Expenditure Forecasting Methodology

30 June 2017

Ausgrid

Expenditure Forecasting Methodology

Contents

Executive Summary

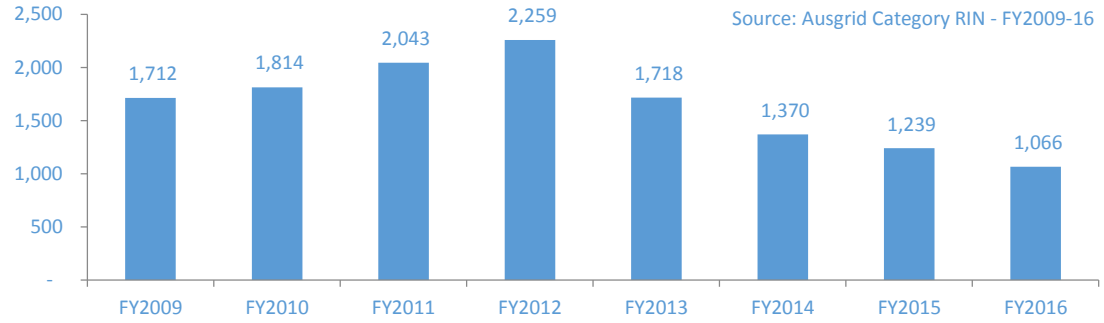
This document describes Ausgrid's proposed methods to forecast capital (capex) and operating (opex) expenditure for standard control services for the 2019-24 regulatory period. It provides an opportunity for the Australian Energy Regulator (AER) and our stakeholders to consider our methods before we submit our regulatory proposal forecasts on 31 January 2018.

The complete details of our approach to forecasting expenditure will be included in our regulatory proposal as required by the National Electricity Rules. This methodology document serves an important role as the starting point for early engagement on integral elements of our proposed revenue and indicative prices for the 2019-24 regulatory period.

Improving the affordability and reliability of our services

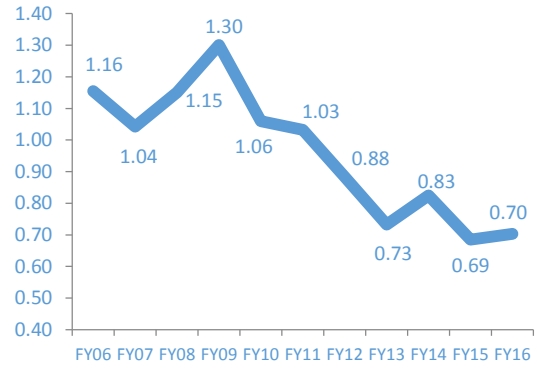
In recent years, we have been making fundamental changes to the way we forecast our expenditure requirements. Our objective has been to sustainably reduce the costs of providing our services to improve affordability for our customers. Through these changes, we have reduced our total expenditure on our standard service by 53 per cent from $2.26 billion at the peak of expenditure in FY2012 to $1.07 billion in FY2016. Figure 1 identifies our total expenditure between FY2009 and FY 2016.

Figure 1 – Total expenditure on standard control services ($m, nominal)



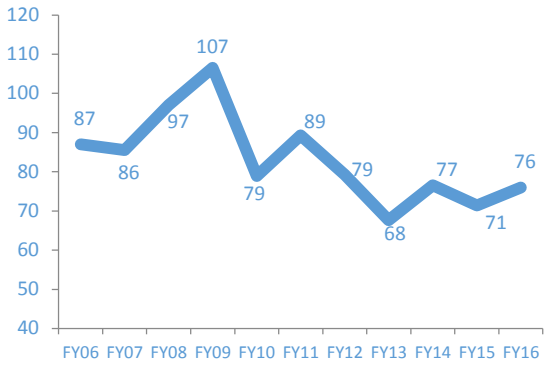
Despite reducing costs in recent years, we have been able to maintain the reliability of our services. Figures 2 and 3 show the number of outages and minutes of outage respectively. Minutes of outage increased rapidly for a typical customer between FY2006 and FY 2009. Our large investment program between 2009 and 2012 helped to improve our reliability performance significantly. We have managed to sustain reliability at these improved levels over the last 4 years.

Figure 2 – Average number of outages for customer



Source: Ausgrid Benchmarking RIN - FY2006-16

Figure 3 – Average minutes of outage for customer



Source: Ausgrid Benchmarking RIN - FY2006-16

Focus for 2019-24 proposal

Our forecast expenditure for the 2019-24 period reflects the costs we would incur while ensuring we deliver safe, secure and reliable services and pursuing productivity and service improvements through innovation. Our approach to forecasting expenditure also considers long-term sustainability in a changing energy market.

In particular, our expenditure forecasting methods have considered paradigm changes occurring in the energy sector. We have been working with the Energy Networks Association on identifying activities we can undertake over the next 10 years to facilitate a transition to a sector characterised by increasing diversity in technology and greater customer choice.

Our methods also build on the transformation we have undertaken in recent years. In response to AER and stakeholder feedback, we have been making the following changes to our forecast methods:

- Reducing capex through better risk and options analysis – We have applied cost benefit techniques and examined demand management options to find ways of reducing our investment levels. For example, we have decommissioned deteriorated assets, rather than undertake like-for-like replacement.
- Incorporating AER models to test our forecasts – We use AER models and techniques to challenge and prioritise our expenditure programs. For example, we will be using the AER's repex model as a 'high level' check of our replacement program expenditure on different asset classes. We will also adopt the AER's preferred 'base-step-trend' model for forecasting total operating expenditure.

Stakeholder feedback

In developing our Expenditure Forecasting Methodology we have undertaken preliminary discussions with our stakeholders on our expenditure forecast approach. In this document, we have highlighted some of the preliminary feedback and data requests from our stakeholders on our capex and opex forecasts.

At a high level, stakeholders identified the need for Ausgrid's forecast methods to consider social objectives in its capacity as an essential service provider. Stakeholders were also supportive of Ausgrid considering long-term objectives when making expenditure decisions. To this point, stakeholders considered our investment strategy should consider our role in a rapidly changing electricity industry.

