5).

Key drivers of asset renewal include asset age, reliability, functionality and maintenance expense. 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.

6.3 Augmentation

Augmentation capital expenditure includes the addition of assets that grow the network (for example 11 kV feeders, distribution substations, zone substations), the result of adding density to address network constraints or to provide capacity or security to customers to service areas, and the upgrade of existing assets.

Augmentation assets are built into DSS and forecast using load forecasts, customer-initiated requests, density and other growth projections. It is zero-based and therefore changes year-to-year, based on the number of large projects.

Key drivers for augmentation projects include local demand growth, the reliability standard, voltage control power quality issues, connection of embedded generation and net market benefits. One of the key ways of forecasting demand, density capacity and other growth projections is to use data from the ACT Land Development Agency. The Agency is responsible for the release and development of government owned land for residential, commercial, industrial and community purposes and publishes its land release and development on its website. Inputs are also taken from engagement with non-government developers, and industrial customers and generators.

6.4 Connections and customer-initiated works

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 key drivers:

- 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.

- Connection of embedded generation, eg solar farms.

6.5 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.

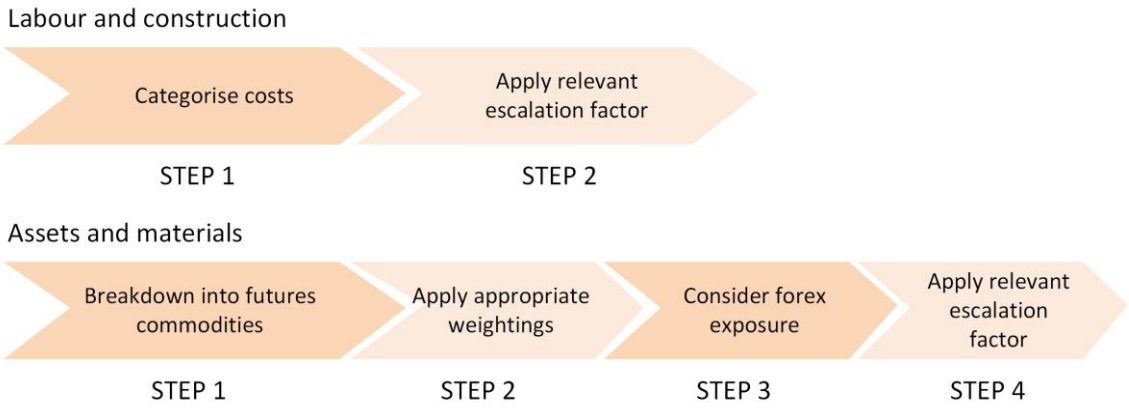
6.6 Input cost escalation

In developing its capex forecasts, ActewAGL Distribution will apply price escalation factors to various asset classes. The following escalation factors, to be developed by an external consultant, will be included for the following input cost 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.

ActewAGL Distribution's process for applying the escalation factors is depicted below.

Figure 12: Price escalation process



The first step of the cost escalation process involves calculating the percentage weightings of different material and labour cost categories within each asset class. The weightings are based on ActewAGL Distribution's recent experience with asset construction and management, and are then reviewed by an independent third-party consultant to ensure that the most appropriate escalation factor is being used.

Finally, the weightings are applied to the relevant escalation factors and input costs to derive a forecast for each asset class. Due to the escalation factors often being based in foreign currency (USD), the forecasts will also be adjusted for foreign exchange movements.

7 Opex forecasting

7.1 Opex categories

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

Table 1: Opex categories

Category	Description
Network operating expenditure	• System Control • Fault Call Centre • Strategy and Planning of the Network • Network Analysis and Planning • Electrical Standards • Regulatory Operations (Networks) • National Electricity Market Operations • Training Apprenticeships and Engineers • Customer Service • Information Technology Support
Network maintenance expenditure	• Zone Substations • Secondary Systems • Distribution • Transmission • Property • Bushfire maintenance
Vegetation management[6]	• All expenditure relating to normal tree cutting, undergrowth control and waste disposal connected to line clearing, including coordination and supervision of vegetation control work, as required under ACT law.
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

[6] The *Utilities Act 2000* (ACT) and utilities associated regulations regulates vegetation management in the ACT.