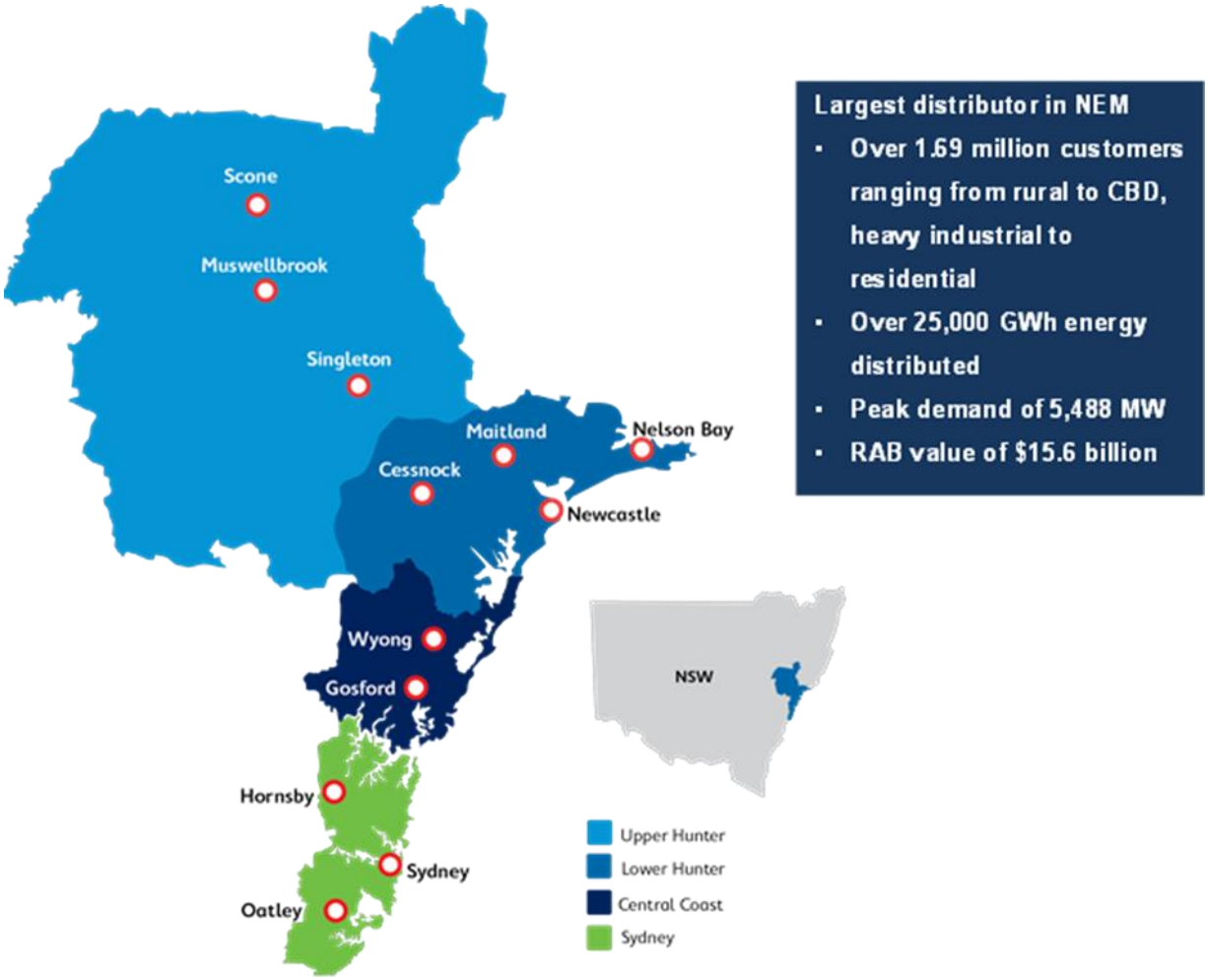
We hope this document facilitates further discussion with our stakeholders and the AER on our forecast expenditure methods. Our intent is to incorporate feedback before submitting our proposal to the AER on 31 January 2018.

1. Introduction

1.1 Ausgrid's network

Ausgrid's network connects about 1.7 million customers to the grid and each other across more than 22,000 square kilometres on the NSW east coast.[1] Ausgrid supplies electricity to almost half of the electricity customers in the state, and we are the largest distributor in the National Electricity Market (NEM) as measured by number of customer connections, electrical throughput and regulated asset base (RAB). Our presence in the Sydney region goes back more than 100 years and our service area includes some of Sydney's most densely populated areas, as well as the fastest growing areas of NSW from Waterfall in Sydney's South to Auburn in Western Sydney to the upper Hunter Valley.

Figure 4: Ausgrid's network area



[1] The Alpha Ministerial Holding Corporation is the owner of the network. The network has been leased to the Ausgrid Asset Partnership (AAP) and subleased to the Ausgrid Operator Partnership (AOP), who is the operator and holds the Distribution Network Service Provider licence and is registered in the NEM as the operator of the network. AOP is also the registered intermediary for AAP.

1.2 Purpose and context for the Forecast Expenditure Statement

This document is a requirement of the National Electricity Rules (the Rules) and sets out the methods that Ausgrid will use to forecast capital and operating expenditure for 1 July 2019 to 30 June 2024.

Every five years, electricity distribution businesses such as Ausgrid must submit a regulatory proposal to the Australian Energy Regulator (AER) outlining the costs required to run a safe and reliable power supply for business and residential customers. Our upcoming proposal will identify the forecast capital and operating expenditure for the 2019-24 regulatory period, which are key elements of our proposed revenue and indicative prices for regulated services.

As part of the regulatory determination process, clause 6.8.1A of the Rules requires us to inform the AER of the methodologies we propose to use to forecast capital and operating expenditure in our regulatory proposal. The purpose is to provide early visibility of our forecast methods for the AER and stakeholders. It also provides an opportunity for the AER to understand where our methods align with its Expenditure Forecast Assessment Guideline published in November 2013.

More details about the methodologies including key assumptions will be included in Ausgrid's regulatory proposal, as required by clauses S6.1.1 and S6.1.2 of the Rules.

1.3 Structure of the document

The remainder of this document sets out our approach to developing expenditure forecasts. In section 2, we explain our corporate objectives and the drivers underlying our expenditure. We show how drivers such as the condition of assets on our network and growth in customer connections can influence the level of capital works and maintenance activity. Importantly, we note our approach to developing expenditure programs incorporates efficiency trade-offs between capital expenditure and operating expenditure, such as whether demand management operating expenditure (a non-network solution) can efficiently defer the timing of capital projects (a network solution) or whether we should maintain or replace assets.

In section 3, we describe our proposed method for forecasting capital expenditure for the 2019-24 regulatory period. Our first step is to examine our investment drivers at a holistic level, and develop overarching strategies that help us meet our needs at efficient costs in the long-run. From here, we develop detailed programs of work for replacement, augmentation, connection and non-network capital expenditure. Finally, we consolidate and prioritise our capital portfolio by examining AER tools, considering resource requirements, and using risk-based prioritisation tools.

In section 4, we describe our proposed method for forecasting operating expenditure for the 2019-24 period. We intend to use a "base-step-trend" approach to forecast most categories of operating expenditure, which aligns with the AER's preferred approach as set out in its Expenditure Forecast Assessment Guideline. For the remaining costs (such as the costs associated with debt raising and demand management), we will use a specific or bottom up forecasting approach, which better reflects the nature of these costs.

1.4 Invitation to provide feedback on this Methodology

Ausgrid welcomes feedback on this Expenditure Forecasting Methodology from customers, stakeholders and the wider community. You can provide feedback directly to us by:

- Emailing us at yoursay@ausgrid.com.au
- Making comments on our Facebook page at www.facebook.com/Ausgrid
- Making comments on our Twitter stream at twitter.com/ausgrid

Alternatively, you can also provide comments on our reports to the AER (www.aer.gov.au).

2. Expenditure objectives and drivers

This chapter sets out our objectives and strategies, together with the drivers underlying our expenditure forecasts for the 2019-24 regulatory period.

2.1 Purpose and vision

Ausgrid is a crucial component of the electricity supply industry. Our role is changing from a passive distribution network operator, which simply delivers electricity to customers, to an interconnected platform that facilitates customer choice by connecting communities and empowering lives. Our vision is to be a leading energy solutions provider, recognised both locally and globally.

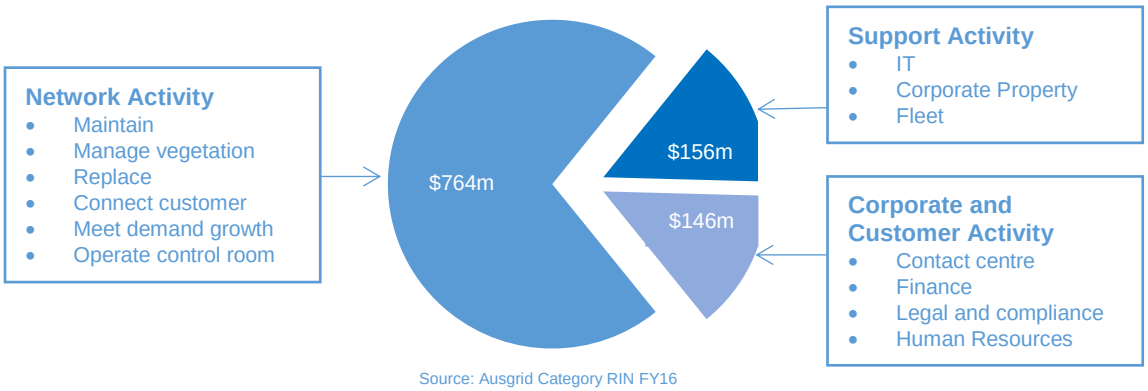
Our objective is to provide safe, reliable and affordable energy services. We have regulatory obligations to operate our network safely for our customers, community and workers. As an essential service provider, we also have regulatory obligations to connect customers to our network and to maintain a reliable and secure supply of electricity.

While these obligations require us to incur capex and opex, our objective is to deliver our services at an affordable price. With this in mind, a key element of achieving our vision and purpose is to drive efficiency in our costs.

2.2 Expenditure drivers

The majority of our expenditure relates to network activities including maintaining, replacing and installing new electrical assets. As part of our maintenance programs, we also keep our electricity lines clear of vegetation to maintain reliability, to avoid fires and other safety incidents. Our network expenditure comprised 72 per cent of total expenditure in 2015-16 as seen in Figure 5.

Figure 5 – Breakdown of Ausgrid's total standard control expenditure in 2015-16



Source: Ausgrid Category RIN FY16

The key drivers of network expenditure include:

- *Maintaining the health of the network* – Electricity assets have a limited technical life, with failure in service leading to reliability and safety risks. Assets can also pose bushfire, health and environmental risks if not managed properly during their life. Our maintenance programs are optimally designed to ensure our assets perform their function adequately through their technical life. We replace assets when maintenance programs are ineffective at managing risk and performance to acceptable levels.

- *Meeting demand for electricity* – Our network is designed to meet the demand of customers at peak times. We incur capex to address constraints in the network arising from localised growth in peak demand growth, where the reliability risk outweighs the cost.

- *Complying with reliability standards* – We have obligations to ensure that average reliability for our CBD, urban and rural areas stay within set levels. We also have an obligation to meet a minimum level of reliability performance across sections of our network.

- *Paradigm changes in the energy sector* – Our changing environment influences our strategic direction on investment. For example, through our participation in the development of the Energy Network Association and CSIRO's Transformation Roadmap, we are considering ways in which we can invest efficiently to provide more options for our customers to obtain value from their own investments in new technologies.

Ausgrid's Asset Management System (AMS) provides the overarching framework for our network activities. The AMS provides an end-to-end system for managing our network assets across the life cycle of planning, construction, operation, maintenance, renewal and disposal. This includes identifying the objectives and strategies underlying our network activities. It also provides the framework for our capital forecast method to identify network expenditure, and our delivery strategy to meet the needs.

In addition to our network activities, we incur support costs associated with operating the business. These include the costs of information technology systems, fleet and corporate property, which represent 15 per cent of total expenditure (as seen in Figure 5). We also undertake a number of corporate functions and customer service activities including finance, compliance, human resources and the operation of contact centres. These costs comprise 14 per cent of total expenditure. We have a number of strategies that provide the framework for support expenditure including an Information Technology Strategy and Property Strategy.