Category	Description
	○ Involves work on assets owned by the network business like damage to its assets, relocations and removals which are not capital in nature.

7.2 Standard control opex forecasting method

7.2.1 Network OT and maintenance

ActewAGL Distribution's regulatory proposal adopts a base year approach for forecasting of all opex categories.

In adopting a base year approach for all opex, ActewAGL Distribution notes that it will continue to assess base year maintenance and vegetation management opex against its zero based forecasts to ensure that forecasts enable optimisation of life cycle costs and therefore reflect its efficient costs. This approach enables compliance with its regulatory obligation to have an up to date asset management system consistent with ISO 55000 Asset Management.

ActewAGL Distribution is moving toward a new strategy in its Network OT branch, aiming to leverage Cloud-based solutions. A key impact on expenditure will be shifting capex and opex costs associated with investing in and maintaining hardware to costs associated with moving to a Cloud-based, pay-as-you-go model that enables ActewAGL Distribution to pay only for what it uses.

Network maintenance expenditure is divided into 3 categories; preventative, corrective and condition monitoring. For network maintenance, DSS is used to generate the zero based forecasts used to check the sustainability of base year forecasts. The use of DSS is discussed in more detail in Section 5. Each asset's maintenance forecast is based on the key activities of condition monitoring, planned maintenance, unplanned maintenance, and strategy & planning. Key drivers of network maintenance expenditure includes labour rates, licencing costs, asset maintenance plans and labour productivity.

7.2.2 Vegetation management

For vegetation management, the base year forecast is checked against the zero-based forecast, which takes account of adjustments for changes in contractual arrangements. ActewAGL Distribution inspects all vegetation in rural areas on an annual basis and in urban areas on a three year cycle. Key drivers of vegetation management expenditure include labour rates and weather patterns.

Responsibility for vegetation clearance rests with either the property occupant, ActewAGL Distribution or the ACT Government depending on the location and attributes of the vegetation. ActewAGL Distribution 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:

Table 2: Vegetation management responsibility

Private land	Public land	
	Unleased land	National land
Land holder for non-pre-existing vegetation. Otherwise ActewAGL	ActewAGL Distribution 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[7]	Vegetation is dealt with on a case by case basis through direct contact with the National Capital Authority

7.3 Alternate control opex forecasting method

7.3.1 Metering

Metering includes both meter reading and testing services, both of which are forecast using a base-step-trend approach. ActewAGL Distribution is responsible for maintenance of its existing type 5 and 6 meters and identifying meters for replacement by Retailers. 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.

7.3.2 Ancillary services (fee based and quoted services)

Ancillary services opex mainly involves labour inputs, and is determined by a cost-build up based on the amount of time taken, as well as the type of labour used, to fully recover costs to deliver these services. Forecasts account for real labour cost growth, as discussed in section 7.4.

7.4 Input cost escalation

In developing its operating expenditure forecasts ActewAGL Distribution will apply labour price escalation factors for inputs that contribute significantly to opex but for which escalation by CPI is inappropriate.

In developing the labour price escalators, ActewAGL will consider various issues, which can include:

- historical trends in utilities wages versus other industries;
- the outlook for the Australian Capital Territory economy;

[7] ActewAGL Distribution is expected to take over responsibility for vegetation management in urban areas from the ACT government following legislative changes.

- the outlook for capital expenditure in the utilities sector; and
- broad labour supply issues, particularly the tightness of the skilled labour market.

7.5 Output growth

Output growth represents changes in the type and volume of services ActewAGL Distribution provides to efficiently meet consumer needs and regulatory obligations. It is reasonable to expect that a material increase in output in the future will require an adjustment to the operating expenditure to deliver this change in output. ActewAGL Distribution therefore includes an adjustment to its operating expenditure forecast to meet output growth.

7.6 Productivity growth

Productivity is a measure of how well a business utilises its inputs to produce outputs. An increase in productivity could be due to an increase in outputs for a given level of inputs or a decrease in inputs for a given level of outputs. Over the course of time, societal or technological changes affect the productivity of the distribution industry as they do the state and national economy. ActewAGL Distribution will assess the appropriateness of an adjustment to account for changes in productivity in preparing its operating expenditure forecast. In doing so, ActewAGL Distribution has regard to such considerations as forecast output growth, expected changes in specific business conditions, forecast technological change and historical productivity performance.