2.3 Key inputs underlying our forecast methods

Our method to develop expenditure forecasts for the 2019-24 period will rely on a number of key inputs as identified in Table 1 below.

Table 1 – Description of key inputs for capex and opex

Key input	Description
Stakeholder engagement feedback	We have undertaken early consultation with key stakeholders on our expenditure forecasting methodology. In chapters 3 and 4, we discuss issues raised by our stakeholders, and identify the way we will incorporate this feedback in finalising our methodology ahead of the regulatory proposal. Importantly, we will continue to listen to our stakeholders throughout the regulatory determination process.
Opex/capex substitution possibilities	As part of our forecasting methodology, we examine whether an operating or capital solution is the least cost option to resolve a need in the long-run. For example, we consider whether demand management operating expenditure can efficiently defer the timing of capital projects. When undertaking such analysis we use economic tools to guide our decision making, including net present value analysis.
Peak demand and customer connection forecasts	We will use 2016-17 summer data to provide the most up-to-date forecast of peak demand for the 2019-24 regulatory period. Our expenditure forecasting methodology examines peak demand growth across all elements of our network. We have also incorporated the expected reductions to peak demand because of PV generation and battery storage penetration in the network. Our peak demand forecasts will incorporate information on expected customer connections at a residential level, and all committed large connections. We will also take into account the latest information on large customer connections, including probability of an uncommitted connection proceeding.

Key input	Description
Cost benefit analysis for major projects	We use cost benefit analysis to analyse the timing of major capital projects. The approach includes assumptions on the value of customer reliability for segments of our network.
Unit costs and cost escalation	We develop unit cost estimates for all capital projects and programs. The method to derive unit costs will vary depending on the type of capital project. For example, for major projects we will use site-specific cost estimates that take into account the location and complexity of the project. In the majority of cases, we will use historical data to inform our cost estimates. We also examine available benchmarking data to test and challenge our unit cost estimates. We will use current economic advice to help us develop accurate cost escalators to apply to the labour, material and contract service portion of our operating and capital expenditure forecasts.

3. Capital expenditure forecasts

Capital expenditure is a significant driver of the network component of electricity prices. The assets we install on our network can remain in service for 50 years or longer. Over the lifetime of the asset, we receive a revenue stream to offset the cost of raising finance. The costs of financing our assets comprise about 60 per cent of the network electricity bill.The electricity industry is undergoing a fundamental change in the way that it operates. The dynamic nature of technology development means that the nature of capital decision-making is changing. The purpose of this chapter is to provide context for the changes we have made to our capex forecasting methods, and to provide a description of the process we intend to use to develop our capex forecasts for the 2019-24 regulatory period. We also show how our forecast method has considered and incorporated elements of the AER's Expenditure Forecast Assessment Guideline.

3.1 Improvements to our forecasting method for capex

As part of our regular business planning, Ausgrid develops long-term capital forecasts, which we update annually to incorporate latest information. The purpose is to identify the capital activities we need to undertake to maintain the safety and reliability of the network at the least cost in the long term.

In recent times, we have made changes to our forecast methods to incorporate feedback from the AER and our stakeholders. In our 2014-19 determination, the AER made a number of observations regarding on our forecast method for capex. In the AER's view, our methods led to conservative decisions that did not sufficiently consider opportunities to reduce our investment. Our stakeholders also noted concerns with our techniques in developing our capex forecast, and questioned whether we had considered opportunities to reduce capex through efficiencies and better options assessment.

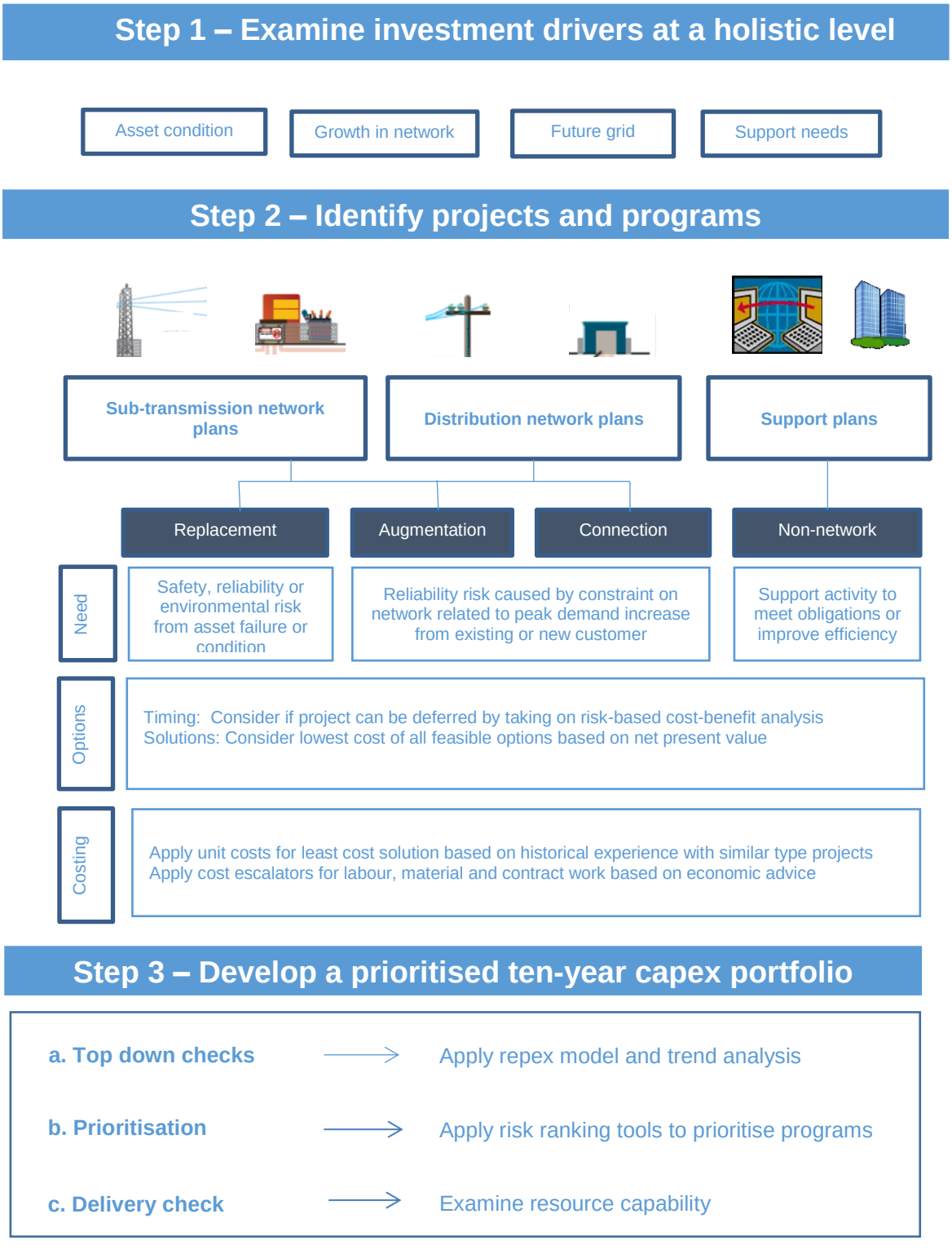
The feedback we received from the AER and stakeholders has prompted us to make a number of refinements to our forecast methods. These include:

- *Managing risk to defer the timing of major projects* – We utilise cost benefit analysis when planning our major projects. We have deferred the timing of major projects where the value of customer reliability is lower than the cost of the project. We also have taken into account reductions in peak demand associated with PV and battery storage.
- *More rigorous options assessment* – We have examined alternative options to mitigate risk through low cost solutions. In particular, we have managed to avoid "like for like" replacement of major infrastructure by utilising spare capacity on the network. We have also integrated demand management options when considering our options to mitigate risk.
- *More emphasis on scope and costs* – Our forecast methods incorporate cost efficiencies from the efficiency transformations we have made to the business. In this respect, the more exacting controls we have placed on governance and procurement have led to significant changes in scope, design and delivery costs, which have been embedded in our forecast programs.
- *Incorporating AER techniques to test our capex forecasts* – As part of its Expenditure Forecast Assessment Guideline, the AER has been collecting more benchmarking data and using high-level tools to assist decision making. We will be using the AER's repex model to test our level of expenditure on replacement for the 2019-24 period together with other tools such as trend analysis.

3.2 Description of the forecast capex method

Ausgrid develops a ten-year forecast of capital works on an annual basis. At a high level, we examine our future drivers of investment at a holistic level, and develop overarching strategies that help us meet our needs at efficient costs in the long-run. Based on these strategies, we develop replacement, augmentation, connection and non-network programs at a detailed level based on "fit for purpose" capital plans. Finally, we prepare a prioritised list of capital projects for a ten-year period based on an assessment of risks on our network, with regard to our resourcing capacity. Figure 6 depicts our capex forecast method, which we summarise in the following sections

Figure 6 – Ausgrid's Forecast Capex Method



Step 1 - Examine investment drivers at a holistic level

When developing our long-term capital forecasts, we look holistically at our expenditure drivers, and develop overarching strategies that inform our detailed capital plans.

The key drivers for network investment include issues with asset condition and network performance, together with growth in peak demand on the network from existing and new customers.

As part of our analysis of drivers, we consider paradigm changes in the energy sector that influence our strategic direction on investment. For example, increasing penetration of embedded generation and storage are likely to change the role our network plays in the electricity system. Box 1 shows how we have been working with the Energy Network Association to develop a transformation roadmap to deliver lower costs to customers while ensuring the safety and security of the system.

We develop a number of overarching strategies that provide direction on how we develop capital programs in an efficient manner to respond to these drivers. These include our network development strategies for the distribution and transmission network, together with our asset class strategies. The strategies consider the future direction of technologies such as PV and battery storage, together with changing customer preferences for new technologies.

For non-network capex, the key drivers include the support necessary to perform our network activities, meet our corporate obligations, and drive efficiency through new technology opportunities. We develop separate strategies for information technology and corporate property to help us to understand the driver for investment over the long-term, and to help us develop a program of capital works that helps us meet our obligations in an efficient way.

Box 1 – Key highlights of ENA Transformation Roadmap

- By 2050, it is estimated that customers or their agents - not utilities - will determine how over $200 billion in system expenditure is spent and millions of customer owned generators will supply 30-45% of Australia's electricity needs.
- CSIRO modelling indicates that almost $1,000 billion could be spent by all parties in Australia's electricity system by 2050, however, the benefits achieved will depend greatly on decisions made early in the energy transition.
- Through the activities identified in the roadmap, customers will spend 30% less for network prices in 2050, compared to 2016.
- Over the next 10 years, network firms will need to provide a more effective service platform to facilitate diverse technologies on the network, orchestrate distributed energy resources such as embedded generators, and establish active distribution system operations and markets.

Sep 2 – Identify projects and programs

Based on our high-level analysis of drivers, we identify projects and programs for replacement, augmentation, connection and non-network capex. These categories align to the AER's assessment methods:

- Replacement - These are capital works associated with replacing an existing asset on our network. The need for these types of programs is deterioration in the condition of the asset that results in unacceptable safety, reliability, or environmental risks.
- Augmentation – These are capital works to install new assets on our shared network to meet additional demand at peak times, or to meet reliability licence conditions.
- Connections – These are capital works to install new assets on the shared network in response to a specific customer connection application that necessitates investment on the shared network.
- Non-network – These are capital works for IT, non-network property, fleet and plant that support our network activity, meet corporate obligations or drive efficiency.

To identify these programs, we develop capital plans that relate to a specific part of the network or a specific driver of investment. Table 2 describes each plan and shows which category of capex to which it relates.

Table 2 – Description of capital plans and alignment to AER capex categories

Key input	Description	Replacement	Augmentation	Connection	Non-network
Sub-transmission Area Plans	We holistically examine replacement, augmentation and customer connection needs for major areas of sub-transmission network.	✓	✓	✓	
Replacement Plans	We examine need for replacement programs for distribution assets and piecemeal elements of our sub-transmission network (which are not covered by Area Plans). The programs include "duty of care" programs, which we base on addressing a particular fire or environmental concern.	✓			
Distribution Capacity Plans	We identify augmentation and connection expenditure for the distribution network based on analysis of local peak demand forecasts, and capacity. The capital contribution element is excluded from standard control capex.		✓	✓	
Non-network Plans	We examine need to replace and install IT, property and fleet assets based on examination of support activity to meet obligations and to improve efficiency.				✓

Our planning approaches reflect a business case assessment of need, analysis of options and timing, and costing. For major projects, our business case assessment is extensive and detailed. We examine the condition of individual assets on the sub-transmission network in terms of failure risk and performance, examine growth at the zone level, and identify how major connections impact the development of the sub-transmission network. We examine all feasible options including the use of demand management to defer the timing of individual projects.