8 Links between capex and opex forecasts

8.1 Overview

ActewAGL Distribution will undertake capex-opex trade-off evaluation in preparing capex forecasts for the 2019-2024 regulatory proposal. The efficient use of assets is key to ActewAGL Distribution's prudent and efficient asset management practice and central to the assessment of options for expenditure. The benefits that flow from capex include additional modern assets with increased performance and low maintenance costs. These are assessed against opex.

Trade-off analysis will be undertaken with respect to refurbishment and replacement of ageing and potentially unreliable equipment, where the ongoing maintenance, repair, and fault costs (including loss of supply) can be compared with the capital cost of refurbishment and replacement. An example of this is the replacement or upgrade of assets which reduce the amount of maintenance required by internal labour or prolonging the life of existing assets through higher levels of maintenance. A decision to invest in new capex as opposed to maintain existing assets can reduce life cycle costs of maintenance of those assets. The majority of capex-opex trade-off evaluations are assessed on an asset class basis rather than a project by project basis.

In addition to efficiency trade-offs, ActewAGL Distribution will also consider trade-offs relating to the National Electricity Objective, including trade-offs relating to –

- Quality
- Safety
- Reliability and security of supply, and
- Security of the national electricity system.

8.2 Potential trade-off impacts

A regulatory decision requires trade-offs between competing objectives. A decision to force substantial price decreases may decrease short term costs but has the potential to risk sustainable operations and investment plans in the long term. The National Electricity Objective (NEO) provides guidance on how these trade-offs should be resolved in specifying that the interests of consumers with which it is concerned are their interests in the 'long term'. A description of potential trade-off impacts and their consequences is described below.

Table 3: Potential trade-off impacts

Trade-off impact	Enhanced risk areas
Higher than optimal long-term costs	• Higher than optimal intervention costs (unplanned replacement generally comes at a higher cost than when planned) • Higher maintenance costs (a higher rate of inspections, more frequent temporary repairs, and costs associated with repairs and other interventions that would not have been necessary if the assets were renewed at the optimal time) • Increased costs to customers (and ActewAGL Distribution) of service interruptions • Increase in the cost of interruptions for ActewAGL Distribution and its customers, and reduced level of service it is able to deliver
Lower level of service	• Increased response time which would induce increased total customer minutes of service interruption and a reduction in level of service • Reductions in ActewAGL Distribution's ability to carry out planned maintenance • A cycle of increasing numbers of unplanned faults as planned maintenance is not carried out, causing further increases to response times • Reductions in renewal and operational budgets leading to aging assets failing more frequently, an inability to carry out planned maintenance, and steadily worsening response times. The cumulative impact will be a drastically lower level of service for customers.
Reduction in safety levels	• Failure of pole-top hardware and cross-arms is the most common form of failure on the overhead distribution system, causing overhead conductors to sag excessively or fall to the ground. The risk to public and worker safety can be significant in such an event. • Replacement of deteriorating cross-arms and pole-top hardware, and installation of vibration dampers, armour rods, and preformed distribution ties on rural high voltage overhead lines located in high bushfire risk areas is required to minimise the role that these assets can play in starting bushfires which are a significant threat to life and property

8.3 Role of DSS in trade-off evaluation

ActewAGL Distribution uses DSS to optimise its asset renewal and replacement capex program and to make capex/opex trade-off evaluations. In particular, DSS considers the failure effect and risk (likelihood and consequence) of each investment decision. Failure effect can include impacts on safety of personnel and public, impact on environment, cascading failure on other equipment, operational consequences (unserved energy), and risk to reputation.

Based on the determined failure effect for each asset under consideration, one of the following replacement strategies is adopted and an optimal time for replacement or monitoring is identified:

- run to failure;
- condition monitoring; or
- age and condition based replacement.