We use high level forecasting tools for asset categories that are comprised of large volumes of less material assets such as poles. In general, we examine the condition of a population of assets using health measures such as failure rates, rather than individual condition assessments. We also examine past trends in connection and augmentation expenditure, rather than a detailed examination by area. As part of our options analysis, we have been examining how demand management activities could be used to defer the timing and scope of large programs of work.

Our plans provide a cost estimate for undertaking our projects and programs. Our unit cost methodology is based on our historical experience with completing works of a similar nature. For major projects, we use "site specific" estimates that provide a granular estimate of the costs for each stage of the project. For programs containing a large volume of assets, we develop an "average" cost based on a typical scope for the program. In some cases, we use a historic trending approach to guide our estimate of expected costs. This approach is required for "reactive" replacement projects where we cannot know in advance which asset may fail in service. As a final step, we apply real cost escalators to labour, materials and contract services to develop a realistic estimate of the costs of undertaking the project by the need date.

Step 3 – Develop a Prioritised ten-year capex portfolio

The final step in our process is to consolidate and prioritise our projects and programs into a ten-year capex portfolio. To consolidate our programs we undertake a number of top down checks and processes including:

- *Remove any potential overlap in programs* – We check to see that there are no overlaps between projects and programs, and remove these from the consolidated list of projects if they do occur.

- *Test categories of capex relative to AER models* – A recent improvement we have made to our capital planning process is to make checks with the AER's models and techniques. Similar to the AER's assessment of capex, we use historical trending as a "check" on our forecast capex requirements. Where there is a material difference, we seek to examine the high-level reasons driving the difference. A further improvement is to check our replacement projections with the predictions of the AER's repex model and examine the reasons for any difference.

- *Allocating our costs* – As part of the consolidation process, we ensure capex has been allocated to standard control in accordance with the AER approved cost allocation method, connection policy, and capitalisation policy.

Our next step is to prioritise our program from highest risk to lowest risk. We undertake a prioritised investment plan (PIP) to develop a risk ranking of all projects and programs. The process uses a well-recognised method in other industries termed "CASH" which provides a view of overall risks. This enables us to understand our risks at a high level, and to understand how each program mitigates risk over time. Such a process also ensures that we consider sustainability over the long-term, as projects that are deferred build up conditions for additional risks in the future. Based on the PIP we develop a consolidated list of projects and programs.

The final step is a detailed delivery plan. In recent times, we have been strengthening this aspect of our forecasting method to ensure that we have resources in place to deliver the proposed program.

3.3 Stakeholder feedback

We held a workshop with our stakeholders on our capital forecast method on 4 April 2017, where we sought feedback on our method to forecast capex for the 2019-24 regulatory proposal. Our stakeholders emphasised the need for transparency in the way we make decisions, including an understanding of the assumptions and data that drive our investment programs.

At a high level, our stakeholders strongly supported Ausgrid's approach to consider long-term objectives when making capital expenditure decisions. They acknowledged the need to renew the network as a means of ensuring sustainability in the long run. However, they wanted a better understanding of how we make replacement decisions, and what tools we use to determine a sustainable level of investment. They also wanted to know if there are opportunities for alternatives to "like for like" investment (including designs that future-proof the network) and whether reduced demand means that we can delay replacement of assets.

Stakeholders also sought a deeper understanding of how our investment programs are responding to technological changes in the electricity industry. Stakeholders noted that the traditional model of energy generation and transportation is changing very quickly, and that Ausgrid needs to ensure that its assets do not become stranded in the future.

Our stakeholders also raised a number of questions on drivers of peak demand in the future and our forecasting approach for spatial demand. Some of our stakeholders wanted a better understanding of how we forecast capex for uncertain spot loads such as data centres. Consumer representatives sought assurance that large new connections pay their fair share for imposing costs on the network. Finally, stakeholders wanted to understand how we integrated the NSW Government's energy efficiency targets into our forecasts.

While stakeholders understood that the majority of our program is to replace deteriorated assets, they wanted to understand the steps we take to consider demand management alternatives. Stakeholders were pleased to understand that we are examining ways to defer major replacement projects through demand management opportunities, and requested further information on project-based demand management deferral.

In previous sessions, stakeholders have also sought clarity on our approach to calculating the value of customer reliability.

We will be having a number of workshops with our stakeholders prior to our regulatory proposal, where we will discuss these issues in more detail. We are likely to make some modifications to our forecasting method in response to stakeholder feedback.

4. Operating expenditure forecasts

Operating expenditure (opex) refers to the maintenance and other non–capital costs we incur in delivering distribution services. It includes items such as labour costs and vegetation management, which are generally ongoing or recurrent in nature and stable over time (or growing in proportion to the size of our network). As part of the regulatory determination process, the AER determines the revenue we are allowed to recover from customers to recoup the costs of our opex.

Our method for forecasting opex is different to the method used for capex. We intend to use a "base-step-trend" approach to forecasting our opex for the 2019-24 regulatory period for most costs. This method aligns with the AER's preferred approach to forecasting most categories of opex, as outlined in the AER's Expenditure Forecast Assessment Guideline. For the remaining costs (such as debt raising costs and demand management), we intend to use a specific or bottom up forecasting approach, which better reflects the nature of these costs.

We will reconcile our forecast of total opex with a bottom up build of expenditure at the program level. We will also test the reasonableness of our opex forecast using a number of approaches to productivity analysis and benchmarking.

This chapter sets our opex categories, explains the changes we have made to our opex forecasting methodology as a result of the last regulatory determination and through our business transformation program, and describes the approach we will use to develop our opex forecast for the 2019-24 regulatory period.

4.1 Opex categories

Our forecast operating expenditure can be categorised into network maintenance, operating and business support, and other costs. The components of these broad categories of costs are described below.