In setting ActewAGL Distribution's maintenance program, the selection of a run to failure, replace on condition or replace on age or usage strategy will be dependent on the safety implications of each and which strategy has the lowest overall expected cost. Generally, replace on condition is the most relevant to capex/opex trade off decisions and is most commonly employed where the consequence of failure is very high, for example pole failures. Where the consequence of failure is low such as assets with standby capacity, the run to failure strategy is often the least cost option. Most distribution transformers have adjacent units which can take up the load in event of failure, so it is common to run these units to failure. The run to failure strategy has the advantage of delivering the maximum life from an asset, however once failure has occurred, replacement or repair is no longer discretionary. Age or usage based replacement is used where inspections are costly, and/or the asset cannot be allowed to run to failure because of safety reasons.

9 Corporate governance

9.1 ActewAGL Board

ActewAGL is structured as two partnerships; ActewAGL Distribution (owned 50 per cent each by Icon Water and Jemena Ltd) and ActewAGL Retail (owned 50 per cent each by Icon Water and AGL Energy Ltd). It is governed by a single Partnerships Board comprised of six members, of which three members are appointed by Icon Water and three are appointed jointly by AGL and Jemena. The board monitors business performance through progress reports on key projects and divisional progress against budgets and activity plans. It also sets performance targets and makes decisions related to business strategy. The board approves expenditure and is responsible for the release of funds based on business cases with a significant capital value.

9.2 Financial planning process

The Commercial Risk Framework (CRF) is the central document that provides the framework and direction for ActewAGL Distribution in relation to the following business deliverables:

- Long-Term Business Planning
- Annual Budgeting and Program Administration, and
- Detailed Project Planning, Estimating and Approvals.

The board approves long-term electricity distribution capital investment and asset maintenance plans. These plans form the basis of all financial and regulatory capital and maintenance expenditure budgets and forecasts and are the key underlying documents in the expenditure approval processes. These plans guide annual program expenditure and budgets, which are prepared and approved on an annual basis and are categorised into the 4 distinct categories –

1. System capex
2. Non-system capex
3. System opex, and
4. Non-system opex.

9.3 Expenditure governance

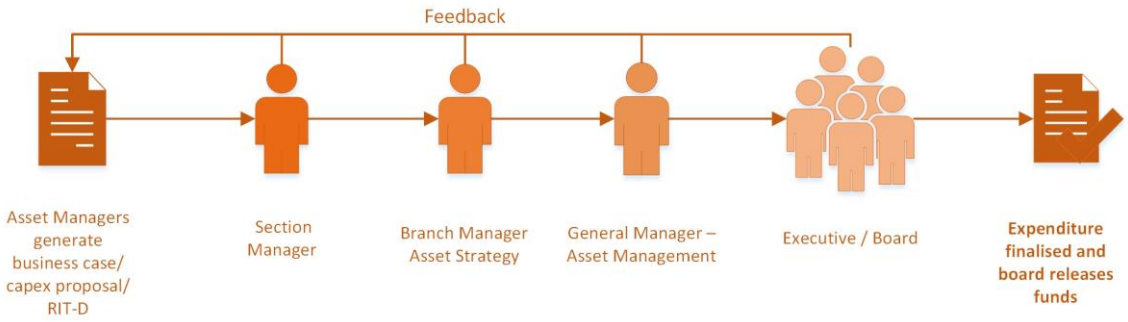
All expenditure made on electricity network capital projects, non-systems capital projects or unregulated business projects requires formal approval. Operational expenditure is approved at a program expenditure level, with additional governance and reporting in place to ensure appropriate controls in respect of operational expenditure. Approval must be

sought from the appropriate level of delegated authority, with project approval, where required, consisting of the following elements:

- Financial Authorisation (Budget Recognition and Alignment)
- Technical Network Approval, and
- Financial Approval.

Capex proposals are generated by asset managers and coordinated through an asset management systems group before being advanced through the General Manager – Asset Management for consideration by the executive. Broad adjustments as directed by the executive are fed back to asset managers for further refinement. The process is repeated until an acceptable solution is arrived at. The figure below illustrates the capital investment governance process.

Figure 13: Overview of capital investment governance process



At each stage, the proposal is rigorously assessed and scrutinised to ensure compliance with regulatory requirements, expenditure is justified through a 'needs' assessment, and options analyses are thorough and accurate. This process validates that the expenditure is efficient and necessary for the organisation to achieve its objectives.