Network maintenance

Our network maintenance opex comprises of the following cost categories that reflect the activities undertaken to maintain the electricity network:

Inspection: Work associated with undertaking planned appraisal and routine preventative maintenance tasks. This category includes the cost of condition monitoring tasks and vegetation management. These tasks are predominantly scheduled and carried out in a repetitive manner with a levelled workload. Inspections identify corrective maintenance needs.

Corrective Maintenance: All work associated with correcting defects that have not yet resulted in a "breakdown". Corrective maintenance occurs when an asset fail to meet the threshold criteria set to ensure it remains in working order until the next inspection maintenance cycle. These tasks are generally driven from the results of the inspection process.

Breakdown Maintenance: All work associated with equipment that has ceased to perform its intended function (excluding nature-induced breakdown). Depending on the asset requiring maintenance, this activity may need to be undertaken in emergency conditions, generally at short notice. Breakdown activities generally result in higher costs as work may need to be carried out in emergency conditions outside normal working hours.

Nature-Induced Breakdown Maintenance: All work associated with equipment that has ceased to perform its intended function due to factors beyond the equipment's design capability (for example, animals causing an equipment malfunction). These failures cannot be managed through normal maintenance activities. Like breakdown maintenance, these activities may be carried out under emergency conditions and may lead to higher costs.

Non-Direct Maintenance: All work associated with the testing of plant, tools and equipment that are used to deliver the different maintenance activities defined above. This cost also includes any training and development required to deliver maintenance activities.

Engineering Support: Work associated with local project planning, scheduling and coordination of maintenance works.

Operating and business support

This operating expenditure group comprises the costs required to support the operation of Ausgrid's network and the costs that would typically exist in any business. Operation and business support consists of the following cost categories:

Information, Communication and Technology: Costs relating to the operation and maintenance of various IT technologies and telecommunication system required for the effective operation of Ausgrid's infrastructure and day-to-day operations.

Property Management: Costs of various activities inherent in the ownership of properties (land and building) including the costs of complying with various legal obligations pertaining to this ownership such as land registration, land tax payments and council rates.

Network Operations: Costs pertaining to activities undertaken for customer operations, network control and engineering, planning and connection. These include:

- Customer operations – these costs include facilitating new connections, responding to complaints and general enquiries concerning the distribution network, installation inspection and emergency response to installation and network safety issues.
- Network control – cost of 24 hour / 7 days a week monitoring and control of Ausgrid's infrastructure. It also includes emergency and incident management.
- Engineering, planning and connections – costs of centralised engineering and planning activities associated with preparing asset engineering and investment standards, maintenance analysis, engineering investigations, equipment ratings, technical regulatory reports and planning associated with large customer connections.

Training and Development: Costs relating to centralised coordination and delivery of the technical, regulatory and professional development needs for Ausgrid's employees and compulsory training related to network access for contractors who work on the network.

Finance Costs: Costs relating to:

- Corporate accounting and reporting.
- Budgeting, forecasting, commercial services, investment analysis and business support.
- Treasury, taxation and cash management.
- Regulatory reporting and fixed asset management and reporting.

Other Operations and Business Support Costs: These relate to:

- Contact centre and data operations.
- Fleet and logistics management.
- Insurance and self-insurance.
- Human resources management.
- Workers compensation, occupational health, wellbeing and safety.
- Regulation.
- Management including the Board of Directors, Chief Executive Officer and Executive Leadership Team.

Other costs

These are operating expenditures relating to demand management and debt raising costs.

4.2 Business transformation

Our expenditure forecasts for the 2014-19 regulatory determination were prepared in accordance with our Expenditure Forecasting Methodology of November 2013.[2] The AER raised concerns with our approach to forecasting operating expenditure[3] and our opex forecast was reduced significantly. The reduction was primarily a result of the AER's application of its benchmarking methodology to set our base level of opex, rather than using actual costs.

At the same time, energy affordability and energy security have been key issues for our stakeholders. Stakeholders expected us to respond to the AER's determination and provide better value and we accepted that we have to continue to provide a highly reliable energy supply but at a lower price. We are committed to becoming more efficient and to delivering services to our customers that are safe, reliable and represent good value for money.

The AER's last regulatory determination set an efficient level of opex for Ausgrid. We have subsequently examined our cost structures in granular detail to identify sustainable cost savings. For example, we have made significant savings in our maintenance programs by examining potential efficiencies in our inspection cycles and practices.

Our stakeholders are supportive of our transformation program and expect us to work to improve affordability. However, they also understand that sustainable costs and service outcomes are in the long-term interests of customers and they consider that we should make investments where these lead to long-term benefits for customers (e.g. in information technology). By maintaining costs at a sustainable level, we will avoid the boom / bust cycle of the past, which led to price volatility for customers.

4.3 Forecasting methodology for opex

Under the base-step-trend method we will select a base year of opex that we consider is representative of efficient costs. The base year is adjusted for one-off events (if any) before proposed step changes are added (to reflect changes in costs relating to a change in regulatory obligations or an opex/capex trade-off). The base year is rolled forward over the 2019-24 regulatory period, trending the costs to account for network growth, real input cost changes and expected productivity gains or losses.

This method ensures that the proposed total forecast opex reasonably reflects a realistic expectation of the cost inputs and demand forecast for the next regulatory period.

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[2] For opex we adopted a "fit for purpose" approach to forecasting expenditure and, rather than using total opex in the base year, we forecast specific categories of opex using different methods. In general, we forecast opex using variants of the base-step-trend approach. However, more detailed bottom up forecasts were developed for components of maintenance, demand management, Information Technology, insurance and property, to take into account changes in workload or drivers. These forecasts then superseded the underlying base year forecasts for those activities.

[3] The AER found that our opex forecasting method differed from its guideline forecasting approach in that it disaggregated total opex into cost categories and applied different forecasting methods to different cost categories. The AER considers that it is best to use consistent forecasting methods for all cost categories of opex. This is because the AER considers that hybrid forecasting methods (ie combining revealed cost and category specific methods) can produce biased opex forecasts. Using a category specific forecasting method for some opex categories may produce better forecasts of expenditure for those categories, but this may not produce a better forecast of total opex. For this reason the AER did not use category specific forecasting methods to separately forecast any of our opex categories in its substitute total opex forecast (except debt raising costs). The AER formed its substitute forecast total opex using its guideline forecasting approach with all opex categories included in the base level of opex.

Efficient base year

We propose to use our estimated operating expenditure for 2017-18 as our base year opex. The AER's last regulatory determination set a target level of opex for Ausgrid and our opex for 2017-18 will include the effect of the efficiency initiatives implemented since that determination was made[4] as well as the impact of our change in ownership. Whilst our commitment to drive business transformation commenced with the submission of our 2014-19 regulatory proposal, the change in our ownership has provided a further catalyst for reform and driven us to examine our operations to seek even further efficiencies.

Adjustment for non-recurrent costs

We will adjust the base year for any non-recurrent (or one-off) costs (if any). Non-recurrent costs may arise from one-off events such as abnormal weather conditions or organisational changes. In addition, we note that the AER has previously viewed cost changes due to service reclassification as part of the consideration of base opex (i.e. they are treated as an adjustment to the base level of opex).

Adding or subtracting step changes

We will consider whether there are any expected step changes to our operating expenditure over the 2019-24 regulatory period. Step changes are essentially factors that trigger a change in costs from the current amount required to provide standard control services. Where a step change is identified, base year opex is adjusted to account for this change (which could be either positive or negative). In general step changes are allowed by the AER for changes in costs associated with new (or revised) regulatory obligations and capex/opex trade-offs (i.e. where a change in capex leads to an offsetting change in opex or vice versa).

Trending the base year

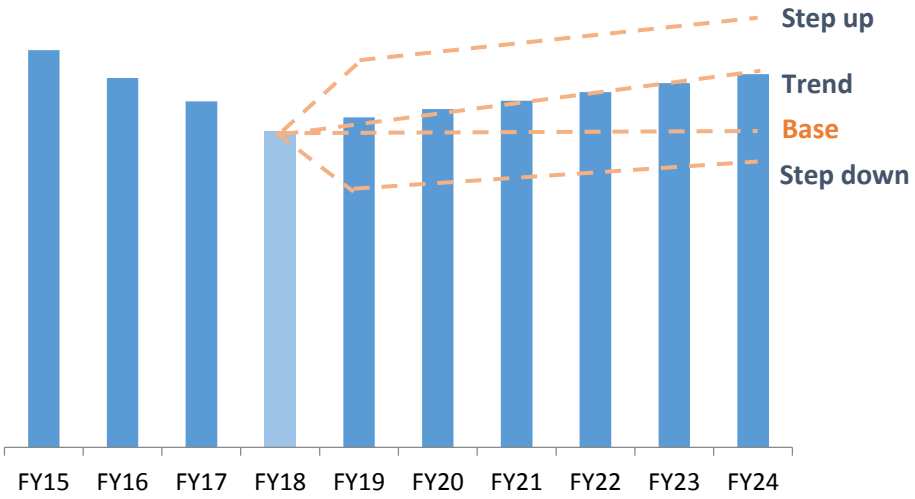
We will trend the base year forward to account for:

- *Output growth* – Expected changes in customer numbers, energy throughput, peak demand, capacity and other relevant factors may mean that changes in our activity levels are required.
- *Real cost escalation* – We will apply forecast real cost escalation to labour, materials, contracted services and other cost types that make up our opex. This is to reflect the expected future price of cost inputs.
- *Productivity gains* – Improvements in our productivity are expected over time, e.g. due to developments in technology or the skillset of our workforce. We will assess the potential for productivity gains over and above those achieved by the broader economy and reflected in the rate of inflation.

[4] We note the outcome of the recent judicial review process and that the AER will remake its opex decision for Ausgrid for the 2014-19 period in accordance with the Australian Competition Tribunal's decision.

Figure 7 below shows our proposed base-step-trend approach schematically.

Figure 7 – Ausgrid's proposed base-step-trend approach to forecasting opex



Methods for forecasting other operating costs

While we intend to use the base-step-trend approach for most operating expenditure costs, there are some exceptions where alternative approaches will be used. We will forecast other operating costs using alternative methods where appropriate.

Forecast of debt raising costs: Our total forecast opex also includes an amount for debt raising costs. Ausgrid intends to adopt the method that the AER uses to derive this cost. That is, debt raising cost will be calculated by applying a benchmark debt raising unit rate to the debt portion of our regulated asset base.

"Bottom up" method: The bottom up method essentially derives the forecast opex by taking into account all the inputs and factors relevant to the activities being performed (e.g., number of tasks, the cost types required to perform each task such as labour and materials and the price of these cost inputs). Demand management costs are forecast on a case-by-case basis using a bottom up approach, after assessing the net present value of each project, in a similar way to the forecasting approach used for our capital program.

Table 2 summarises our opex categories and identifies which forecasting method we intend to use for each category.

Table 2 – Opex categories and proposed approach to expenditure forecasting

			Base-step-trend	Bottom up or specific forecast
Opex	Network maintenance	Inspection	✔	
		Corrective	✔	
		Breakdown	✔	
		Nature induced breakdown	✔	
		Non-direct maintenance	✔	
		Engineering support	✔	
	Operation and business support	ICT	✔	
		Property management	✔	

			Base-step-trend	Bottom up or specific forecast
		Network operations	✔	
		Training and development	✔	
		Finance	✔	
		Other operations and business support	✔	
	Other	Demand management		✔
		Debt raising		✔

Testing our opex forecast

We will reconcile our forecast of total opex with a bottom up build of expenditure at the program level. We will also test the reasonableness of our opex forecast using a number of approaches to productivity analysis and benchmarking. In particular, we will use partial indicators and benchmarking at the category, activity and process levels to compare our performance with past performance and the performance of other distribution network businesses. This will help us to understand our relative efficiency compared to other businesses and target areas for further review.

Ausgrid welcomes the opportunity to submit its Expenditure Forecasting Methodology to the AER. We consider that the Methodology serves an important role in the determination process for Ausgrid and its stakeholders, as it is intended to be the starting point for early engagement on these integral elements of our revenue requirement. We look forward to discussions with the AER and other stakeholders on our approach to forecasting expenditure and the 2019-24 distribution determination more generally.