ActewAGL Distribution ensures the following prior to committing to any large investment:

- Investments are cost effective and consider whole-of-life costs associated with a new asset.
- Timing of the new investment is such to meet the requirement of the need when it reaches the point that the need cannot otherwise be met.
- Appropriate investment procedures are followed, including business case and Board approval, and execution of RIT-D if required.
- Works are timed to ensure smooth capital and replacement cash flows, and availability of resources.
- Works are coordinated as required with other utilities and/or network service providers, and to meet customer needs.

9.4 Regulatory Investment Test

In line with the requirements of the NER,[8] if the cost of an augmentation proposal exceeds $5 million, ActewAGL Distribution undertakes a Regulatory Investment Test for Distribution (RIT-D) before an investment decision is made. This provides opportunities for parties external to ActewAGL Distribution to propose alternative solutions including non-network options. ActewAGL Distribution is obliged to consider any options on a non-discriminatory basis as part of the RIT-D process.

[8] NER clause 5.17.

10 Fixed Price Service Charge (FPSC)

10.1 What is the FPSC?

The FPSC is an annual charge issued by ActewAGL Corporate for the shared corporate services being provided to ActewAGL Distribution – Electricity and Gas, ActewAGL Retail and Icon Water, with a true-up mechanism applied on an annual basis to account for unders and overs based on actual expenditure. It covers the following services:

- CEO
- Human Resources
- Facilities Management
- Environment, Health, Safety and Quality Division
- Contracts and Procurement
- Legal & Secretariat
- Corporate Finance
- Accounts Payable
- Corporate Accounts
- Regulatory Affairs
- Business Systems Division (ICT)

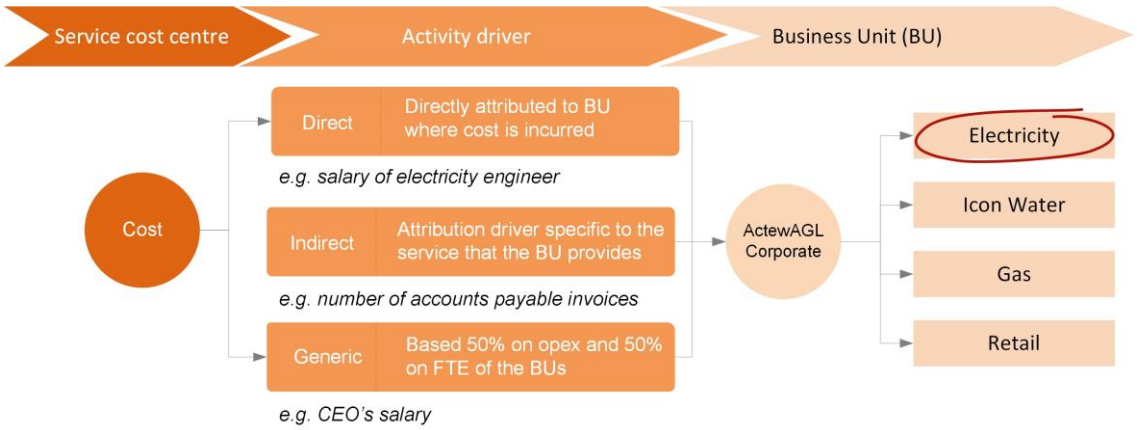
10.2 How is the FPSC calculated?

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 three 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.

The FPSC charge to the businesses includes a breakdown of the charge by service and includes a calculation of the drivers.

Figure 14: FPSC attribution



10.3 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 forecasting approach is used.

Glossary

ABC	Augmentation business case
ACTCOSS	ACT Council of Social Service
AEMC	Australian Energy Market Commission
AER	Australian Energy Regulator
AMP	Asset management plan
ASP	Asset specific plan
COF	Consequence of failure
CRF	Commercial Risk Framework
DNSP	Distribution network service provider
DSS	Decision Support System
DTI	Detectability index
ECRC	Energy Consumer Reference Council
Forex	Foreign exchange market
FPSC	Fixed price service charge
NEO	National Electricity Objective
NER	National Electricity Rules
NPV	Net present value
OT	Operational technology
POF	Probability of failure
RIT-D	Regulatory Investment Test for Distribution
RPN	Risk Priority Number
SCADA	A real-time software and hardware data system that manages the distribution network
WMS	A commercial off-the-shelf maintenance software product

ActewAGL

for you